

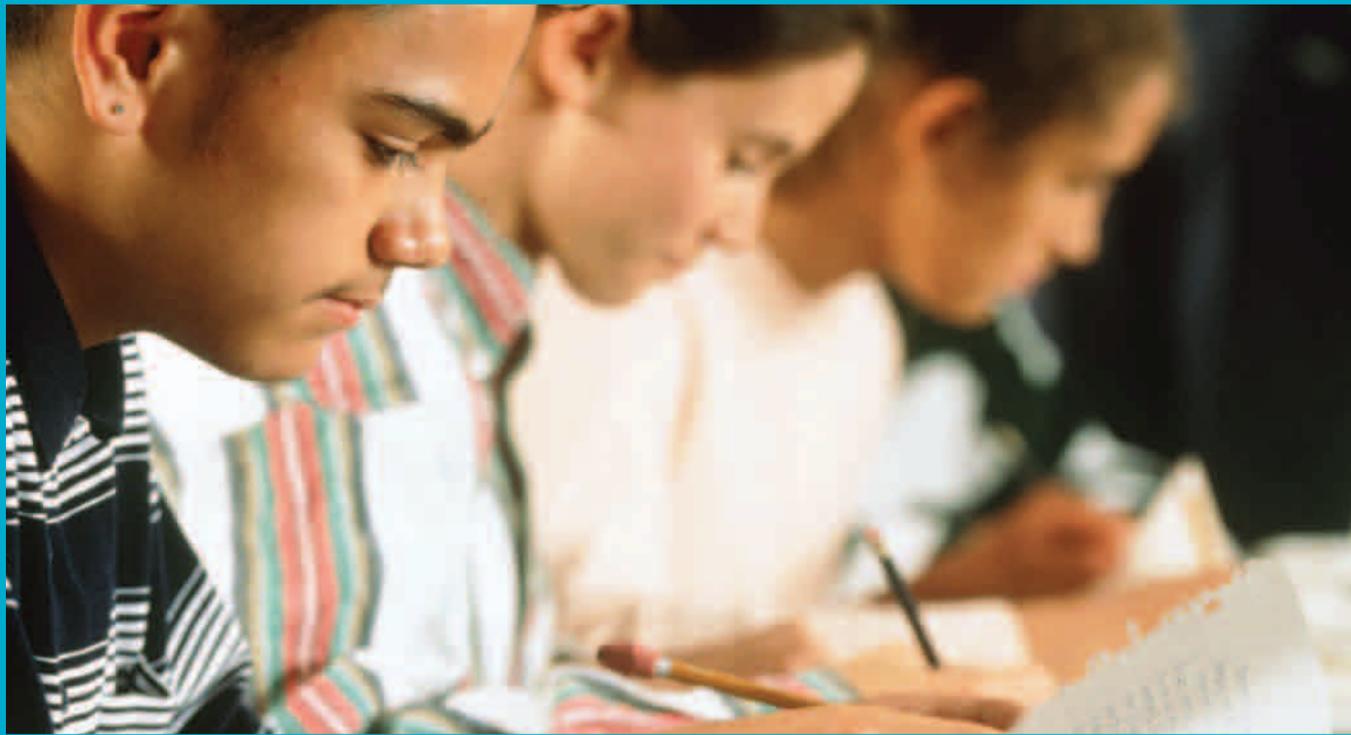
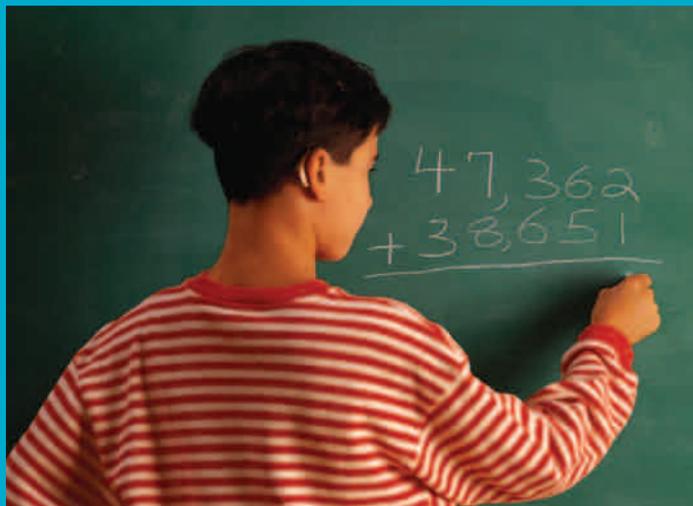
GRADE

7



STUDY GUIDE

Texas Assessment of Knowledge and Skills



**A Student and Family Guide to Grade 7
Reading • Mathematics • Writing**



TAKS STUDY GUIDE

Texas Assessment of Knowledge and Skills

Grade 7

Reading, Mathematics, and Writing

A Student and Family Guide

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Dear Student and Parent:

The Texas Assessment of Knowledge and Skills (TAKS) is a comprehensive testing program for public school students in grades 3–11. TAKS replaces the Texas Assessment of Academic Skills (TAAS) and is designed to measure to what extent a student has learned, understood, and is able to apply the important concepts and skills expected at each tested grade level. In addition, the test can provide valuable feedback to students, parents, and schools about student progress from grade to grade.

Students are tested in mathematics in grades 3–11; reading in grades 3–9; writing in grades 4 and 7; English language arts in grades 10 and 11; science in grades 5, 10, and 11; and social studies in grades 8, 10, and 11. Every TAKS test is directly linked to the Texas Essential Knowledge and Skills (TEKS) curriculum. The TEKS is the state-mandated curriculum for Texas public school students. Essential knowledge and skills taught at each grade build upon the material learned in previous grades. By developing the academic skills specified in the TEKS, students can build a strong foundation for future success.

The Texas Education Agency has developed this study guide to help students strengthen the TEKS-based skills that are taught in class and tested on TAKS. The guide is designed for students to use on their own or for students and families to work through together. Concepts are presented in a variety of ways that will help students review the information and skills they need to be successful on the TAKS. Every guide includes explanations, practice questions, detailed answer keys, and student activities. At the end of this book is an evaluation form for you to complete and mail back when you have finished the guide. Your comments will help us improve future versions of this guide.

There are a number of resources available for students and families who would like more information about the TAKS testing program. Information booklets are available for every TAKS subject and grade. Brochures are also available that explain the Student Success Initiative promotion requirements and the new graduation requirements for eleventh-grade students. To obtain copies of these resources or to learn more about the testing program, please contact your school or visit the Texas Education Agency website at www.tea.state.tx.us.

Texas is proud of the progress our students have made as they strive to reach their academic goals. We hope the study guides will help foster student learning, growth, and success in all of the TAKS subject areas.

Sincerely,



Ann Smisko
Associate Commissioner
Curriculum, Assessment, and Technology
Texas Education Agency

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READING

INTRODUCTION

What Is This Book?

This is a study guide to help you strengthen the skills tested on the seventh-grade TAKS test. The guide has three sections—reading, mathematics, and writing. This is the reading section.



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How Is the Reading Section Organized?

The reading section has four parts.

- Part One: “Skills and Strategies” explains the skills and strategies tested on the seventh-grade TAKS test while guiding you through some practice questions.
- Part Two: “Guided Practice” leads you through sample reading selections with practice questions that will give you a chance to practice the skills and strategies you learned in the first part of this guide.
- Part Three: “Independent Practice” provides sample reading selections and questions like those on the TAKS test. These selections and questions give you a chance to see how well you understand the skills and strategies tested on TAKS.
- Part Four: “Answer Key” gives you the answers to the practice questions in this guide and explains each of the answer choices.

What Is Tested on TAKS?

Careful readers use many different skills to get the most out of what they read. On TAKS, these reading skills and strategies are grouped under four objectives, or goals for learning. You show how well you understand an objective by answering questions related to some of the skills grouped under that objective. The reading selections and questions in this guide provide help and practice with all four reading objectives.

What Does a TAKS Reading Test Look Like?

The reading section of the seventh-grade TAKS test will include several reading selections. These might be short stories, newspaper or magazine articles, or informational essays. After reading a selection, you will be asked to answer some multiple-choice questions about the passage.

Note to Students

As you work through the sections of this study guide, practice your writing skills by writing your answers in the booklet. In the “Skills and Strategies” section, fill in the “Try It” boxes with your best answers. In the “Guided Practice” section, write your answers to the questions in the margins of the reading selections. Practicing your writing skills now will help you understand what you are reading and help you develop a valuable life skill.

Steps to Success

Student's Name

Directions: When you finish working through the information for each of the sections of the study guide, put a check mark next to that section on the chart.

READING		
1	<p style="text-align: center;">Getting Started</p> <ul style="list-style-type: none"> ● Read “What a Careful Reader Does” on page 11. ● Now read “Mayday!” on pages 12–14. 	✓
2	<p style="text-align: center;">Help with Skills</p> <ul style="list-style-type: none"> ● Read “Help with Skills” on pages 15–60. You should review all the skills and strategies presented there. 	✓
3	<p style="text-align: center;">“Mayday!” Again</p> <ul style="list-style-type: none"> ● Read “Mayday!” again on pages 63–66. Answer the questions in the margins of the story as you read. ● Read “Practice with Reading Skills” on pages 67–72. 	✓
4	<p style="text-align: center;">“The Island Where Crab Is King”</p> <ul style="list-style-type: none"> ● Read “The Island Where Crab Is King” on pages 73–76. Answer the questions in the margins of the story as you read. ● Answer the practice questions on pages 77–80. Check the answers in the answer key on pages 95–96. 	✓
5	<p style="text-align: center;">“Patches” and “Crash”</p> <ul style="list-style-type: none"> ● Read “Patches” and “Crash” on pages 83–87. ● Answer the practice questions on pages 88–91. Check the answers in the answer key on pages 97–98. 	✓

SKILLS AND STRATEGIES

- What a Careful Reader Does
- “Mayday!”
- Help with Skills

The purpose of pages 11–60 is to provide practice with the reading skills and strategies tested on the seventh-grade TAKS reading test. Read through each part and practice with the examples.

Throughout the skill and strategy explanations in this section, you will find “Try It” boxes with a number of blank lines following the questions. Practice your writing skills by writing your answers to these questions on the blank lines provided.

This section is not meant to be read all at once. You will benefit from working in short sessions that take place every day. If at any time you feel frustrated, take a break, ask for help, and try again later.

What a Careful Reader Does

BEFORE reading, a careful reader sets a purpose for reading. The reader might ask

Why am I reading this selection?

Am I reading for entertainment or for information?

What does the selection seem to be about?

Is it about something or someone I already know?

Is it about something new I am learning?

Is it about something I want to learn?

What kind of reading will I do?

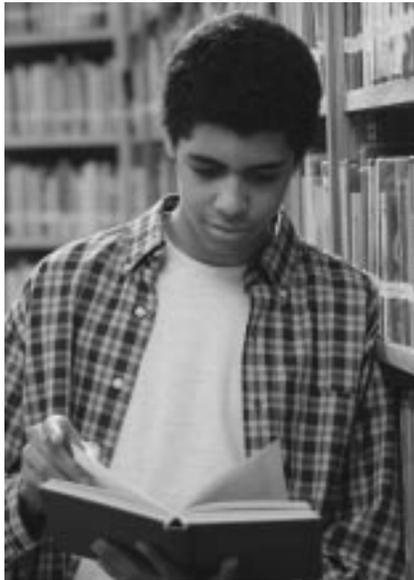
Will I read about characters in a story?

Will I read about how to do something?

Will I read to learn interesting facts?



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WHILE reading, a careful reader asks

Do I understand what I'm reading?

Do I need to slow down?

Can I figure out any words I don't know?

Do I need to look for clues?

Do I need to read some parts again?

How can I connect with what I'm reading?

Is it something I already know?

Is it something new I am learning?

Is it something I want to know more about?

AFTER reading, a careful reader asks

What do I remember about the selection?

Can I name the most important ideas in it?

Can I tell someone what the story was about?

Can I think of other ways to show that I understand it?

What do I think about the selection?

Did it add to something I already knew?

Did it tell me something new?

Did it make me want to learn more?



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“Mayday!”

Read the story below. It will be used throughout the skill and strategy explanations in the “Help with Skills” section that follows. The story is a sample of the type of selection you might find on a TAKS test. As you read, you may notice a number next to each paragraph. The paragraphs are numbered, just like they are on the TAKS test, to help you when answering questions.

Mayday!

- 1 Li-Minh keyed the microphone on the shortwave radio* again. “K5NRL, this is K5ZXY. Come in. Over.” She listened carefully for a reply but caught only static and occasional pieces of other radio conversations. The old radio set squealed and hissed as she checked the frequency setting again. “Alyssa should be at her radio right now,” Li-Minh thought, “unless she’s forgotten again.” She leaned back and sighed. “Maybe there’s some interference,” she muttered, peering out doubtfully through the window screen. The South Texas sky was clear, and it was even a little hot for late December. A gentle breeze rattled the wind chimes, and their tinkling notes blended with the rustling of the leaves on the old mulberry tree behind the house.
- 2 “Oh, well,” Li-Minh mumbled. “I guess she’s busy with her new friends.” Li-Minh and Alyssa were best friends, but Alyssa’s family had recently moved about 50 miles away. “It might as well be a million miles,” Li-Minh thought. It had been her father’s idea that the girls keep in touch by ham radio. Both he and Alyssa’s father had been talking on ham radios since they were kids. Li-Minh’s father had explained that a ham radio was a two-way communication system like the ones used by police and emergency crews. It had sounded so exciting in the beginning. Li-Minh remembered studying with Alyssa for their amateur radio licenses. She frowned as she thought of all the boring rules and emergency procedures that she had had to memorize.
- 3 At first talking on the radio had been fun, but now it seemed tiresome. It just wasn’t the same as talking to someone in person or even on the phone. Li-Minh knew Alyssa’s new number, but long-distance calls were expensive. Li-Minh looked at the bulky radio and sulked. Its big knobs and dials looked like something out of an old

Continued

* Shortwave radios, sometimes called ham radios, are two-way radios used by amateur radio operators to communicate. Sometimes used to call for help or give warnings, shortwave radios operate in a way that is similar to walkie-talkies, but they are able to communicate over long distances.

movie. Compared to the modern phone, the radio seemed like an obsolete piece of junk. The reception wasn't very clear, and she couldn't carry the radio from room to room like she could a cordless phone. In front of Li-Minh, the radio droned on in a steady hum of static. “Why would anyone want to talk on a ham radio, anyway?” she asked, reaching for the power switch.

4 “Mayday! Mayday! Anyone listening, please help!” A voice broke through the static.

5 Li-Minh recognized *Mayday* as the international radio distress call. “Someone must be in trouble!” she thought. She turned up the volume and listened closely. The radio whined and popped, but all Li-Minh could hear was the familiar, dull static. Then, just as she was about to give up, she thought she heard a voice again.

6 Li-Minh radioed nervously, “Mayday, this is K5ZXY. What is your emergency? Over.”

7 A muffled reply crackled over the speaker. The voice was faint and broken up, but Li-Minh thought she heard something about a car accident. “Mayday, if you've been in an accident, please state your location, and I will get help for you,” Li-Minh said. She twisted the dial as her father had shown her, hoping to fine-tune the signal.



8 “We're on Old Canyon Road about five miles north of town. We've slid off the shoulder. My dad and I are hurt. Please hurry!” a girl's voice replied anxiously.

9 “Old Canyon Road?” Li-Minh thought. She had never heard of it.

10 “Please hurry,” the voice crackled over the static again. “Our car is stuck in the snow, and we're freezing.”

11 “Stuck in the snow!” Li-Minh repeated in surprise. “Mayday, what town are you near? Over.” Straining to hear through the garbled static and squealing, Li-Minh thought she heard the name Farmington.

Continued

“Mayday!”

- 12 Just then her parents walked into the house with a bag of hamburgers from their favorite fast-food restaurant. Li-Minh quickly explained what had been happening.
- 13 “Keep trying to reach her on the radio,” her father said, grabbing the telephone. “I’ll call 911.”
- 14 Meanwhile Li-Minh’s mother turned the television to a national weather channel. “There’s a big snowstorm hitting parts of Colorado and New Mexico,” she said. She grabbed an atlas from the bookshelf and flipped quickly to the index. “There’s a Farmington, Colorado,” she said, flipping back to the map to check the town’s location, “but it’s not in the right area.” She turned back to the index. “There’s also a Farmington, New Mexico,” she called, “and it looks to be right in the middle of the storm.”
- 15 “Try Farmington, New Mexico,” Li-Minh’s father told the operator anxiously. Li-Minh went back to the radio and tried to reestablish contact, but her efforts were futile. She had lost the signal, and nothing she did to get it back was working. She could only listen in frustration to the fuzzy background noise. “Yes, about five miles north. That’s right,” she heard her father say. “They’ve reached Farmington, New Mexico,” he said, covering the phone’s mouthpiece. “It’s snowing heavily right now, and there is an Old Canyon Road nearby,” he added. “Yes,” he said, speaking into the phone again. “Please let us know.” He hung up and sighed. “They’re sending a rescue vehicle out to investigate.”
- 16 Li-Minh and her parents stood still for a minute, wondering what to do next. Li-Minh’s mother suddenly remembered the burgers. They tried to eat, but no one seemed very hungry. Li-Minh picked at her food and fidged nervously. She couldn’t get her mind off the voice on the radio. The girl had sounded so desperate.
- 17 Finally the phone rang. Li-Minh followed her father into the living room and watched him pick up the receiver. “That’s great news,” he said a few seconds later. “The rescue workers have found them, and everyone is safe!” he exclaimed. “They’re on their way to a hospital to be checked out as a precaution, and the girl’s injuries appear to be minor.”

You have finished Step 1 in your “Steps to Success.” Be sure to place a check mark in your chart on page 8.

Help with Skills

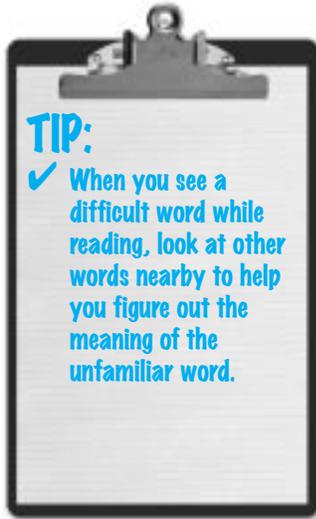
This section is not to be done all at once. Take a break when you need one. Remember that the information presented in “Help with Skills” will refer back to “Mayday!”

Objective 1: The student will demonstrate a basic understanding of culturally diverse written texts.

What is “a basic understanding”?

Having a basic understanding involves being able to do the following:

- Recognize words and their meanings while reading
- Learn the meanings of new words that you come across while reading
- Learn parts of words such as prefixes and suffixes
- Find the main idea of a paragraph, article, or story
- Find the supporting details in a paragraph, article, or story
- Paraphrase and summarize what you have read



Context Clues

Sometimes when you are reading, you may come across a word that you don't know. Often you can use the words you do know as clues to the meaning of the word you don't know. When you do this, you are using **context clues** to help you figure out the meaning of an unfamiliar word.

What are some examples of context clues?

Synonyms—A synonym is a word that means the same or almost the same as another word. *Appreciative* and *grateful* are synonyms, as are *persist* and *continue*.

Read the sentences below. Can you find a synonym for the word *enlisted*?

After graduating from high school, John enlisted in the army. His lifelong dream was to join the army, just like his dad.

The word *join* is a synonym for *enlist*.



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Antonyms—An antonym is a word that means the opposite of another word. *Compliment* and *insult* are antonyms, as are *unique* and *common*.

Read the sentences below. Can you find an antonym for the word *hinder*?

Joshua's habit of forgetting his homework might hinder his ability to pass his class. Keeping track of his assignments would help him avoid losing points.

The word *help* is an antonym for *hinder*.

Explanations, Definitions, and Descriptions—These explain, define, or describe the meaning of another word.

Read the sentence below. Can you find an explanation for the word *botanist*?

“My older sister is a botanist,” said Silvia. “She has always wanted to be a scientist who studies all kinds of plant life.”

The words “scientist who studies all kinds of plant life” explain the meaning of *botanist*.



Example—An example is an item that is similar to other items in a group. The Texas Rangers, New York Yankees, and Houston Astros are examples of baseball teams. Earth, Pluto, and Mars are examples of planets.

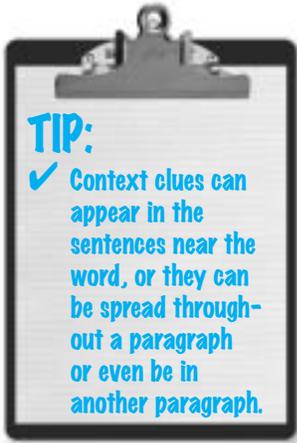
Read the sentence below. Can you find an example that helps you figure out the meaning of the word *azure*?

The little girl's eyes were azure. To her mother they were the same color as the sky on a clear day.

The words “same color as the sky on a clear day” are an example that helps you know that *azure* is a shade of blue.



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Try It

Look at these sentences from the story “Mayday!” Use what you know about context clues to help you figure out the meaning of the underlined word.

Li-Minh recognized Mayday as the international radio distress call. “Someone must be in trouble!” she thought.

1. What word helps you know what distress means?

2. What does the word *distress* mean?

1. The word *trouble* helps you understand what *distress* means. This word is a synonym for the word *distress*.
2. The word *distress* means “in trouble.”

Multiple-Meaning Words

Since some words have more than one meaning, you have to consider which meaning the author intends. Keep in mind the context in which you read a word. The context will tell you which meaning to choose.

What does the word *straining* mean in the sentence below?

Latisha was too busy straining water out of some pasta to answer the phone when it rang.

If you look up the word *strain* in the dictionary, you might see something like this:

strain /'strān/ v 1. to filter to remove 2. to squeeze tightly
3. to stretch beyond a proper limit 4. to put forth extreme effort

In this sentence, the words “water out” help you know that *straining* means “filtering to remove.”

TIP:

✓ Some words have more than one meaning. Clues can help you pick the right meaning.

Try It

Now look at the sentence below from paragraph 11 on page 13 of “Mayday!”

Straining to hear through the garbled static and squealing, Li-Minh thought she heard the name Farmington.

1. Look back at the dictionary entry for *strain*. What does the word *straining* mean in this sentence?

2. What clues help you know this?

1. The word *straining* in this sentence means “putting forth extreme effort.”
2. You know from the story that Li-Minh has just heard a distress call and has asked the person for her location. This knowledge, combined with the words “hear through the garbled static and squealing,” are clues that help you figure out the meaning of the word *straining*.



Prefixes and Suffixes

Sometimes you can find clues to help you understand the meaning of a new word by breaking the word into its parts. A **prefix** is a word part that can be added to the beginning of a word to make a new word.

Here are some prefixes that you might come across as you read:

pre- means “before”

dis- means “not, opposite of”

re- means “again”

Can you figure out the meaning of the underlined word in the sentence below? Use what you know about prefixes.

The crowd stared in disbelief as fireworks exploded in the night sky.

dis- (not, opposite of) + *belief* (the idea that something is real or true) = the idea that something is not real or true

A **suffix** is a word part that is added to the end of a word to change the word’s meaning. Here are some common suffixes that you might recognize as you read:

-ant means “something that performs the function of”

-ize means “to cause to be”

-some means “having the quality of”

Can you figure out the meaning of the underlined word in the sentence below from “Mayday!”? Use what you know about suffixes.

At first talking on the radio had been fun, but now it seemed tiresome.

tire (to exhaust or bore) + *-some* (having the quality of) = having the quality of being exhausting or boring

Try It

Can you figure out the meaning of the underlined word in the sentence below? Use what you know about prefixes and suffixes.

The nurse cleaned the cut with some disinfectant.

First break the word apart: *dis-* + *infect* + *-ant*

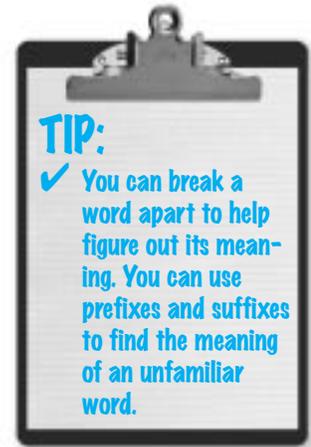
Now complete the following statements to figure out the word's meaning.

1. The prefix *dis-* means _____ .
2. The word *infect* means _____ .
3. The suffix *-ant* means _____ .

So the word *disinfectant* means _____ .

1. The prefix *dis-* means "not" or "the opposite of."
2. The word *infect* means "contaminate with a disease."
3. The suffix *-ant* means "something that performs the function of."

So the word *disinfectant* means "something that performs the function of protecting from disease." When you put this definition together with what you know about nurses, you can tell that the nurse was cleaning the cut with something to prevent infection.



Once you are familiar with these word parts, you can find the clues in a word by breaking it into its parts.



Denotative and Connotative Meanings

The **denotation** of a word is its dictionary definition.

The **connotation** of a word is the feeling connected with it, in addition to its dictionary meaning.

Words with the same denotation can have very different connotations—for example, *angry* and *irritated*. Both words have similar meanings. But *angry* has a stronger negative feeling connected with it than *irritated* does. Knowing word connotations can help you understand an author's message.

Do you think Li-Minh is *surprised* or *amazed* when the stranded car is found in New Mexico?

Surprised and *amazed* have similar meanings, but *amazed* is associated with a stronger feeling. Certainly Li-Minh must be *surprised* about the location of the stranded car, but she is probably *amazed* that the car is so far away.

Read this paragraph from “Mayday!”

Li-Minh and her parents stood still for a minute, wondering what to do next. Li-Minh's mother suddenly remembered the burgers. They tried to eat, but no one seemed very hungry. Li-Minh picked at her food and fidgeted nervously. She couldn't get her mind off the voice on the radio. The girl had sounded so desperate.

Why do you think the author uses the word *fidgeted* to describe Li-Minh's behavior?

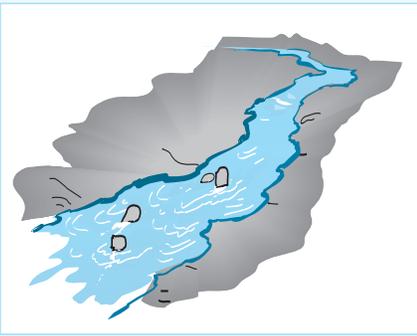
Think about what is happening at this point in the story. As Li-Minh and her parents wait to hear about the girl and her father, they try to eat but are not hungry. Li-Minh thinks of the desperate sound of the girl's voice. Li-Minh feels anxious. So the word *fidgeted* creates a vivid image of Li-Minh's behavior.

Figurative Language

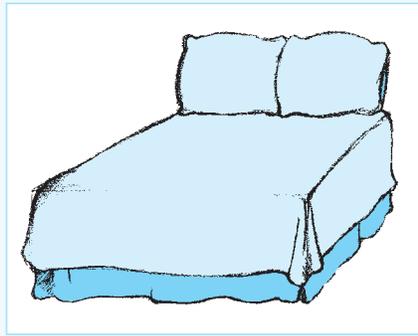
Authors use **figurative language** to help create vivid images in the minds of their readers. Figurative language helps you see ordinary things in an unusual way. When authors compare something common to something extraordinary, their use of words often goes beyond dictionary meanings.

Read the following sentences.

The stream was a ribbon of light.



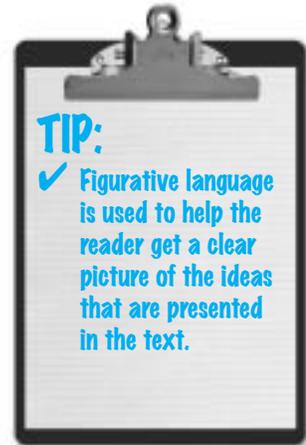
The bed was as soft as a cloud.



Notice how these sentences create vivid images in your mind. By using figurative language, the author gives the reader a clearer picture of the stream and the bed. As a result, you can almost feel the softness of the bed and see the light reflected in the stream.

Authors use figurative language to communicate everyday feelings. Instead of directly stating a particular feeling, a writer might suggest the feeling to create a certain mood.

You know that objects cannot see, think, move, or feel. But sometimes authors describe objects or situations as if they could behave like people. Authors use this type of figurative language to express a certain feeling or get a certain reaction from the reader.



Look at the description below. How does the author create a picture in your mind?

As the sky darkened into evening, the factory stood at attention. Suddenly, the factory's smokestacks began to sputter and belch loudly, spitting angry puffs of smoke. As the noise grew steadily louder, the smokestacks filled the evening sky with a blanket of thick dark-gray smoke. The factory seemed to laugh as it choked the city with its foul-smelling breath.



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You are probably asking yourself, “How can a factory stand at attention?”

Standing at attention is something a person, such as a soldier, does. When a person is at attention, he or she can be described as serious and watchful. By describing the factory in this way, the author is giving the factory human qualities.

Can you find other words or phrases from the passage that make the factory or the smokestacks seem human?

Sputter, belch, spitting, and *angry* are words that the author uses to create a human image of the factory.

What image is the author trying to create in the reader's mind?

The descriptions of the factory create an image of a place that is harsh and cruel. The author gives the factory and the smokestacks human qualities in order to paint this picture with words.

Main Idea, Supporting Details, and Summary

Main idea—The main idea of a story or paragraph answers the question “What is the story or paragraph mainly about?”

Sometimes the main idea is stated clearly in a paragraph, making it easy to find.

Now return to “Mayday!” and reread paragraph 3 on pages 12–13.

What is the main idea of paragraph 3?

The first sentence of this paragraph is the main idea: “At first talking on the radio had been fun, but now it seemed tiresome.”

How do you know that this is the main idea?

Some of the ideas in the paragraph that support this main idea are the statement that “the radio seemed like an obsolete piece of junk” and Li-Minh’s words at the end of the paragraph, “Why would anyone want to talk on a ham radio, anyway?”

Sometimes the author does not state the main idea directly in a story or paragraph. This means that you have to pay attention to the supporting details in a story or paragraph to figure out the main idea.

Go back and reread paragraph 1 of “Mayday!” on page 12. Find the main idea.

What is the main idea of paragraph 1?

Li-Minh adjusts her shortwave radio and wonders why she is unable to contact her friend Alyssa.

How do you know this is the main idea?

In the first part of the paragraph, Li-Minh listens carefully for a reply but hears only static. Later in the paragraph Li-Minh thinks Alyssa should be at her radio. This is another detail that helps the reader determine that Li-Minh is wondering why she is unable to contact Alyssa.



TIP:

✓ To find the main idea, imagine saying to a friend, “Well, basically, this story is about _____.”

Supporting Details—Supporting details explain the main ideas or make them clearer. Some details add depth and interest to a story by appealing to the senses and can bring a story to life for the reader. Details answer the questions *who*, *what*, *when*, *where*, *why*, and *how*.

Another way to think about supporting details is to imagine a bicycle. A bicycle has a frame, a seat, brakes, and two wheels. Think of this bicycle as the main idea.



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Now think of a few “extras” that make the bicycle more appealing—15 speeds, an adjustable seat, a shock absorber, and off-road tires. Think of these extras as supporting details. Just as extras can make a bicycle look and perform better, supporting details can make a story more interesting and fun to read.



Photo courtesy of Cannondale Corp.

TIP:

✓ Careful readers often stop to summarize what they have read.

Summary—A summary is a way to briefly restate the most important ideas and show how they are connected. When you write a summary, it is important to paraphrase, or restate, the author’s ideas in your own words. A good summary usually tells what the whole story is about but focuses only on the important events included in the story.

Read the following story. What is the main idea? What are the supporting details? How would you summarize the story?

Runaway Horse

“I know all about riding horses,” Jim stated confidently. On the first day of summer vacation, Jim and his cousin Gina were excited about riding horses at the ranch owned by Gina’s parents. As Jim put his foot in the stirrup, Sox took a small step, throwing Jim off balance.

Noticing Gina’s frown, Jim said, “Don’t worry. I know all about riding horses. Sox and I will be fine.”

They rode slowly through a wooded area and across a pasture. After reaching the far end of the pasture, Gina said, “Let’s go back. It’s hot out here!”

As they turned the horses toward the barn, Sox bolted. Jim barely hung on to the saddle horn. Sox galloped into the mesquite trees, knocking Jim to the ground. “Jim, are you O.K.?” Gina cried, hurrying to his side.

“I guess I don’t know as much about horses as I thought,” Jim mumbled, standing up and dusting the dirt off his pants.

“Try reining him in next time,” Gina said, laughing.

Main Idea of “Runaway Horse”

After Jim falls off his horse, he realizes he doesn’t know as much about horses as he thought he did.

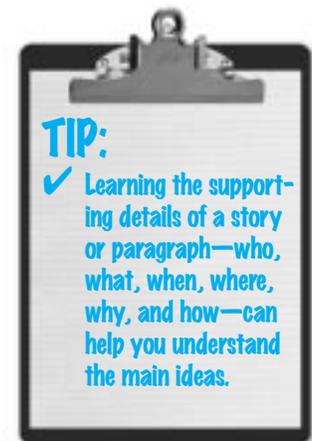
Supporting Details of “Runaway Horse”

Who is the story about?	Gina and Jim
What are the characters doing?	They are riding horses.
When does the story take place?	The story takes place on the first day of summer vacation.
Where does the story take place?	The story takes place at the ranch owned by Gina’s parents.
Why does the horse bolt into the woods?	Jim doesn’t rein him in.
How does the story end?	After Jim falls off the horse, he admits that he doesn’t know that much about horses.

Summary of “Runaway Horse”

Using the details above, you can summarize the story as follows:

Gina and Jim go horseback riding at a ranch. Jim acts as if he knows a lot about horses. When his horse bolts through the trees, Jim is knocked to the ground. After he falls, Jim admits he doesn’t know as much about horses as he claimed to.



Try It

Return to “Mayday!” on page 12–14. As a review of the story, answer the following questions about the supporting details.

1. Who is the story about? _____

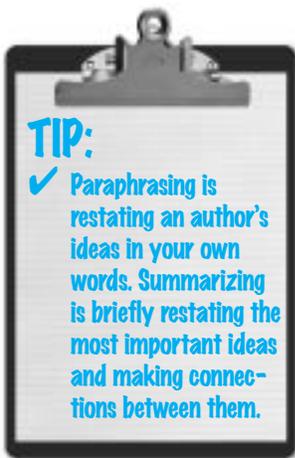
2. Where does the story take place? _____

3. Why does Li-Minh use the ham radio? _____

4. What happens as Li-Minh listens to the ham radio? _____

5. How do Li-Minh and her parents help the person in trouble?

1. The story is about Li-Minh and her parents.
2. The story takes place in Li-Minh’s South Texas home.
3. She is trying to talk to her best friend, who has moved away.
4. She gets a distress call from someone who has been in an accident and is stuck in the snow, but she doesn’t get the person’s exact location.
5. Li-Minh’s mother figures out where the distressed person is located by using the television and an atlas. Then Li-Minh’s father gives the information to rescue workers.



You can use the answers to the above questions as supporting details to write a summary for “Mayday!”:

Using her ham radio, Li-Minh tries unsuccessfully to reach her friend. Instead, she receives an emergency call from a girl who is stranded in the snow with her father. Li-Minh and her parents use the television and an atlas to locate the stranded family a state away. They contact rescue workers and later find out that the girl and her father are safe.

Important Note

Readers can get confused about main ideas, supporting details, and summaries, so here is a comparison of the three. The **main idea** is the most important idea in a paragraph or reading selection. It can be stated in one sentence. The answers to questions such as *who*, *what*, *when*, *where*, *why*, and *how* are **supporting details**. You create a **summary** when you take the main idea and the supporting details and put them together in your own words. It usually takes several sentences to write a good summary.

Objective 2: The student will apply knowledge of literary elements to understand culturally diverse written texts.**What are literary elements?**

Literary elements are the basic parts that an author uses to create a story. These parts include the characters, the setting, the plot, and the conflict in a story.

An understanding of literary elements includes being able to do the following:

- Analyze characters, including their traits, motivations, conflicts, and points of view
- Analyze characters' relationships
- Analyze changes that characters go through, both personally and in their relationships with others or the world around them
- Recognize plot and identify events or conflicts that affect the plot and problem resolution
- Identify a story's setting and its effect on the story's meaning
- Identify how authors use literary devices such as flashback, foreshadowing, and symbolism to shape the reader's understanding of characters, events, and meaning of the story.

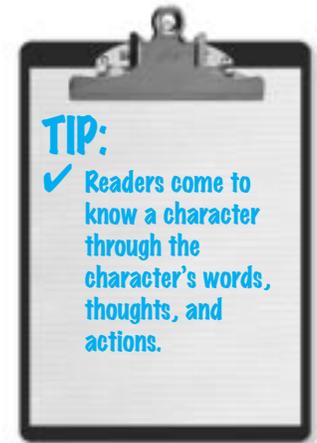
Analyzing Characters

Characters are the people or animals in stories. You can tell a lot about a character by asking these questions as you read:

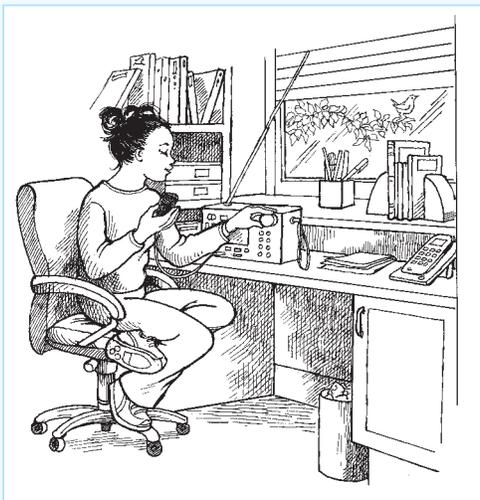
- How does the character feel?
- How do other characters feel about the character?
- What does the character do?
- What does the character say?
- What do other characters say about the character?
- How does the character change in the story?

When you analyze a character, you look for several kinds of clues in the story. An author often provides information about a character's traits, motivations, conflicts, points of view, relationships, and changes.

Traits—How would you describe one of your close friends? Your description would most likely tell about the characteristics that make your friend unique. Like your friend, characters in stories also have certain traits, or qualities, that set them apart from other characters. As a reader, you discover a character's traits as the story unfolds.

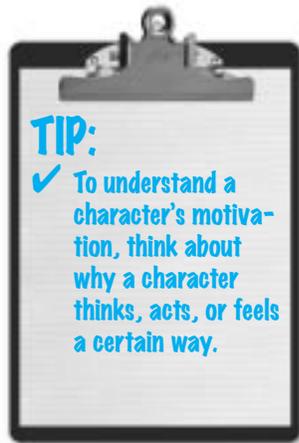


Go back to page 13 and reread paragraphs 5–7 from the story “Mayday!”



Based on the information in these paragraphs, what words could you use to describe Li-Minh?

You might say that she is skillful, concerned, or capable, for example. Information in these paragraphs shows how Li-Minh handles an emergency. She knows enough to recognize the distress call. Although she is nervous, she stays calm and levelheaded, and she uses what her father has taught her. She is persistent and tries to get help for the people in trouble.



Thinking about what a character says and does as you read will tell you a lot about that character. Trying to imagine how you would feel if you were that character may also help you identify character traits.

Motivation—What makes characters in a story behave the way they do? A character's motivation is what makes the character think, feel, or act in a particular way. When you know the reasons for a character's actions, thoughts, or feelings, you understand his or her motivation.

Think back to the story “Mayday!”

What motivated Li-Minh to learn how to use a ham radio?
Her best friend was moving away, and she wanted to keep in touch with her.

How do you know?

Paragraph 2 on page 12 states that “it had been her father's idea that the girls keep in touch by ham radio.” Later in the paragraph, you learn that Li-Minh thought using the ham radio in this way “sounded so exciting in the beginning.” So her motivation was that she wanted to keep in touch with her friend who moved away.

You can see that a character's motivation influences his or her actions. The actions, in turn, reveal the character's traits.

Conflict—A conflict is a struggle between two opposing forces. Sometimes conflict occurs between two or more characters, as in a disagreement between a teen and a parent. Conflict can also occur between a character and an outside force, as when a character must fight to survive a blizzard. Conflict may even occur within a character; for example, a character is torn between doing something that is against the rules and doing what is right.

Go back to page 13 and reread paragraphs 4–11 of “Mayday!”

What conflict does Li-Minh face in the story?

Li-Minh must determine where the emergency call is coming from in time to save the girl and her father.

In most stories, a character's conflict is resolved by the end of the story.

Point of View—A character's point of view is the way the character views the events or circumstances in which he or she is involved. Characters in a story often have different points of view about a situation or another character.

Go back to pages 12–13 and review paragraphs 1–3 of “Mayday!”

What is Li-Minh’s point of view toward her friendship with Alyssa? At the beginning of the story, Alyssa has forgotten to be “at her radio” when Li-Minh calls, so Li-Minh believes that her friendship with Alyssa is changing. From her point of view, the change is not a good one. Li-Minh thinks she is losing a close friend because Alyssa is too “busy with her new friends.” Li-Minh doesn’t want her friendship with Alyssa to change.

As you read, be aware of each character’s point of view toward important issues in the story. If you notice that characters have differing points of view about a situation or another character, you may have discovered the roots of the story’s conflict!

Relationships—Another way to understand a character is to look at the character’s relationships with other characters in the story. Does the character get along with others? Is he or she in conflict with another character? Does the character have a best friend?

Go back to page 14 and reread paragraphs 13–14 from “Mayday!”

What do these paragraphs reveal about Li-Minh’s relationship with her parents?

Li-Minh’s father knows how to use the ham radio, but he doesn’t take over. This shows that he trusts her and treats her with respect. Li-Minh’s mother immediately starts helping her and her father solve the problem. This shows that the family can work as a team.

Changes—Just as we are changed by our experiences in real life, characters undergo changes in a story. A character often changes as different events unfold in the story. These changes can affect the outcome of the story.

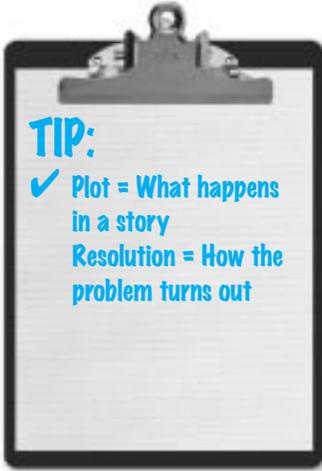
Go back to pages 12–13 and review paragraphs 3–7 of “Mayday!”

How does Li-Minh change as the events in these paragraphs unfold?

At first Li-Minh is upset and sulking because she has been unable to reach her friend Alyssa on the ham radio. She is able to stop feeling sorry for herself when she is faced with a bigger problem than her own.



Help with Skills: Objective 2



Story Plot and Problem Resolution

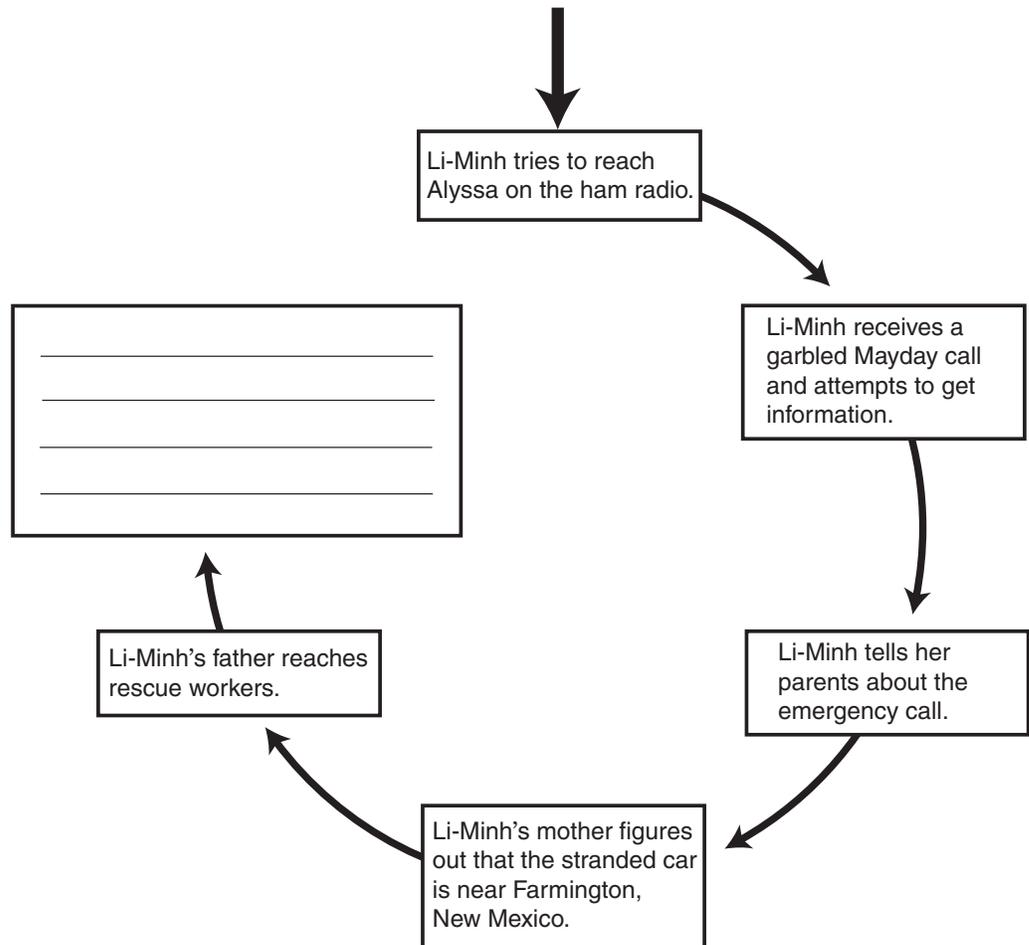
Plot is the sequence of events that make up a story. The story is usually centered around a problem, or conflict.

As one or more characters try to solve the problem, events build to a **climax**, or turning point. Then comes the **resolution**, in which the reader learns how the problem turns out.

To figure out the resolution to the problem, ask yourself, “How does the main character solve his or her problem?”

Try It

Look at the sequence of events in “Mayday!” How is the problem resolved? Put your answer on the blank lines provided.



The rescue workers reach the stranded car in time.

Setting and Its Importance

Setting is the time and place in which the events of a story happen. The setting can be either real or imaginary and can take place in the past, present, or future. In some stories the author is very specific about when and where the events take place. In others the author may tell you either the time or the place that the events occur, but not both.

It was one minute before the tardy bell, and Sofia couldn't find her homework.

This sentence tells when something happens.

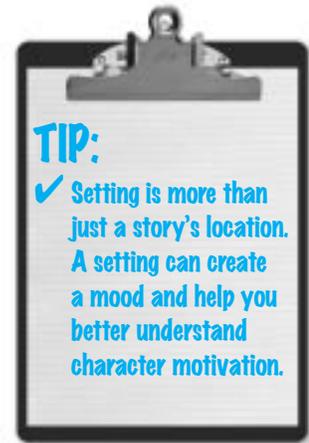
A group of students was gathering to listen to the band play in the auditorium.

This sentence tells where something happens.

Trisha and her friends went to a movie on Saturday at the new mall.

This sentence tells when and where something happens.

Setting can be an important part of the plot. It can also help you understand why characters act as they do. Often setting creates a particular mood or atmosphere in a story. When you read, look for details about the setting.



TIP:

✓ Setting is more than just a story's location. A setting can create a mood and help you better understand character motivation.

Try It

Reread paragraph 1 on page 12 of the story “Mayday!” Then answer these questions about setting.

1. Where does the story take place?

2. When does the story take place?

3. Why are time and place important in the story?

1. The story takes place in South Texas.

2. The story takes place in December.

3. Knowing the time and place of the story helps you understand why Li-Minh knows that the stranded girl and the girl’s father are far away. She knows this because there is no snow near where she lives. Paragraph 1 says that “it was even a little hot for late December.”

Literary Devices

Writers bring their stories to life by using special tools called **literary devices**. These tools include flashback, foreshadowing, and symbolism. Literary devices help you understand the characters, events, and meaning of a story.

Flashback—Have you ever watched a movie in which the image on the screen becomes wavy or hazy and the action shifts from the present to the past? This is a technique often used to indicate a flashback. A flashback interrupts the sequence of events in a story to show something that happened before the story’s beginning. The flashback helps the reader understand a character’s present situation.

Not all stories are told in chronological order. As you read, pay attention to when each event in a story actually takes place.



Can you find a flashback in this excerpt from a story?

“Go Bears! Go Bears!” yelled Phillip, waving his right arm. Even though his left arm was in a cast and he was sitting on the bench, Phillip was still focused and excited about the game. The Bears were behind; the score was 41–40. With five seconds left, Phillip’s best friend James dribbled down the court. Suddenly a flood of memories overwhelmed Phillip.

It was the first game of the season. As Phillip drove through the lane to score the winning basket, he was fouled. He ended up underneath the two boys who had tried to block his shot. Phillip tried to hold back his tears when he saw the bulging broken bone of his dangling arm. His season was finished.

The cheers of the crowd now brought Phillip back to reality. James had just put up the winning shot. Phillip would have given anything to be playing tonight, but he was glad that James had a chance to shine.

At what point in the story excerpt above does the forward movement in time stop?

The flashback begins when “a flood of memories” overwhelms Phillip. The author wants the reader to know how Phillip broke his arm so that it is clear why he is not playing in the basketball game and why he is so excited about his team’s victory.



Foreshadowing—Another literary device is foreshadowing. In foreshadowing an author gives hints about what might happen later in a story. These clues can be in the form of events in the story. Clues can also come from information from the narrator or a character. Foreshadowing is often used to build suspense or tension in a story.

Read the selection below. Can you find any foreshadowing?

Luis turned his old car onto the gravel road. Dust followed him as he drove across the desert toward the mountains. He usually loved driving down this road at sunset on his way home. But today was different. The road seemed more desolate and even bumpier than usual. He remembered the time he had had a blowout and the car had spun uncontrollably as it crossed the road. He wiped the beads of perspiration from his forehead and gripped the steering wheel with both hands. Having a blowout had been frightening. He hoped it wouldn't happen again.

What part of this excerpt tells you that something bad may happen to Luis?

The lonely road feels bumpier than usual. He remembers when his car spun out of control before and hopes that this won't happen again.

As you read, look for the use of foreshadowing and think about what future event each clue might be suggesting.

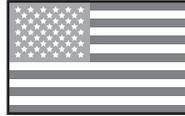
Symbolism—Another device authors use is symbolism. A symbol is something that stands for, or represents, something else. For example, the U.S. flag is a symbol of freedom to Americans. What do these symbols represent to you: a lion? a red heart? an owl? To many people a lion symbolizes courage; a heart, love; an owl, wisdom.



Love



Peace



U.S.A.

Sometimes an author will use a symbol in a story to create a certain feeling in the reader or to make an important point. Authors may use symbols to tell the reader something significant about a character or situation in a story. In a story, a symbol can be a person, an object, or even a situation.

Read these paragraphs.

Lily felt so lonely that she could hardly face the day. As she dragged herself out of bed, she thought of home. Only two more days! Then she would be able to see her mother again. She missed her mother's smile and her hugs, but she especially missed working in the garden with her. They had spent many happy hours there that summer, weeding and planting but mostly chatting.

Lily quickly dressed and went downstairs to greet her aunt and her cousins María and Juan. A huge smile broke across her face when she saw the vase of daisies on the table. She didn't feel quite as lonely as she read the card that was attached to the vase. It read, "Miss you. Mom."

In the excerpt above, the symbol is an object—the vase of flowers.

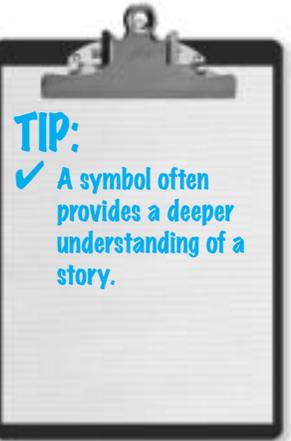
What does it stand for?

It stands for Lily's home.

What feeling does it create?

It creates a feeling of happiness.

Symbols can often give you clues to the theme of a story. As you read, look for any symbols the author may be using to help you understand the selection's theme.



Important Note

Objectives 3 and 4 both require students to analyze culturally diverse written texts.

What does “analyzing a text” mean?

Analyzing a text means recognizing the way an author organizes information in order to understand the author’s purpose. By analyzing a text, careful readers move beyond reading the words on the page and begin to think critically about the information presented.

Objective 3: The student will use a variety of strategies to analyze culturally diverse written texts.**What are “strategies,” and how do they help students analyze a text?**

Strategies help readers think about what they are reading by providing a structure, or framework, for different ways of looking at what they are reading. Reading strategies allow readers to understand the different ways authors present ideas and how these ideas are connected throughout a text.

Reading strategies include being able to do the following:

- Locate and recall information using structural clues such as sequential order and cause and effect
- Identify similarities and differences among texts
- Use graphic organizers, such as outlines, to analyze text
- Identify an author’s purpose for writing (to inform, to persuade, to express an idea, to entertain)
- Examine the ways an author’s point of view, or perspective, affects his or her writing

Using a Text's Structure to Locate and Recall Information

Authors put the events of a story in a certain order so that they will make sense. When you read, look for patterns in the way events have been organized and how they relate to one another. You can use patterns of organization, such as cause and effect or chronology, to help you locate information in a selection.

Cause and effect—A cause makes something happen. An effect is what happens as a result. Authors often write stories as a series of causes and effects. Knowing how to recognize these causes and effects helps you better understand an author's message.

As you read stories and articles, you will notice that authors don't always state every cause-and-effect relationship. Instead, you must use clues from a selection to figure out these relationships.

Look closely at the situation below. Can you determine the cause and the effect?

You are on your way to a picnic. When you arrive, it begins to rain, so the picnic is canceled.

Cause: It begins to rain.

Effect: The picnic is canceled.



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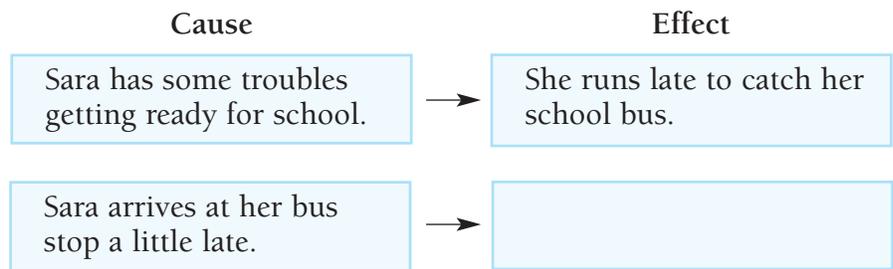


Try It

Read the story below. Can you find the cause-and-effect relationships?

Sara was not having a great Tuesday morning. She woke up at 7:00, ten minutes later than usual. She went to brush her teeth but found that she was out of toothpaste. When it was time to put on her shoes, she could find only one. She reached into the refrigerator to get her lunch, but it wasn't in its usual place. Then she remembered that she hadn't made her sandwich the night before. At 7:45 she hurried out the front door and sprinted to the bus stop. Just as she reached the bus stop, she saw the back of her school bus in the distance as it made its way to school. "Maybe I should have stayed in bed this morning," Sara mumbled to herself, turning to trudge back to the house to tell her mother that she needed a ride to school.

What is the effect of Sara arriving at her bus stop a little late? Write your answer in the blank box.



Sara misses her school bus. She'll have to get a ride from her mother.

Chronological Order—Another way an author can organize events is in **chronological**, or time, order. In the story above, the events are told in the order in which they occur in time. Many authors choose to write stories beginning with the first event that occurs and ending with the last event. Authors often use clue words to help you see the order of events clearly.

Reread paragraphs 4–6 of “Mayday!” on page 13. Pay careful attention to the order of events.

What happens first in this part of the story?
Li-Minh hears a call for help on the ham radio.

What happens after Li-Minh turns up the volume on the radio?
Just as she is about to give up, Li-Minh thinks she can hear the voice again.

What happens next?
Li-Minh radios back, trying to get in touch with the person who sent the emergency call.

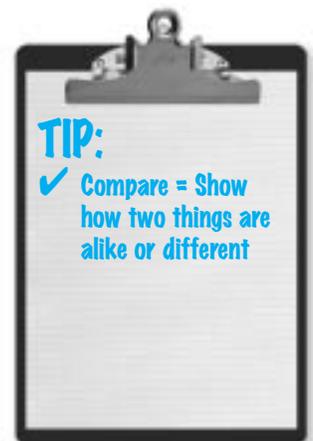
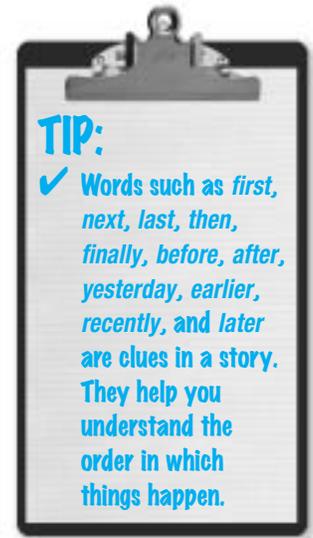
Comparing Two Selections

Have you ever watched a movie or a television show and thought, “Hey, that was kind of like another show I saw”? If you have, then you already know how to compare two stories.

Although not exactly alike, two stories or pieces of writing sometimes can have a lot in common. Here are some ways in which two pieces of writing might be similar and different:

- **Main idea:** Two stories might be about different characters in different settings but still have the importance of trust or some other theme as the main idea.
- **Subject:** You might read a fictional story about a windsurfer, a nonfiction essay about a real windsurfer, an article about the history of windsurfing, or a poem about the thrill of windsurfing. Each of these has the same subject or topic (windsurfing), but each is presented in a different way.
- **Setting:** Stories might be set in the same place and at the same time but be about different characters.
- **Characters:** You might read two stories about the same characters. Or you might read the same story told by two different characters.
- **Plot:** Two stories might have the same plot. Even if the setting and the characters are different, the action is similar in each story.
- **Conflict:** Two stories might have the same basic conflict, such as people struggling against nature.
- **Organization:** Two authors might organize their writing in similar ways, such as in time order or cause and effect.

At times the seventh-grade TAKS test will have two stories that are meant to be read together. These are called paired selections. When reading paired selections, you must be able to recognize how the two stories are similar and different.



Compare the two stories that follow. First take a look at this story:

First Day

Cheyenne took her seat and stared at her desk. Her face and neck became uncomfortably hot as she tried to look as if she belonged. Pairs of eyes were glued to her, watching her every move. Had they never seen anyone from Texas before? Cheyenne took a deep breath and glanced at the clock—58 minutes until class would end. Then she would have five minutes until the next class, and the staring would start all over again.

Cheyenne regretted all the times she had stared when someone new had entered her class, especially Emil. She remembered how lost and confused he had looked. Cheyenne wished she could turn back the clock and do things differently. Then maybe she wouldn't feel this way. Would she ever get used to Iowa?

Now look at this story:

Moving to Minnesota

Sophie plopped down in her seat and shoved her backpack under her chair. She glanced at the clock and drummed her fingers on her desk. She felt as though this was the beginning of an adventure, and she couldn't wait to get started. As she looked up at the clock a second time, she noticed everyone staring at her. Maybe they had never met a Texan before. Sophie smiled as she thought about it. Perhaps she would talk with a slow southern drawl.

Sophie thought back to all the new students who had entered her class, especially Devon. She remembered how fascinating he had seemed. And those stories he used to tell! Even if they weren't true, he knew how to liven things up. She would never forget Devon. Now it was her turn to liven things up, if only class would start.

How are these two stories alike?

Both characters have moved from Texas to someplace new. Both stories contain a clock as a symbol and a memory that lets the reader understand how each character views the idea of being a new student.

How are these stories different?

Cheyenne and Sophie view their new surroundings differently. Cheyenne is nervous and full of regret, while Sophie is playful and adventuresome. In "First Day," the clock represents Cheyenne's nervousness and regret. She wishes she could go back in time and undo things. In "Moving to Minnesota," the clock is a symbol for adventure. Sophie is ready to begin an adventure. She wishes she could go back in time only to relive past adventures.

Representing Information in Different Ways

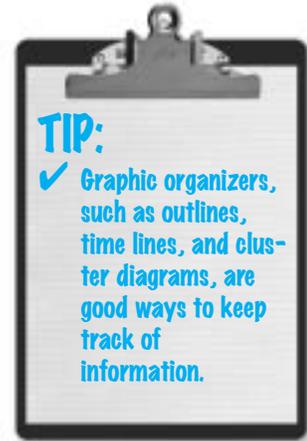
One way to keep track of the information you read is to take notes. Another way is to make graphic organizers such as outlines, Venn diagrams, time lines, and cluster diagrams. Seeing information in a graphic organizer can help you answer questions about what you have read.

- An **outline** is an organized list of main ideas and important details. You can use an outline to show the relationships among ideas in an informational text.

Outlines usually follow the form shown below.

Ham Radios

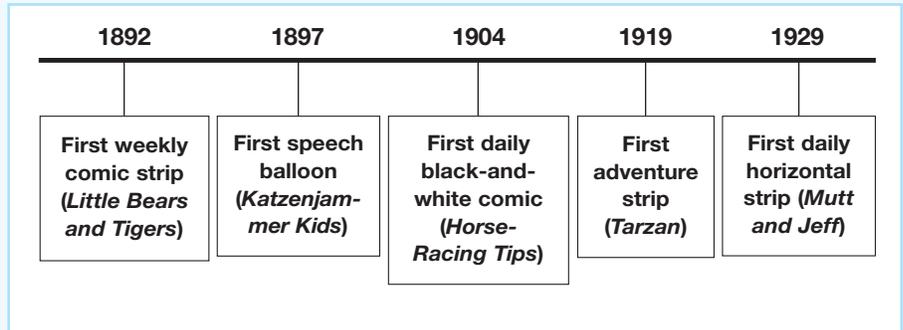
- I. Radio operators
 - A. Need a license
 1. Must pass a test
 2. Can receive three different types of license
 - B. Can be any age
 - C. Are taught by teachers who are called Elmers
- II. Uses of ham radios
 - A. Can transmit two-way communication
 1. Can talk to people around the world
 2. Can talk to astronauts in space
 - B. Can send Morse code, computer, or voice signals
 - C. Can be used during emergencies



Help with Skills: Objective 3

- A **time line** is a type of graph that shows the order in which events take place and the amount of time that passes between each event. Marks on a time line show units of time.

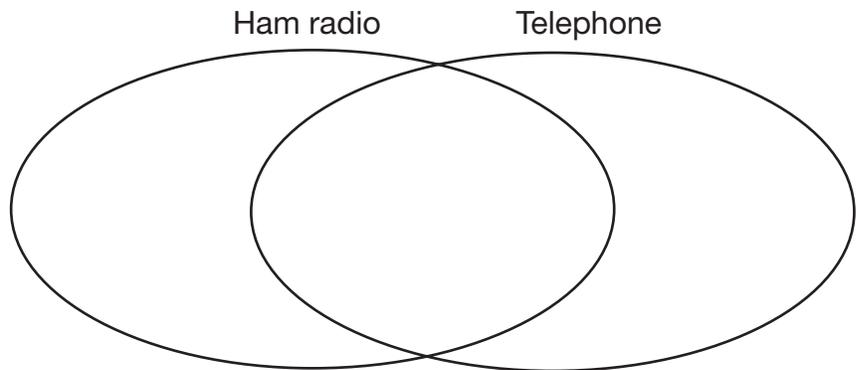
Suppose you read an informational text on the development of the newspaper comic strip. You might show the information on a time line to help keep track of the order of events.



When did the first weekly comic strip begin?
The first weekly comic strip began in 1892.

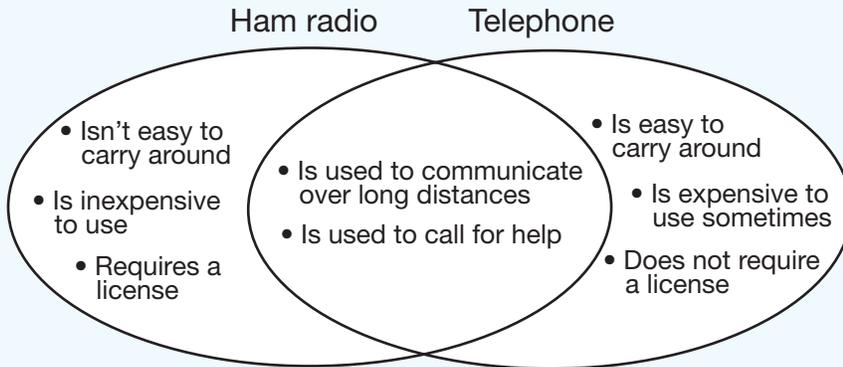
How many years after the first weekly strip did the first adventure strip appear?
The first adventure strip appeared 27 years after the first weekly strip.

- A **Venn diagram** can show how things are alike and how they differ. It can be used to compare two characters, stories, events, or ideas. Look at the Venn diagram below.



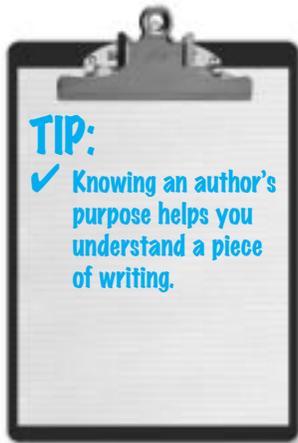
The diagram is made up of two ovals. Each oval represents one of the things being compared. The area where the ovals overlap shows how the two things being compared are similar. The other part of each oval shows how the two things being compared are different from each other.

Think about the story “Mayday!” In the story, Li-Minh compares her ham radio to a telephone. You can make a Venn diagram to organize this information. Read the Venn diagram below and then answer the questions that follow.



According to the story, how are ham radios and telephones alike? Using the diagram, you can look at where the two ovals overlap to find the answer to this question. Ham radios and telephones are both used to communicate over long distances and to call for help.

What is one difference between a ham radio and a telephone? Any of the ideas listed in the two outside parts of the ovals could answer this question. For example, telephones are easy to carry around, but ham radios are not. Telephones can be expensive to use, especially when calling long-distance, but ham radios are not. Ham radios require a special license, but telephones do not.



Purposes of Text

As you read, ask yourself, “Why did the author write this?” Authors write stories and articles for different reasons, or purposes. Some of these reasons are:

To inform—Some types of writing are created to inform readers about topics or events. You read them to find out factual information. Newspapers, encyclopedias, and textbooks are all written to inform. For example, an article about camping in U.S. national parks is meant to inform.

To persuade—If a writer wants to make the reader feel a certain way about something, he or she is trying to influence or persuade. The writer uses powerful words to make the reader feel a certain way. For example, an editorial in favor of lower fees for campsites in national parks is meant to persuade.

To explain—Some pieces of writing are created to give the reader specific instructions or directions—for example, directions on how to set up a tent.

To entertain—Many stories and books are written to entertain readers by telling a good story. For example, a made-up story about a camping adventure is meant to entertain.



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Some writing has more than one purpose. A story about a mountain-climbing adventure might entertain you and teach you about mountain climbing at the same time. An advertisement for a toaster oven might include recipes to try.

Why do you think the author of “Mayday!” wrote the story?
The author’s main purpose seems to be to entertain.

What other purpose does the story serve?

The story contains interesting information about ham radios, so another purpose of the story is to inform the reader.

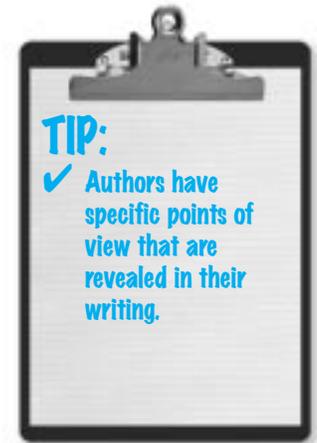
Language and details are clues to an author’s purpose. In “Mayday!” the author presents details in time order and builds suspense about the emergency in the story. These are clues that the author’s purpose is to entertain. When you read the story, you also learn something about ham radios. The author informs you about ham radios so that you can better understand the story.

How an Author's Perspective Affects a Text

An author's **perspective**, or point of view, is the way the author looks at the world. This perspective is a combination of ideas, beliefs, attitudes, and feelings.

Understanding an author's point of view is sometimes easier in a nonfiction selection. The author will often state his or her opinion directly, as in "I have always loved the smell of bread baking in the oven" or "There are far too many advertisements in most magazines."

Authors of fictional, or made-up, stories don't usually state their opinions in their works. Still, you can often guess an author's point of view by looking closely at story elements, such as plot, character, and theme.



Read the paragraphs below. Notice how the two writers differ in their feelings about living in a big city.

Point of View #1

Big cities are for me! I wouldn't ever want to live anywhere else. I go to a big school and have friends from many different backgrounds. For example, my best friend lived in China for the first eight years of his life. I can always find fun things to do in the city. I can go to movies, concerts, and major-league sports events. When I grow up, I know I will want to live in a big city. Just think about all the different kinds of jobs I will be able to choose from!

Point of View #2

I have never liked living in a big city. Big cities have too many cars, too many people, and too many big buildings. It seems like I spend half my life sitting in a car waiting for red lights to turn green. The noise is awful, too. I know it would be different if I lived in the country. I could have a horse, go fishing, and hang out with my friends. I wish we could move to the country.

How would you describe the first writer's point of view about living in a big city?

The writer thinks that living in a big city is great.

How would you describe the second writer's point of view?

The writer thinks that living in a big city is difficult.

Both writers share their feelings about living in a big city, but they have different perspectives—they see living in the city in different ways.

How authors think and feel affects their view of the world and how they write about it.

Objective 4: The student will apply critical-thinking skills to analyze culturally diverse written texts.**What are “critical-thinking skills”?**

Careful readers use critical-thinking skills to gain a deeper understanding of what they read. Critical thinkers make judgments and solve problems by applying the information that they learn to new situations.

Thinking critically about a text includes being able to do the following:

- Understand when deeper meanings are implied rather than directly stated in a selection
- Form conclusions based on the information within a selection
- Make reasonable predictions about what might happen next
- Support conclusions, generalizations, and interpretations with ideas and sentences from the selection
- Distinguish between facts and opinions, especially in selections whose purpose is to persuade the reader about a specific topic, such as newspaper articles and advertisements
- Make connections between the themes and issues presented in texts
- Recognize how an author chooses to organize information
- Assess the ways that style, tone, and mood affect texts

Inference

Authors don't always clearly state every idea in a story or article. When you recognize these unstated ideas, you are making an inference. As you read, you make inferences by drawing conclusions, forming generalizations, or making predictions.

Conclusions—One type of inference is a **conclusion**. Drawing a conclusion is like putting a puzzle together. You piece together information that is specifically stated in the selection with information that is implied or with guesses that you make based on your own experience. In other words, you answer questions such as:

- What is the author suggesting in this selection?
- What does my own experience tell me about this?
- What makes sense based on what I'm reading?

Drawing conclusions helps you better understand the characters and situations in a selection.



TIP:

✓ When you make an inference, look for evidence in the text that will support your educated guess.

Go back to page 14 and reread paragraph 14 of “Mayday!”

Based on the information in the paragraph, what can you conclude about the weather in Farmington, Colorado?

It is not snowing there.

What information did you use to draw this conclusion?

Li-Minh’s mother compares the location of the storm on the television map to the map in the atlas and says that “it’s not in the right area.”



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Generalizations—A **generalization** is a judgment. Drawing conclusions and making generalizations depend on being able to put together what you know and what you have read.

Suppose you read a newspaper article about an increase in the number of Little League teams being formed in cities across the United States. From this information you might make this generalization:

Little League is becoming more popular in the United States.

For a generalization to be valid, it must be based on evidence. Generalizations are not guesses. Valid generalizations often use words such as *many*, *often*, and *some*.

Rain falls in *many* southern states in spring.

Generalizations that are not valid often make statements that are too broad. They may use words such as *all*, *always*, *every*, and *never*.

Every student has read *Tom Sawyer*.

Making generalizations will help you connect information that you read with your own experiences.



Try It

Reread paragraphs 2 and 3 of “Mayday!” on pages 12–13.

1. What generalization can you make about using a ham radio?

2. What evidence from the text supports this generalization?

1. Ham radios are not as convenient to use as modern telephones.
2. In paragraph 3, you learn that a ham radio is bulky, its reception is sometimes bad, and it can't be carried from room to room. Using this information and what you know about telephones, you can infer that ham radios are not as convenient to use as phones.

Predictions—When you make a **prediction** in a story, you guess what might happen based on information in the story and your own experience.

To make a prediction, notice the following things as you read:

- Details about character, plot, and setting
- What a character says and does
- Foreshadowing, or hints about what might happen in the future



Read the story below. What prediction can you make?

The Show Must Go On

The curtains were about to open, but the play could not begin without Alisha. She had a starring role. Mrs. Kirkland nervously watched the door. She hoped that at any second it would swing open and Alisha would rush in. Mrs. Kirkland tried to ignore the fact that the play should have started 10 minutes ago, but the rustling and whispering from the other side of the curtain grew louder. The audience was growing restless! “Bring me Alisha’s costume, please,” Mrs. Kirkland said to a stagehand. As she waited, Mrs. Kirkland whispered, “I sure hope that skirt fits me.”

What do you predict Mrs. Kirkland will do?
Mrs. Kirkland will take the place of Alisha in the play.

What clues helped you make this prediction?
Although the play should have begun 10 minutes ago, Alisha hasn’t arrived yet. Mrs. Kirkland tells a stagehand to bring her Alisha’s costume. She whispers to herself that she hopes the costume will fit.

As you read, you may have to change a prediction based on new information in the story.

Supporting Your Interpretation with Text Evidence

A key ingredient in making an inference is the information an author gives you. This information can be ideas, details, facts, or examples. The author's thoughts and ideas combined with prior knowledge allow a reader to provide powerful **support**, or evidence, for a particular interpretation of a text.

When interpreting a text, you may use the actual words an author has written to support your interpretation. Other times you will paraphrase, or restate in your own words, what the author has written. When you paraphrase, you often think again about your own knowledge and experiences that are connected to what you just read.

Fact and Opinion

A **fact** is a statement that can be proved true.

An **opinion** is a statement that cannot be proved true or false. An opinion tells what someone thinks, feels, or believes.



Read the sentences below. Which sentence states a fact? Which states an opinion?

Sentence 1: Granite is a rock made from melted material called magma.

Sentence 2: Granite is the best material to use for countertops.

Sentence 1 is a fact. You can prove it by using a reference source about granite.

Sentence 2 is an opinion. It tells what a person thinks or believes.

Try It

Read the sentences below from a report about ham radios.

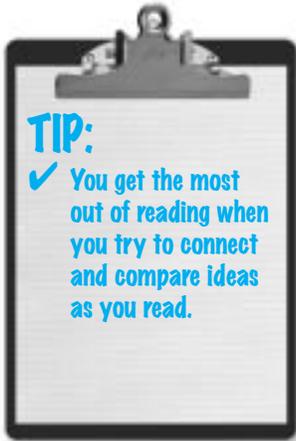
Operating a ham radio is the best hobby around. It doesn't take much to get started with this hobby. The first thing you need to do is get a license. There are three different kinds of licenses, and to get the most basic one, you have to pass only a multiple-choice test. After you've gotten your license, you'll need to pick the radio that best suits your needs.

1. Which underlined sentence is a fact?

2. Which underlined sentence is an opinion?

1. The second underlined sentence is a fact. It can be proved by using a reference source.
2. The first underlined sentence is an opinion. Operating a ham radio might be the "best hobby around" for the person writing this report, but there is no way to prove that this is true for everyone.





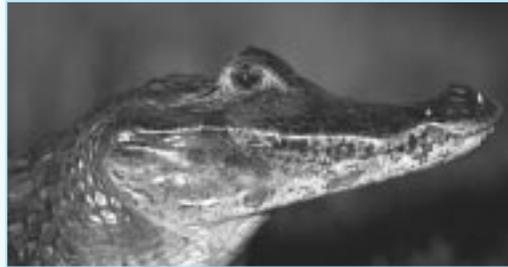
Connecting and Comparing Ideas

An important way to make sense of what you read is to think about the ideas in a story or article. This is especially helpful when you read two selections based on the same topic or theme. You might ask yourself these questions as you read:

What can I learn when I connect the main ideas?

How are the ideas alike? How are they different?

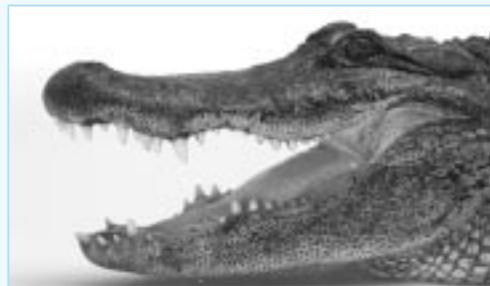
Read the following selections about alligators and crocodiles. Think about how you can compare information contained in each selection.



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Alligators

The alligator is found in marshes and swamps in Florida, the Carolinas, and South Texas. This carnivore has a broad, shovel-like snout and is black with yellowish cross bands across its back, which is protected by bony plates. The alligator grows to be about 13 feet in length and weighs about 300 pounds. This reptile must swallow its food whole because its teeth are not made for chewing; sometimes it holds its prey in its jaws until the animal deteriorates enough to be swallowed.

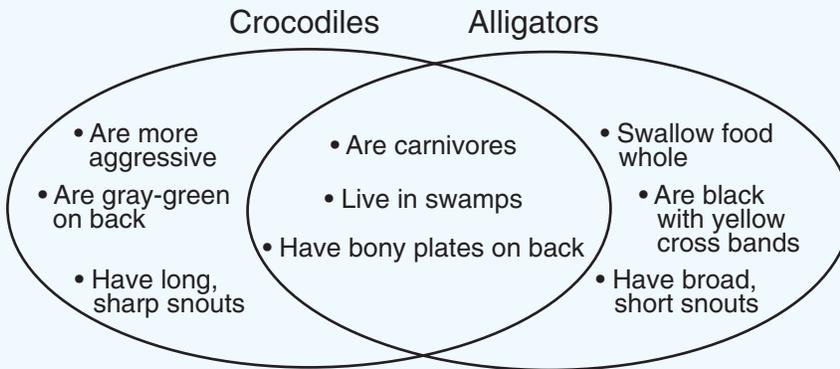


©Craig Lovell/CORBIS

Crocodiles

The long, sharp snout of the crocodile distinguishes it from the alligator. The crocodile is classified as an endangered species throughout its habitat in southern Florida. This cold-blooded carnivore grows to be 10 feet long. Its gray-green back is protected by bony plates, and its underside is pale. The crocodile lives in swamps or along riverbanks and is considered more aggressive than the alligator. Sometimes crocodiles even attack humans.

You might compare the ideas in both selections using a graphic organizer like the Venn diagram below.



Analyzing the Ways Authors Organize Ideas

Authors organize information in different ways. Knowing how a text is organized will help you find the main ideas. For example, if you notice that an author has used a cause-and-effect pattern, you will know to look for more causes and effects as you read.

Here are some of the patterns authors use to arrange and link ideas:

Cause and effect: The author focuses on something that has happened (effect) and tells you why it has happened (cause).

Compare and contrast: The author focuses on how two or more things are alike or different.

Specific-to-general reasoning: The author begins with facts and examples and leads you to a general conclusion based on the facts and examples.

Generalization-to-conclusion reasoning: The author begins with a general statement and provides facts and examples that support it.

Chronological order: The author relates events in the order in which they occur in time.





Read the following selections. Which organizational pattern has each author used?

Accidental Paws

“Oh, my!” Lisa shouted as the container of rice fell from the cabinet. Before she could grab the broom and dustpan, her huge dog Maggie came bounding into the room. When Maggie’s paws hit the grains of rice, she began to slide across the kitchen floor. Unable to regain her footing, she slid right into Lisa. Lisa came tumbling down on top of Maggie, who yelped and gave Lisa a surprised look.

People and Their Pets

Many families in the United States keep pets. Some people have dogs and cats. Others have birds such as parakeets and parrots. Some keep snakes in aquariums, while others keep goldfish in bowls. It might be said that pets are as varied as their owners.

How has the author organized the first selection?

The author organizes it through cause-and-effect relationships.

What clues tell you this?

The rice causes the dog to slide, which causes Lisa to fall down.

How has the author organized the second selection?

The author uses generalization-to-conclusion reasoning.

What clues tell you this?

The first sentence, a generalization, is followed by examples. The last sentence states a conclusion based on these details.

Paying attention to how an author organizes a selection can help you understand the information in it. Often authors will use more than one organizational pattern in their writing.

Style, Tone, and Mood

Suppose you read a story about someone who travels to Japan. Then you read another story about the same subject by a different author. What sets these stories apart? The main difference might be that the authors do not use language in the same way. Another difference might be that one author may tell the story in a humorous way, while the other may tell the story in a serious way. The overall feeling of each story might be different, too.

Style is the way an author uses words, phrases, and sentences. Two authors' styles can be as different as their speaking voices or signatures.

Tone is an author's attitude toward the subject he or she is writing about. The tone of a story can be lighthearted, curious, angry, and so on. The way an author feels about a subject determines the language he or she uses. This language sets the tone.

Mood is the overall feeling of a story. The mood of a story can be peaceful, mysterious, suspenseful, and so on. An author's choice of words and details creates the mood.

Authors select words and phrases in a story to elicit certain feelings in you, their audience. Authors are aware that words have the power to make the hairs on the back of your neck stand up or to make you laugh out loud. Mood is this feeling or atmosphere created by the author's words.

Read the sentence below.

As Steve walked along the dark empty street, he looked nervously over his shoulder.



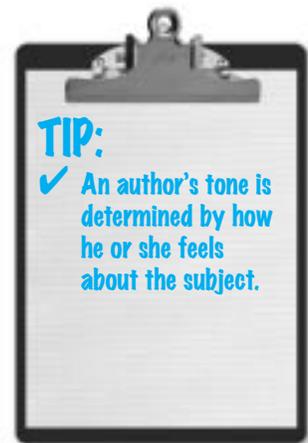
©Bob Witkowski/CORBIS

How would you describe the mood in this sentence?

The words *frightening*, *suspenseful*, or *eerie* could be used to describe the mood of this sentence.

What words does the author use to create this mood?

The author uses words such as “dark,” “empty,” and “looked nervously.”



Try It

Read the sentence below.

Wearing a huge grin, the child skipped happily across the field toward her friend.



©Larry Williams/CORBIS

1. How would you describe the mood of the sentence?

2. What words does the author use to create this mood?

1. You could say that the mood of this sentence is joyful and happy.

2. The author's choice of words ("huge grin," "skipped happily," and "friend") help create the mood.

Great work! You've finished Step 2 in your "Steps to Success." Be sure to place a check mark in your chart on page 8.

GUIDED PRACTICE

- “Mayday!” Again
- “The Island Where Crab Is King”

The purpose of pages 63–80 is to provide you with reading selections so that you can apply the skills and strategies you learned in the last section. Read each selection carefully, look at the questions in the margins of both stories, and try to answer them as you read.

Although the selections on the actual TAKS test do not include questions in the margins, they are provided here as examples of the types of questions you should ask yourself as you read.

Writing the answers to the questions in the margins of both stories will help guide your thinking and will help you practice a very important life skill.

“Mayday!” Again

Now you will read “Mayday!” for a second time.



©Jack Hollingsworth/CORBIS

“Mayday!” is a **narrative**. It is something you might read for fun, but you might also read it to learn something new.

When you read a narrative, look for these things:

- **Characters**, such as people or animals
- A **place** where the story happens
- A **time** when the story happens
- A **problem** that a character has
- A **resolution**, or end to the problem

Reading Selection

Mayday!

(Question 1)
What information in paragraph 1 suggests that Li-Minh and Alyssa have agreed to contact each other on the ham radio at a specific time?

(Question 2)
What is paragraph 2 mainly about?

(Question 3)
What information in paragraph 2 suggests that a ham-radio operator is supposed to have an amateur radio license?

(Question 4)
Why has Li-Minh started to lose her enthusiasm for talking on the ham radio?

(Question 5)
What does the word obsolete mean?

1 Li-Minh keyed the microphone on the shortwave radio* again. “K5NRL, this is K5ZXY. Come in. Over.” She listened carefully for a reply but caught only static and occasional pieces of other radio conversations. The old radio set squealed and hissed as she checked the frequency setting again. “Alyssa should be at her radio right now,” Li-Minh thought, “unless she’s forgotten again.” She leaned back and sighed. “Maybe there’s some interference,” she muttered, peering out doubtfully through the window screen. The South Texas sky was clear, and it was even a little hot for late December. A gentle breeze rattled the wind chimes, and their tinkling notes blended with the rustling of the leaves on the old mulberry tree behind the house.

2 “Oh, well,” Li-Minh mumbled. “I guess she’s busy with her new friends.” Li-Minh and Alyssa were best friends, but Alyssa’s family had recently moved about 50 miles away. “It might as well be a million miles,” Li-Minh thought. It had been her father’s idea that the girls keep in touch by ham radio. Both he and Alyssa’s father had been talking on ham radios since they were kids. Li-Minh’s father had explained that a ham radio was a two-way communication system like the ones used by police and emergency crews. It had sounded so exciting in the beginning. Li-Minh remembered studying with Alyssa for their amateur radio licenses. She frowned as she thought of all the boring rules and emergency procedures that she had had to memorize.

3 At first talking on the radio had been fun, but now it seemed tiresome. It just wasn’t the same as talking to someone in person or even on the phone. She knew Alyssa’s new number, but long-distance calls were expensive. Li-Minh looked at the bulky radio and sulked. Its big knobs and dials looked like something out of an old movie. Compared to the modern phone, the radio seemed like an obsolete piece of junk. The reception wasn’t very clear, and Li-Minh couldn’t carry the radio from room to room like she could a cordless phone. In front of Li-Minh, the radio droned on

Continued

* Shortwave radios, sometimes called ham radios, are two-way radios used by amateur radio operators to communicate. Sometimes used to call for help or give warnings, shortwave radios operate in a way that is similar to walkie-talkies, but they are able to communicate over long distances.

in a steady hum of static. “Why would anyone want to talk on a ham radio, anyway?” she asked, reaching for the power switch

4 “Mayday! Mayday! Anyone listening, please help!” A voice broke through the static.

5 Li-Minh recognized *Mayday* as the international radio distress call. “Someone must be in trouble!” she thought. She turned up the volume and listened closely. The radio whined and popped, but all Li-Minh could hear was the familiar, dull static. Then, just as she was about to give up, she thought she heard a voice again.

6 Li-Minh radioed nervously, “Mayday, this is K5ZXY. What is your emergency? Over.”



7 A muffled reply crackled over the speaker. The voice was faint and broken up, but Li-Minh thought she heard something about a car accident. “Mayday, if you’ve been in an accident, please state your location, and I will get help for you,” Li-Minh said. She twisted the dial as her father had shown her, hoping to fine-tune the signal.

8 “We’re on Old Canyon Road about five miles north of town. We’ve slid off the shoulder. My dad and I are hurt. Please hurry!” a girl’s voice replied anxiously.

9 “Old Canyon Road?” Li-Minh thought. She had never heard of it.

10 “Please hurry,” the voice crackled over the static again. “Our car is stuck in the snow, and we’re freezing.”

11 “Stuck in the snow!” Li-Minh repeated in surprise. “Mayday, what town are you near? Over.” Straining to hear through the

Continued

(Question 6)
Why does the author include paragraph 14?

(Question 7)
How is the word contact used?

(Question 8)
How would you describe the mood of paragraphs 13 through 15?

(Question 9)
How would you describe Li-Minh’s attitude toward ham radios at the end of the story?

(Question 10)
What does precaution mean?

(Question 11)
Why would Li-Minh probably have been unable to help the girl and her father if their accident had happened a year earlier?

garbled static and squealing, Li-Minh thought she heard the name Farmington.

12 Just then her parents walked into the house with a bag of hamburgers from their favorite fast-food restaurant. Li-Minh quickly explained what had been happening.

13 “Keep trying to reach her on the radio,” her father said, grabbing the telephone. “I’ll call 911.”

14 Meanwhile Li-Minh’s mother turned the television to a national weather channel. “There’s a big snowstorm hitting parts of Colorado and New Mexico,” she said. She grabbed an atlas from the bookshelf and flipped quickly to the index. “There’s a Farmington, Colorado,” she said, flipping back to the map to check the town’s location, “but it’s not in the right area.” She turned back to the index. “There’s also a Farmington, New Mexico,” she called, “and it looks to be right in the middle of the storm.”

15 “Try Farmington, New Mexico,” Li-Minh’s father told the operator anxiously. Li-Minh went back to the radio and tried to reestablish contact, but her efforts were futile. She had lost the signal, and nothing she did to get it back was working. She could only listen in frustration to the fuzzy background noise. “Yes, about five miles north. That’s right,” she heard her father say. “They’ve reached Farmington, New Mexico,” he said, covering the phone’s mouthpiece. “It’s snowing heavily right now, and there is an Old Canyon Road nearby,” he added. “Yes,” he said, speaking into the phone again. “Please let us know.” He hung up and sighed. “They’re sending a rescue vehicle out to investigate.”

16 Li-Minh and her parents stood still for a minute, wondering what to do next. Li-Minh’s mother suddenly remembered the burgers. They tried to eat, but no one seemed very hungry. Li-Minh picked at her food and fidgeted nervously. She couldn’t get her mind off the voice on the radio. The girl had sounded so desperate.

17 Finally the phone rang. Li-Minh followed her father into the living room and watched him pick up the receiver. “That’s great news,” he said a few seconds later. “The rescue workers have found them, and everyone is safe!” he exclaimed. “They’re on their way to a hospital to be checked out as a precaution, and the girl’s injuries appear to be minor.”

Practice with Reading Skills

Question 1: What information in paragraph 1 suggests that Li-Minh and Alyssa have agreed to contact each other on the ham radio at a specific time?

Quickly skim paragraph 1. You read in the middle of the paragraph that Li-Minh says, “Alyssa should be at her radio right now.” This detail suggests that Li-Minh expects to reach Alyssa. You probably have had a similar experience in which you told someone that you would phone, only to discover that the person wasn’t home at the prearranged time. Using the information in the story and your own knowledge, you can infer that Li-Minh and Alyssa have agreed to contact each other on the radio at a specific time.



Turn to page 51 for more information about making inferences.

Question 2: What is paragraph 2 mainly about?

When you review paragraph 2 to find what it is mainly about, you learn that Li-Minh’s best friend Alyssa has moved away. You also learn that Li-Minh’s father suggested that the girls learn to use ham radios to stay in touch. If you put these ideas together, you see that paragraph 2 is mainly about the reason that Li-Minh and Alyssa use ham radios to communicate.

Turn to page 25 for more help with finding main ideas.

TIP:

✓ Remember that the answers to the questions *who*, *what*, *when*, *where*, *why*, and *how* can help you figure out the main idea.

“Mayday!” Again



Question 3: What information in paragraph 2 suggests that a ham-radio operator is supposed to have an amateur radio license?

First review the information in paragraph 2. You read that Alyssa and Li-Minh studied rules and emergency procedures to get an amateur radio license rather than just using the radio without any training. If you combine these details with what you know about taking classes, learning rules, and getting licenses, you can conclude that ham-radio operators are supposed to have an amateur radio license.

Turn to page 51 for more information about making inferences.

Question 4: Why has Li-Minh started to lose her enthusiasm for talking on the ham radio?

This question asks about the motivation behind Li-Minh’s feelings toward the ham radio. At first she thinks that talking on the radio is fun. Then she begins to feel that using a ham radio is “tiresome” because the reception is bad. In addition, she can’t “carry the radio from room to room like she could a cordless phone.” She has lost her enthusiasm for talking on the ham radio because it isn’t convenient to use and she can’t get in touch with her friend Alyssa.

Turn to page 31 for more help with analyzing characters.

Question 5: What does the word obsolete mean?

Let’s go back to paragraph 3 of the story and find the word *obsolete*, which is underlined for you.

When you first read “Mayday!” you might not have known what the word *obsolete* meant. But paragraph 3 helps you figure it out. Look at the words around *obsolete*. In the same sentence, you read the words “compared to a phone” and the word “junk.” These are clues to the meaning of *obsolete*. They allow you to make an analogy, or comparison, between newer technology (the phone) with older technology (the ham radio). The comparison suggests that Li-Minh thinks that her ham radio is old and out-of-date, or *obsolete*.

Turn to page 16 for more help with context clues.

TIP:

✓ Remember to use context clues to determine a word’s meaning.

Question 6: Why does the author include paragraph 14?

If you read paragraph 14 carefully, you can see that the author includes this paragraph for a purpose—it provides information that shows how the problem of finding the stranded family is resolved. Li-Minh’s mother uses the television and an atlas to locate the crash site.

Turn to page 34 for more help with analyzing plot.



Question 7: How is the word contact used?

If you looked up the word *contact* in a dictionary, this is what you might find.

contact \ˈkän-takt\ *n* **1.** the act of touching **2.** communication **3.** a person serving as a source of information **4.** an electrical part that completes a connection

Look at paragraph 15 to find context clues to help you decide which definition applies. In sentence 2, you read that Li-Minh goes back to the radio. In sentence 3, you read that Li-Minh had lost the signal.

Now let’s look at the four meanings of the word *contact*. Think about which one works best for how the word *contact* is used in the story.

The first meaning, “the act of touching,” doesn’t make sense. Li-Minh is trying to connect with someone in New Mexico.

The second meaning, “communication,” seems to fit because Li-Minh is trying to communicate with someone using a radio—a means of communicating with others.

The third meaning, “a person serving as a source of information,” doesn’t fit with the verb *reestablish*.

The last definition, “an electrical part that completes a connection,” doesn’t make sense. Li-Minh isn’t working with electrical parts or trying to make an electrical connection.

Therefore, the second meaning is correct. It is good to read through all four meanings. By doing so, you are able to see that the first, third, and fourth meanings don’t make sense with the way the word is used in the sentence. This helps you make sure that the second meaning fits with the context of the sentence.

Turn to page 19 for more help with multiple-meaning words.

Question 8: How would you describe the mood of paragraphs 13 through 15?

When you reread these paragraphs, look for details that give you clues about the mood the author is trying to create. For example, in paragraph 13, Li-Minh’s father is described as “grabbing” the phone. In paragraph 14, Li-Minh’s mother flips through the atlas quickly. In paragraph 15, Li-Minh’s father speaks to the operator anxiously, and Li-Minh’s efforts to reestablish contact are futile. All this information works together to make you feel both excitement and tension as Li-Minh’s family works together to get help for the distressed travelers.

Turn to page 59 for more help with recognizing mood.

Question 9: How would you describe Li-Minh’s attitude toward ham radios at the end of the story?

Remember that in paragraph 3, Li-Minh thinks that her ham radio is an inconvenient “piece of junk.” However, you can infer that at the end of the story, she is thankful that she was able to use the ham radio to save people’s lives. Now she might even describe ham radios as useful in an emergency.

Turn to page 31 for more help with analyzing characters.

Question 10: What does precaution mean?

To figure out the meaning of *precaution*, break the word apart: *pre-* + *caution*. Think about the times you have heard or seen the word *caution* used. You might have heard someone tell you to use caution to avoid getting hurt. The word *caution* means “close attention to avoid risk.”

Now look at the prefix. The prefix *pre-* means “before.” You can put together the meanings of the two word parts to figure out that *precaution* means “care or attention taken in advance.”

Turn to page 20 for more help with prefixes and suffixes.

“Mayday!” Again

Question 11: Why would Li-Minh probably have been unable to help the girl and her father if their accident had happened a year earlier?

In paragraph 2, you read that Alyssa’s family recently moved away and that Li-Minh and Alyssa studied to earn an amateur radio license. These clues tell you that Li-Minh only recently learned to use the ham radio, so she probably would not have been able to help the girl and her father a year earlier.

Turn to page 41 for more help with using a text’s structure to locate and recall information.



Excellent! You’ve finished Step 3 in your “Steps to Success.” Be sure to place a check mark in your chart on page 8.

“The Island Where Crab Is King”

Now you will read “The Island Where Crab Is King.” This is an **informational article**. An informational article is about real people, places, or events. It explains or describes something. It might also tell how to do something. Informational writing helps you learn about the world around you.

When you read an informational article, look for these things:

- Information about . . .
 - what something is like
 - how to do something
 - what happened long ago
 - an interesting person, place, or thing
- Examples to help readers understand the topic
- New words to learn



You may want to read an informational article more slowly than a narrative. An informational article can give you a lot to think about.

Here are some helpful hints for when you read an informational article:

- Take notes while you read.
- Try to connect the information with what you already know.
- When you have finished the article, try to retell the main ideas in your own words.

The County Tribune

Section C1

The Island Where Crab Is King

By Ethan Smythe

As you read, think about how Ethan feels about the place he is describing.

Why is Ethan proud to be a waterman?

What does tranquil mean in paragraph 1?

In what ways does Ethan allow his personal feelings to influence his description of Tangier Island?

1 A hazy fog hovers over a tranquil sea. Across the bay the deep-throated wail of a lonely foghorn floats gently over the calm water. A soft silvery glow lights rows of white-shingled crab houses built on pilings out on the water. It is just after 3:00 A.M. In the pinkish gray preceding the first specks of dawn, fathers and sons raise mesh crab pots from the salty waters of Chesapeake Bay and pour the crabs out into shallow holding tanks. Over and over they haul and empty the pots until the sun creeps above the edge of the Atlantic to reveal the brilliant blue sea and its white frosted surf. The cooing of a mourning dove announces a new day on Tangier—my island home.

2 I follow my father across a humpbacked bridge over a tidal canal, along a road no wider than a sidewalk. There are no cars and no streets here on Tangier Island. Like everyone here, my family gets around on golf carts, motorbikes, and scooters. As my father and I near the white picket fence surrounding our clapboard house, my mother steps onto the porch and calls us to breakfast. It is 7:30 A.M.

3 I am a proud fourth-generation waterman. My great-grandfather first crabbed these waters more than 100 years ago. He worked long and hard, and so do I. My father has taken me out on the water every weekend and summer since I was ten. Over the past three years, I have learned to handle the traps and lines as well as anyone on the island. Sometimes, while I'm pulling up a pot or baiting a trap, I picture my great-grandfather doing the same thing years ago. In those moments, I feel as if I know him.

4 Crabbing is a harsh, relentless job, but it is one of the few occupations on Tangier. Although the island has a couple of grocery stores, a marine filling station, and a few seafood restaurants, most of the island's 800 residents earn their living by trapping crabs. Most islanders who do not work on the bay are employed by the Tangier Combined School.

5 I am one of about 125 students who attend the school. There are only 13 teachers, but they work hard to teach us well and help us succeed. Since the classes are small, we get plenty of individual attention. Many

of our teachers also volunteer to help coach the basketball team or supervise the cheerleading squad. Others help with fashion shows, skits, plays, and other presentations for the public.

6 Each year the school sponsors a Junior-Senior Cruise. It is the biggest event of the year. It will be a few more years before I can participate, but tonight my sister and the other juniors and seniors will take a 90-minute cruise to Salisbury, Maryland, for an evening of dinner and dancing. For some seniors it will be something of a farewell cruise as they embark on a new life away from Tangier Island. While the other students are on the cruise, students in the lower grades will scramble to hide objects all over the island. When the juniors and seniors return, they will take part in an all-night scavenger hunt. There are always great prizes for the winners.

7 Tourists often come to visit my island. They sometimes think Tangier is a strange place. Although the island was first settled more than 300 years ago, it has remained very isolated. Most islanders still speak with the same accents as our ancestors from Cornwall, England. Some people say we sound Shakespearean because we pronounce our words the way they were spoken in the seventeenth and eighteenth centuries.

8 On an island like Tangier, there are very few secrets. Everyone knows you and what you are doing. A large crowd heads for the post office each day when the mail boat arrives from Crisfield, Maryland. Mothers ride scooters with babies in baskets or drive golf carts with children sitting on their laps. Others arrive on bicycles, mopeds, or motorcycles. The front of the post office is soon a swarm of activity. While the mail is sorted, islanders catch up on the latest news and read important notices tacked to the post office door. Perhaps a wedding has been announced, or a new baby has been born. A few islanders will catch a ride on the mail boat’s return trip. Our island is inaccessible by car, so most people take the ferry to the mainland once or twice a month for shopping or entertainment.

9 Today the talk at the post office is all about tonight’s Junior-Senior Cruise. My sister has been looking forward to it for weeks. Later my parents and I will gather at the dock to see her and her friends off. Soon we will be seeing her off to college. I wonder whether she’ll return to Tangier after she graduates. I’ve begun to wonder that about myself lately, too.

10 Although I live on an island that sometimes seems stranded in the past, I feel as modern as any American teenager. My friends and I hang out, drink soft drinks, and

Why isn’t Ethan participating in the cruise to Salisbury, Maryland?

What are the things that happen on the Junior-Senior Cruise?

Why do most islanders speak with the same accent as their ancestors?

What does inaccessible mean in paragraph 8?

What can you tell about the lives of teenagers on Tangier Island?

“The Island Where Crab Is King”

Why do you think Ethan Smythe wrote this article?

11

listen to CDs. We like pizza, hot dogs, and fries. We read magazines, play video games or air hockey, and talk about our favorite movie stars. We use computers to learn about people all over the world. We have bikes and motor scooters, radios and satellite TV. But we also have beaches and boats, fresh air and open spaces, and on clear mornings the most incredible sunrises you’ve ever seen.

Still, life on a tiny island is not for everyone. There are no shopping

malls, movie theaters, or video stores. You won’t find any amusement parks, skateboard ramps, or fast-food restaurants. But neither will you see any billboards, parking lots, or smog. When two golf carts going in opposite directions happen to meet on one of the narrow one-way paths, both are likely to pull over to let the other pass. This is about as close to a traffic jam as we get on Tangier Island, my island—the island where crab is king.

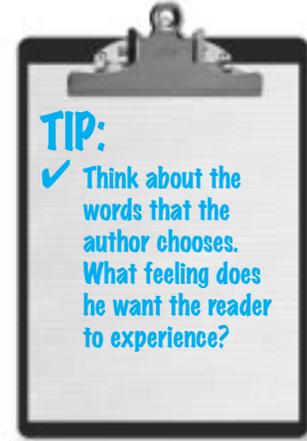
Practice Questions

Here are questions similar to the ones you answered as you read “The Island Where Crab Is King.” Each question now has four answer choices. See whether one of the choices matches the answer you thought of as you were reading. If not, think about the four choices and choose the best one.

Question 1

In this article, the author creates a sense of —

- A embarrassment
- B amusement
- C desperation
- D contentment

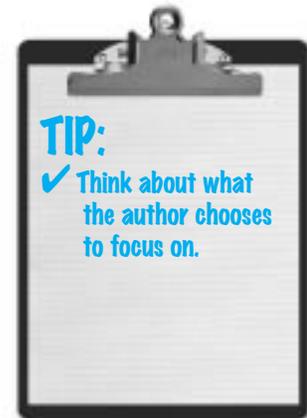


 Answer Key: page 95

Question 2

In what way does the author allow his personal feelings to influence his description of Tangier Island?

- A He focuses on the difficult life of the island’s teenagers.
- B He concentrates on the many things islanders must do without.
- C He emphasizes the positive things about life on the island.
- D He discusses the reasons people often leave the island.



 Answer Key: page 95

Question 3

What does the word tranquil mean in paragraph 1?

- A Dangerous
- B Peaceful
- C Shallow
- D Powerful

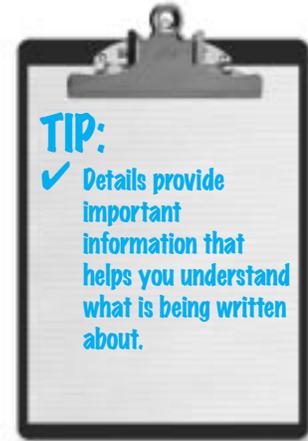
 Answer Key: page 95

“The Island Where Crab Is King”

Question 4

Ethan Smythe is proud to be a waterman because —

- A trapping crabs is a good way to prepare for college
- B he is carrying on a family tradition that dates back more than 100 years
- C most islanders do not have the skill to handle the crab lines and traps
- D he is one of the few people on Tangier Island who still earns his living on the bay



 **Answer Key: page 95**

Question 5

Why isn't Ethan Smythe participating in the cruise to Salisbury, Maryland?

- A He would rather play video games.
- B He has grown tired of Salisbury.
- C He is supposed to empty the crab pots.
- D He is not old enough.

 **Answer Key: page 95**

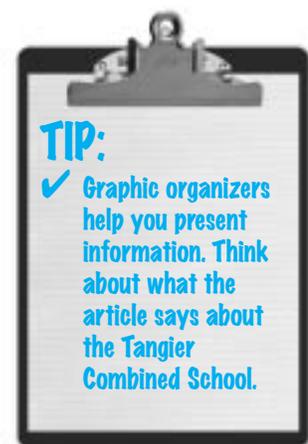
Question 6

Read the following portion of an outline of this article.

- III. Tangier Combined School
 - A. Junior-Senior Cruise
 1. 90-minute cruise to Maryland
 2. _____
 3. All-night scavenger hunt

Which information belongs in the blank?

- A Scooters and golf carts
- B A day of shopping
- C Dinner and dancing
- D Video games and air hockey



 **Answer Key: page 96**

Question 7

Why do most islanders speak with the same accent as their ancestors?

- A They have had very little contact with people on the mainland through the years.
- B They think that the way most tourists talk sounds strange.
- C They are taught to speak that way at the Tangier Combined School.
- D They like to read books written in the seventeenth and eighteenth centuries.



Answer Key: page 96

Question 8

In paragraph 8, the word inaccessible means —

- A not a great distance away
- B too large to be seen
- C not capable of being reached
- D attractive to tourists



Answer Key: page 96

Question 9

From information provided in this article about the lives of teenagers on Tangier Island, the reader can conclude that —

- A some Tangier Island students move away after graduation
- B young people on Tangier Island do not have access to computers
- C students must ride a ferry to school each day
- D the Junior-Senior Cruise takes place every other year

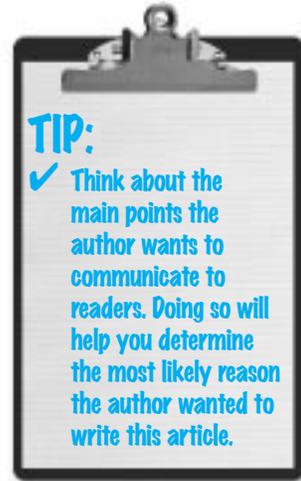


Answer Key: page 96

“The Island Where Crab Is King”**Question 10**

Why do you think Ethan Smythe wrote this article?

- A To persuade readers that tourists should be kept off Tangier Island
- B To explain how watermen trap crabs on Tangier Island
- C To entertain readers with stories about Tangier Island’s early settlers
- D To describe what it is like to live on a small isolated island



Answer Key: page 96

You have finished Step 4 in your “Steps to Success.” Be sure to place a check mark in your chart on page 8.

INDEPENDENT PRACTICE

- “Patches” and “Crash”

The purpose of pages 83–91 is to provide you with an opportunity to practice what you have learned by reading stories and answering questions similar to those that are on the TAKS test. The two stories, “Patches” and “Crash,” on pages 83–87 are paired selections and should be read together before you answer the questions that follow. Like the selections on the TAKS test, the stories in this section do not have questions in the margins to guide your thinking. You may want to use “What a Careful Reader Does” on page 11 to help you remember what types of questions to ask yourself as you read.

“Patches” and “Crash”

Now you will read two selections, “Patches” and “Crash.” These are paired selections and should be read together before you answer the questions that follow. “Patches” and “Crash” are **narratives**. Remember that a narrative is a story that you might read for fun. As you read both narratives, think about how they work together to provide different information about the same event. From looking at the illustrations below, can you guess what might happen in the narratives?

LOST



Patches
Disappeared the afternoon of
Monday, October 5.
Patches is white with black
spots. He has short hair and
weighs about 30 pounds. He is
very friendly. We miss him!!
Please call Lisa at 555-9043

DOG FOUND
Lovable dog found on
Franklin Boulevard on
Monday, October 5.
He is still a puppy,
white with black spots.
We are sure that he
is missed!
Call Jack at
555-4210

When you read a narrative, look for these things:

- Characters, such as people or animals
- Setting, or where and when the story takes place
- A **conflict**, or problem, faced by the characters
- A **resolution**, or solution, to the problem

As you read, remember what you have learned so far about being a careful reader. Being a careful reader means asking *who*, *what*, *when*, *where*, *why*, and *how*. It also means using context clues and your experience to figure out the meanings of words that are new to you. And it means determining how the two stories are alike and how they are different.

Ask yourself questions about what is happening in the story. Try to guess what will happen next!

Reading Selections

Patches

- 1 “Patches! Here, boy,” Lisa called, bracing for the impact as she opened the door. At any second the energetic puppy would undoubtedly charge into her like a runaway truck. The playful Dalmatian wasn’t quite a year old, but he was nearly full-grown. When the expected collision didn’t occur, Lisa whistled and called again, but the exuberant dog did not appear.
- 2 “He’s probably behind the bushes,” Lisa thought. Sometimes Patches liked to lie there in the cool dirt, but he wasn’t there today, nor in his doghouse. Then Lisa saw a hole under the gate. Patches’s collar hung there, caught on a piece of wood, broken at the buckle. “Oh, no!” Lisa cried. “Patches!”
- 3 “Dad!” she called, running back inside. “Patches is gone!” She felt her eyes fill with tears. Her family lived near a busy street; they had to find Patches quickly.
- 4 “Get his leash,” her father said, grabbing his keys. “Maybe he hasn’t gotten too far.”
- 5 Lisa held up the broken collar.
- 6 “That’s not good news,” he said. Patches’s dog tags dangled from the collar. “That’ll make it hard for people to contact us if they find him.”
- 7 They searched for hours without finding Patches. “We had better stop for tonight,” Lisa’s father said at last. “Maybe he’s home already. It’s almost time for his supper.”
- 8 Patches was still gone, however, and Lisa couldn’t stop thinking about him. She picked at her dinner and had a hard time falling asleep. “Good night, Patches,” she whispered. “I hope you’re O.K., wherever you are.”
- 9 Patches still wasn’t back the next morning, so Lisa and her father spent the day searching the neighborhood again, calling Patches’s name and asking people whether they had seen him. Lisa’s mother used a picture they had taken of Patches and made a flyer to post in places around the area. Lisa’s father even called the newspaper to place a lost-and-found advertisement.

- 10 Lisa just knew something terrible had happened. Before stopping for the day, they went to check the animal shelter. A moment of hope turned into disappointment when it turned out that a Dalmatian the shelter had taken in wasn't Patches.
- 11 Back at home Lisa looked out the window at Patches's doghouse and felt a tear run down her cheek. Would she ever see him again?
- 12 Just then the doorbell rang, but Lisa just stared out the window. Suddenly she heard a familiar bark. "Patches!" she yelled, running to the front room. Patches shot from her father's grip and almost knocked her over.
- 13 A man and a teenage boy were at the door. "He was on Franklin Boulevard," the man said. "We thought he might get hurt, so we picked him up. We didn't know where he belonged."
- 14 "But I saw your flyer at the supermarket," the boy added. Lisa thought he sounded a little sad.
- 15 "Thanks so much," she said, rubbing Patches's neck vigorously. The excited dog barked and wagged his tail. "And you," Lisa said, looking at Patches, "had better ask permission before you go looking for new friends again!"

Crash

- 1 Jack leaned his head back and closed his eyes. It had been a long, hard day washing cars in the hot sun. At least now his baseball team could buy new uniforms. Just as he opened his eyes, something suddenly darted into the road. “Dad, look out!” he shouted.
- 2 His father barely avoided a dog that had run into his lane. The dog barked excitedly, totally oblivious to the danger. Cars in the other lane zoomed past, but the dog stood happily wagging its tail just a few feet away. “Dad, we’ve got to help it,” Jack said, reaching for his seat belt.
- 3 “Wait,” Jack’s father said, turning on the truck’s emergency flashers. “You stay in the truck.” He waited for a break in the traffic before getting out. The friendly dog ran right over and jumped up on him. “Easy, boy,” he said. “Well, we had better get him off this busy street,” he said as he opened the door. The excited dog leapt in easily and bounded onto Jack’s lap.
- 4 “I don’t see a collar. Can we keep him?” Jack asked excitedly.
- 5 “Let’s try to find out who owns him. They’re probably worried.”
- 6 “He’s a Dalmatian,” Jack said. The dog’s coat was sprinkled with characteristic black spots.
- 7 They drove around for over an hour, asking whether anyone knew someone who had lost a dog, but no one did. Finally they took the dog home. “Just for tonight,” Jack’s father warned. “Tomorrow I’m putting a lost-and-found advertisement in the newspaper. We can put up some flyers, too.”
- 8 “What if nobody calls?” Jack asked hopefully.
- 9 “Let’s see what happens,” his father said cautiously. “A pet is a big responsibility.”
- 10 “O.K.,” Jack said. Still, it was hard to curtail his enthusiasm. He was excited and already had a name in mind.
- 11 They spent the next day putting up flyers. Crash, as Jack had started calling the energetic dog, rode with them. “This is the last one,” Jack said finally. “How about that pole?”

- 12 “We’ve put several around here already,” his father said. “Let’s put it in that big supermarket up the road. It’s a long way from where we found him, but many people shop there.”
- 13 Jack’s father and Crash waited while Jack ran inside. A few minutes later he came out carrying a different flyer. “Look!” he said. “Someone is looking for him.”
- 14 A few minutes later a tired-looking man answered the door at the house listed on the flyer that Jack had found. “Have you been looking for this guy?” Jack’s father asked with a grin.
- 15 “Patches, you rascal!” the man said, grabbing hold of the dog. The dog barked excitedly.
- 16 “Patches!” someone called from another room. Suddenly the impulsive dog bolted loose and crashed into a girl just as she came into the room.
- 17 “Tired?” Jack’s father asked a few minutes later on their way home.
- 18 “Not too tired for a trip to the pet store,” Jack replied hopefully.

Practice Questions

Answer these questions about the selections you just read, “Patches” and “Crash.” As you do, think about the skills you have learned already in “Mayday!” and “The Island Where Crab Is King.”

Use “Patches” (pp. 84–85) to answer questions 11–13.

Question 11

From information about animal shelters provided in this story, the reader can infer that —

- A animal shelters are places where injured animals are taken to see a veterinarian
- B most lost animals are eventually found and taken to a nearby animal shelter
- C animal shelters are places where people sometimes take stray animals
- D information about lost animals should be taken to the nearest animal shelter



Answer Key: page 97

Question 12

Which of these is the best summary of this story?

- A Lisa’s dog does not come when she calls him. She thinks he is probably lying behind the bushes, but he isn’t there when she looks. While looking around her backyard, she sees that he has dug a hole and crawled out.
- B After Lisa discovers that her dog is missing, she and her father search for him for the rest of the day and most of the next day but do not find him. That night a man and his son bring the dog home after seeing a flyer that Lisa’s mother put up in a nearby supermarket.
- C Lisa and her father search their neighborhood for Lisa’s lost dog, but nobody has seen him. When it gets late, they decide to quit for the night. Lisa’s father promises to put an advertisement in the lost-and-found section of the newspaper.
- D Lisa and her father go to the animal shelter to see whether their missing dog has been picked up but are disappointed to find out that he hasn’t. Later that night, as she is wondering whether she will ever see the dog again, Lisa hears a familiar bark.



Answer Key: page 97

Question 13

In paragraph 1, the word exuberant means —

- A high-spirited
- B beautiful
- C slow-moving
- D lazy



Answer Key: page 97

Use “Crash” (pp. 86–87) to answer questions 14–15.

Question 14

In paragraph 3, Jack’s father turns on his truck’s emergency flashers because —

- A he wants to attract the attention of the dog’s owners
- B stopping on the side of the road is dangerous
- C he needs to get the attention of nearby police officers
- D the dog needs to be scared away from the road



Answer Key: page 97

Question 15

How do Jack and his father figure out where to take the dog they find?

- A Someone tells them about a family that has lost its dog.
- B Jack sees a flyer about the dog posted in the supermarket.
- C They get a call from Lisa’s mother after she sees their flyer.
- D Lisa sees their lost-and-found advertisement in the newspaper.



Answer Key: page 97

“Patches” and “Crash”

Use “Patches” and “Crash” (pp. 84–87) to answer questions 16–20.

Question 16

Why does Jack sound sad when he and his father return the dog to Lisa?

- A He sees that Lisa doesn’t treat the dog very nicely.
- B It turns out that it is not the right dog after all.
- C Lisa and her father do not offer him a reward.
- D He was hoping that he might get to keep the dog.



Answer Key: page 98

Question 17

One way these selections are similar is that both —

- A explain why animal shelters are necessary
- B describe what Dalmatians look like
- C explain how to make a flyer for a lost pet
- D involve families trying to get a dog back to its home



Answer Key: page 98

Question 18

These two selections tell the same story but have different —

- A characters
- B points of view
- C outcomes
- D time periods



Answer Key: page 98

Question 19

Which sentence from these selections supports the idea that Lisa’s father is exhausted from looking for the dog?

- A *Lisa’s father even called the newspaper to place a lost-and-found advertisement.*
- B *A few minutes later a tired-looking man answered the door at the house listed on the flyer that Jack had found.*
- C *Patches shot from her father’s grip and almost knocked her over.*
- D *“Tired?” Jack’s father asked a few minutes later on their way home.*



Answer Key: page 98

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Question 20

An idea in both selections is —

- A solving problems
- B growing up
- C helping strangers
- D being honest



Answer Key: page 98

Congratulations! You’ve finished the last step in your “Steps to Success.”
Be sure to place a check mark in your chart on page 8.

ANSWER KEY

- “The Island Where Crab Is King”
- “Patches” and “Crash”

The reading answer key on pages 95–98 provides the answers and explanations for the practice questions that follow “The Island Where Crab Is King” and the paired selections “Patches” and “Crash.” Check your answers to see whether you got the questions right. Don’t worry if you miss some; the explanations included with each question will help you know how to answer the questions correctly.

“The Island Where Crab Is King”

Question 1 (page 77)

- A** Incorrect. There are no clues in the article that the writer feels embarrassed.
- B** Incorrect. There are no clues in the article that the writer feels amused. He is giving a serious description of his home.
- C** Incorrect. There are no clues in the article that the writer feels desperate. He describes his school and the island itself as a nice place.
- D** **Correct.** The article is full of clues that show the writer’s contentment. Words such as “a soft silvery glow,” “the cooing of a mourning dove” (paragraph 1), and “the most incredible sunrises” (paragraph 10) show that the island is peaceful and beautiful. Statements such as “I am a proud fourth-generation waterman” (paragraph 3) and “I feel as modern as any American teenager” (paragraph 10) show that the writer is happy with his life.

If you missed this question, turn to page 59 to read more about style, tone, and mood.

Question 2 (page 77)

- A** Incorrect. The writer does say that crabbing is hard work, but he makes the life of the island’s teenagers seem pleasant, not difficult.
- B** Incorrect. In paragraph 11, the writer does mention things islanders must do without, but this is not the focus of the article.
- C** **Correct.** The article is about the things the writer likes about the island: its beauty, its traditions, and its small size.
- D** Incorrect. The article does not really discuss why people move away from the island.

If you missed this question, turn to page 49 to read more about how the author’s perspective affects a text.

Question 3 (page 77)

- A** Incorrect. The words “floats gently over the calm water” in the next sentence show that the sea is not dangerous.
- B** **Correct.** The words “floats gently over the calm water” in the next sentence are a clue that *tranquil* means “peaceful.”
- C** Incorrect. It does not make sense to describe a sea as “shallow.”
- D** Incorrect. The words “floats gently over the calm water” in the next sentence show that at the moment the sea is gentle, not powerful.

If you missed this question, turn to page 16 to read more about context clues.

Question 4 (page 78)

- A** Incorrect. Nothing in the article suggests that working as a waterman trapping crabs is a good way to prepare for college.
- B** **Correct.** Paragraph 3 states that Ethan is proud to be carrying on the work that his great-grandfather used to do.
- C** Incorrect. Paragraph 4 says that “most of the island’s 800 residents earn their living by trapping crabs.”
- D** Incorrect. Paragraph 4 states that most islanders earn their living either on the bay or at the Tangier Combined School.

If you missed this question, turn to page 51 to read more about drawing conclusions.

Question 5 (page 78)

- A** Incorrect. Ethan never says he would rather play video games than go on the cruise.
- B** Incorrect. Ethan never says he has grown tired of Salisbury.
- C** Incorrect. Paragraph 1 shows that the crab pots are emptied in the morning.
- D** **Correct.** In paragraph 6, Ethan says, “It will be a few more years before I can participate.”

If you missed this question, turn to page 51 to read more about making inferences.

Reading Answer Key

Question 6 (page 78)

- A** Incorrect. Scooters and golf carts have nothing to do with the school, the cruise, or the scavenger hunt.
- B** Incorrect. Paragraph 8 does say that people shop on the mainland, but this has nothing to do with the school, the cruise, or the scavenger hunt.
- C** **Correct.** Dinner and dancing occur the same night as the cruise to Maryland and the scavenger hunt.
- D** Incorrect. Video games and air hockey are mentioned in paragraph 10 to show that Ethan and his friends are modern teenagers. However, this has nothing to do with the school, the cruise, or the scavenger hunt.

If you missed this question, turn to page 45 to read more about using graphic organizers to represent information.

Question 7 (page 79)

- A** **Correct.** Paragraph 7 of the article says Tangier has remained very isolated since it was first settled more than 300 years ago.
- B** Incorrect. The article does not say the islanders think tourists sound strange.
- C** Incorrect. Nothing in the article suggests the islanders are taught to speak that way.
- D** Incorrect. Nothing in the article suggests the way the islanders speak comes from reading books.

If you missed this question, turn to page 41 to read more about cause and effect.

Question 8 (page 79)

- A** Incorrect. This choice does not make sense with the rest of the sentence. What would the fact that the island is “not a great distance away” have to do with the fact that people take the ferry to the mainland?
- B** Incorrect. This choice doesn’t include the meaning “not” from the prefix *in-*, and it doesn’t make sense with the rest of the sentence. What would the fact that the island is “too large to be seen” have to do with the fact that people take the ferry to the mainland?
- C** **Correct.** The prefix *in-* means “not,” so *inaccessible* means “not capable of being reached.” The last sentence of paragraph 8 says “people take the ferry to the mainland,” which makes sense if the island is not capable of being reached by car.

- D** Incorrect. This choice does not make sense with the rest of the sentence. What would the fact that the island is “attractive to tourists” have to do with the fact that people take the ferry to the mainland?

If you missed this question, turn to page 20 to read more about prefixes and suffixes.

Question 9 (page 79)

- A** **Correct.** Paragraph 6 says the cruise will be “something of a farewell” for the high school seniors who will “embark on a new life away from Tangier Island.” And in paragraph 9, the writer wonders whether his sister will return to the island after she graduates from college.
- B** Incorrect. Paragraph 10 says students do have access to computers.
- C** Incorrect. Ferries are used to cross water. The school is on the island, so students do not have to cross water to get to it.
- D** Incorrect. Paragraph 6 says the cruise happens every year.

If you missed this question, turn to page 51 to read more about drawing conclusions.

Question 10 (page 80)

- A** Incorrect. The article does not tell how Ethan feels about tourists.
- B** Incorrect. Paragraphs 1 and 3 do talk about how watermen trap crabs, but most of the article is not about trapping crabs.
- C** Incorrect. The article has very little information about Tangier Island’s early settlers.
- D** **Correct.** The article is a description of life on a small island. It describes Ethan’s work as a waterman, his small but good school, how he gets around on the island, and so on.

If you missed this question, turn to page 48 to read more about purposes of texts.

“Patches” and “Crash”**Question 11 (page 88)**

- A** Incorrect. The story does not say there is a veterinarian at the animal shelter.
- B** Incorrect. Patches is lost for most of the story, but he is never taken to an animal shelter.
- C** **Correct.** Paragraph 10 mentions “a Dalmatian the shelter had taken in.” This tells the reader that the shelter takes in stray animals. Also, when Patches is lost without a collar, Lisa and her father go to the shelter to look for him.
- D** Incorrect. Paragraph 10 says that there is a Dalmatian at the shelter. This shows that the purpose of the shelter is to care for animals, not to collect information about them.

If you missed this question, turn to page 51 to read more about drawing conclusions.

Question 12 (page 88)

- A** Incorrect. This answer choice describes things that happen in “Patches,” but these things all happen at the beginning of the story. A summary needs information from the whole story.
- B** **Correct.** This answer choice mentions all the most important events and ideas from the story.
- C** Incorrect. The third sentence does not match what happens in the story. Although Lisa’s father puts an ad in the newspaper, the story never mentions that he promises to do so.
- D** Incorrect. This answer choice describes things that happen in the story, but there are important events that are left out of this summary.

If you missed this question, turn to page 26 to read more about summarizing texts.

Question 13 (page 89)

- A** **Correct.** The words “energetic,” “charge into her like a runaway truck,” and “playful” are all context clues that show that *exuberant* means “high-spirited.”
- B** Incorrect. There are no clues in paragraph 1 that indicate that Patches is beautiful.
- C** Incorrect. The words “energetic,” “charge into her like a runaway truck,” and “playful” show that Patches moves quickly, not slowly.
- D** Incorrect. The words “energetic,” “charge into her

like a runaway truck,” and “playful” show that Patches is the opposite of lazy.

If you missed this question, turn to page 16 to read more about context clues.

Question 14 (page 89)

- A** Incorrect. The story does not say that Jack’s father thinks the dog’s owners are nearby.
- B** **Correct.** Paragraph 2 tells of cars zooming past and suggests that the dog is in danger. Paragraph 3 states that Jack’s father makes Jack stay in the truck. It also tells that Jack’s father waits for a break in traffic before getting out of his truck. The actions of Jack’s father show that he is concerned about being hit by other drivers.
- C** Incorrect. The story does not say that any police officers are nearby.
- D** Incorrect. In paragraph 3, Jack’s father opens the door to the truck so that the dog can jump in. In paragraph 7, he and Jack try to find the dog’s owners. These actions show they want to help the dog get home, not scare it off the road.

If you missed this question, turn to page 41 to read more about recognizing cause and effect.

Question 15 (page 89)

- A** Incorrect. This never happens in the story.
- B** **Correct.** In paragraph 13, Jack comes out of the supermarket carrying a flyer and tells his father that someone is looking for the dog.
- C** Incorrect. This never happens in the story.
- D** Incorrect. This never happens in the story. In paragraph 7, Jack’s father does say he will put a lost-and-found ad in the newspaper, but the story never states whether he does this.

If you missed this question, turn to page 26 to read more about finding supporting details.

Reading Answer Key

Question 16 (page 90)

- A Incorrect. Neither story ever shows that Lisa does not treat the dog nicely.
- B Incorrect. Both stories show that Patches and Lisa recognize each other.
- C Incorrect. It is true that Jack is not offered a reward, but Jack's actions in "Crash" show that he cares about the dog, not about money.
- D **Correct.** In paragraph 4 of "Crash," Jack asks his father whether he can keep the dog. Paragraph 10 of "Crash" says that he has even picked a name for the dog.

If you missed this question, turn to page 43 to read more about comparing two selections.

Question 17 (page 90)

- A Incorrect. "Patches" mentions animal shelters in paragraph 10, but "Crash" never does.
- B Incorrect. "Crash" describes Dalmatians in paragraph 6, but "Patches" never does.
- C Incorrect. Both stories talk about flyers, but neither story explains how to make one.
- D **Correct.** Both stories are about families trying to get a lost dog back home.

If you missed this question, turn to page 56 to read more about connecting and comparing ideas.

Question 18 (page 90)

- A Incorrect. Both stories have the same characters: Lisa and her father and Jack and his father.
- B **Correct.** The events of "Patches" are seen from Lisa's point of view, and the events of "Crash" are seen from Jack's point of view.
- C Incorrect. Both stories have the same outcome: Jack and his father take Patches back to Lisa.
- D Incorrect. Both stories are set during the same time period: the two days when Patches is missing.

If you missed this question, turn to page 43 to read more about finding differences across texts.

Question 19 (page 91)

- A Incorrect. This sentence by itself does not show that Lisa's father is exhausted.
- B **Correct.** This sentence from "Crash" tells how tired Lisa's father looks. Paragraph 9 of "Patches" says that Lisa's father has spent all day looking for Patches.
- C Incorrect. This sentence is not about Lisa's father.
- D Incorrect. This sentence is not about how tired Lisa's father is.

If you missed this question, turn to page 54 to read more about using a text to support responses.

Question 20 (page 91)

- A **Correct.** Both selections are about problem solving. Lisa and her father try to solve the problem of finding their lost dog. Jack and his father try to solve the problem of finding a dog's owners.
- B Incorrect. Neither story is about growing up.
- C Incorrect. This idea is found in "Crash" but not in "Patches."
- D Incorrect. This idea is found in "Crash" but not in "Patches."

If you missed this question, turn to page 56 to read more about connecting ideas across texts.

MATHEMATICS

What Is This Book?

This is a study guide to help you strengthen the skills tested on the Grade 7 Texas Assessment of Knowledge and Skills (TAKS). TAKS is a state-developed test administered with no time limit. It is designed to provide an accurate measure of learning in Texas schools.

By acquiring all the skills taught in seventh grade, you will be better prepared to succeed on the Grade 7 TAKS and during the next school year. This study guide is organized into three sections. This section is about mathematics.

What Are Objectives?

Objectives are goals for the knowledge and skills that a student should achieve. The specific goals for instruction in Texas schools were provided by the Texas Essential Knowledge and Skills (TEKS). The objectives for TAKS were developed based on the TEKS.

How Is the Mathematics Section Organized?

The mathematics section of this study guide is divided into the six objectives tested on TAKS. A statement at the beginning of each objective lists the mathematics skills you need to acquire. The study guide covers a large amount of material. You should not expect to complete it all at once. It may be best to work through one objective at a time.

Each objective is organized into review sections and a practice section. The review sections present examples and explanations of the mathematics skills for each objective. The practice sections feature mathematics problems that are similar to the ones used on the TAKS test.

How Can I Use This Book?

First look at your Confidential Student Report. This is the report the school gave you that shows your TAKS scores. This report will tell you which TAKS subject-area test(s) you passed and which one(s) you did not pass. Use your report to determine which skills need improvement. Once you know which skills need to be improved, you can read through the instructions and examples that support those skills. You may also choose to work through all the sections. Pace yourself as you work through the study guide. Work in short sessions. If you become frustrated, stop and start again later.

What Are the Helpful Features of the Mathematics Section?

- There are several words in the mathematics section that are important for you to understand. These words are bold-faced in the text and are defined when they are introduced. Locate the bold-faced words and review the definitions.
- Examples are contained inside shaded boxes.
- Each objective has “Try It” problems based on the examples in the review sections.
- A Grade 7 Mathematics Chart is included on pages 102–103 and also as a tear-out page in the back of the book. This chart includes useful mathematics information. The tear-out Mathematics Chart in the back of the book also provides both a metric and a customary ruler to help solve problems requiring measurement of length.

- Look for the following features in the margin:

Ms. Mathematics provides important instructional information for a topic.



Detective Data offers a question that will help remind you of the appropriate approach to a problem.



Do you see that . . . points to a significant sentence in the instruction.



How Should the “Try It” Problems Be Used?

“Try It” problems are found throughout the review sections of the mathematics study guide. These problems provide an opportunity for you to practice skills that have just been covered in the instruction. Each “Try It” problem features lines for your responses. The answers to the “Try It” problems are found immediately following each problem.

While completing a “Try It” problem, cover up the answer portion with a sheet of paper. Then check the answer.

What Kinds of Practice Questions Are in the Study Guide?

The mathematics study guide contains questions similar to those found on the Grade 7 TAKS test. There are two types of questions in the mathematics section.

- **Multiple-Choice Questions:** Most of the practice questions are multiple choice with four answer choices. These questions present a mathematics problem using numbers, symbols, words, a table, a diagram, or a combination of these. Read each problem carefully. If there is a table or diagram, study it. You should read each answer choice carefully before choosing the best answer.
- **Griddable Questions:** Some practice questions use a seven-column answer grid like those used on the Grade 7 TAKS test.

How Do You Use an Answer Grid?

The answer grid contains seven columns, which includes two decimal places: tenths and hundredths.

Suppose 3,108.6 is the answer to a problem. First write the number in the blank spaces. Be sure to use the correct place value. For example, 3 is in the thousands place, 1 is in the hundreds place, 0 is in the tens place, 8 is in the ones place, and 6 is in the tenths place.

Then fill in the correct bubble under each digit. Notice that if there is a zero in the answer, you need to fill in the bubble for the zero.

The grid shows 3,108.6 correctly entered. The zero in the tens place is bubbled in because it is part of the answer. It is not necessary to bubble in the zero in the hundredths place, because this zero will not affect the value of the correct answer.

3	1	0	8	.	6	
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Where Can Correct Answers to the Practice Questions Be Found?

The answers to the practice questions are in the answer key at the back of the mathematics section, pages 236–244. Each question includes a reference to the page number in the answer key for the answer to the problem. The answer key explains the correct answer, and it also includes some explanations for incorrect answers. After you answer the practice questions, you can check your answers.

If you still do not understand the correct answer after reading the answer explanations, ask a friend, family member, or teacher for help. Even if you have chosen the correct answer, it is a good idea to read the answer explanation because it may help you better understand why the answer is correct.

Grade 7 Mathematics Chart

LENGTH

Metric

1 kilometer = 1000 meters

1 meter = 100 centimeters

1 centimeter = 10 millimeters

Customary

1 mile = 1760 yards

1 mile = 5280 feet

1 yard = 3 feet

1 foot = 12 inches

CAPACITY AND VOLUME

Metric

1 liter = 1000 milliliters

Customary

1 gallon = 4 quarts

1 gallon = 128 ounces

1 quart = 2 pints

1 pint = 2 cups

1 cup = 8 ounces

MASS AND WEIGHT

Metric

1 kilogram = 1000 grams

1 gram = 1000 milligrams

Customary

1 ton = 2000 pounds

1 pound = 16 ounces

TIME

1 year = 365 days

1 year = 12 months

1 year = 52 weeks

1 week = 7 days

1 day = 24 hours

1 hour = 60 minutes

1 minute = 60 seconds

Metric and customary rulers can be found on the tear-out Mathematics Chart in the back of this book.

Grade 7 Mathematics Chart

Perimeter	square	$P = 4s$
	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
Circumference	circle	$C = 2\pi r$ or $C = \pi d$
Area	square	$A = s^2$
	rectangle	$A = lw$ or $A = bh$
	triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
Volume	cube	$V = s^3$
	rectangular prism	$V = lwh$ or $V = Bh^*$
	cylinder	$V = \pi r^2h$ or $V = Bh^*$
<i>*B represents the area of the Base of a solid figure.</i>		
Pi	π	$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$

Objective 1

The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

For this objective you should be able to

- represent and use numbers in a variety of equivalent forms; and
- add, subtract, multiply, or divide to solve problems and justify solutions.

What Are Rational Numbers?

Numbers that can be written in the form of a fraction are called **rational numbers**. Integers, fractions, mixed numbers, percents, and some decimals are rational numbers. For example, the integer 7 can be written as the fraction $\frac{7}{1}$. The mixed number $3\frac{1}{4}$ is equivalent to the fraction $\frac{13}{4}$. The decimal 0.3 is equal to $\frac{3}{10}$. Each of these numbers can be written in the form of a fraction. They are all rational numbers.

How Do You Convert Between Different Forms of Rational Numbers?

Given a rational number in one form (integer, fraction, mixed number, percent, or decimal), you should be able to convert it to an equivalent number in any of the other forms. Here are some guidelines for converting rational numbers.

To convert a fraction to a decimal, divide the numerator of the fraction by the denominator.

Rewrite $\frac{4}{5}$ as an equivalent decimal.

Divide the numerator, 4, by the denominator, 5.

The fraction $\frac{4}{5}$ is equivalent to the decimal 0.8.

$$\begin{array}{r} 0.8 \\ 5 \overline{)4.0} \\ \underline{-4.0} \\ 0 \end{array}$$

To convert a decimal to a fraction or mixed number, use the place value of the digit farthest to the right of the decimal point as the denominator. Use the digits to the right of the decimal point as the numerator. Use any digits to the left of the decimal point as the whole-number part of a mixed number.

Rewrite 0.381 as a fraction.

The place value of the digit farthest to the right of the decimal point is thousandths.

0.381

Use 1,000 as the denominator.

Use 381 as the numerator.

The decimal 0.381 is equivalent to the fraction $\frac{381}{1,000}$.

Rewrite 12.07 as a mixed number.

The place value of the digit farthest to the right of the decimal point is hundredths.

12.07

Use 100 as the denominator.

Use 7 as the numerator.

Use 12 as the whole-number part of the mixed number.

The decimal 12.07 is equivalent to the mixed number $12\frac{7}{100}$.

To convert a decimal to a percent, multiply by 100. Then place the percent sign after the number.

Rewrite 0.675 as a percent.

Multiply 0.675 by 100. This moves the decimal point two places to the right.

$$0.675 \cdot 100 = 67.5$$

Write a percent sign.

$$0.675 = 67.5\%$$

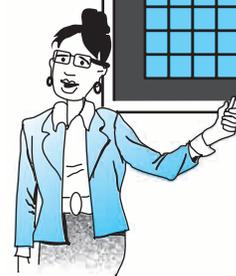
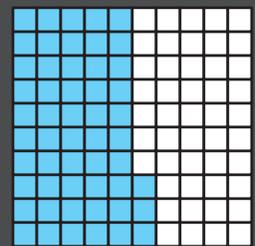
The decimal 0.675 is equivalent to 67.5%.

To convert a fraction to a percent, first convert the fraction to a decimal by dividing the numerator by the denominator. Then convert the decimal to a percent by multiplying by 100 and writing a percent sign.

A percent is a ratio that compares a number to 100.

For example, 53% means 53 parts out of 100 parts, or $\frac{53}{100}$.

On the square below, 53 parts out of 100, or 53%, is shaded.



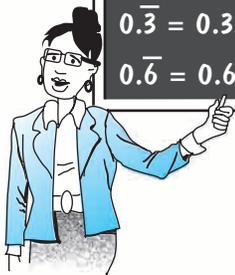
Objective 1

A bar over a decimal number indicates a repeating decimal.

The fractions $\frac{1}{3}$ and $\frac{2}{3}$ convert to repeating decimals.

$$0.\overline{3} = 0.333333\dots$$

$$0.\overline{6} = 0.666666\dots$$



Rewrite $\frac{5}{6}$ as a percent.

Divide the numerator, 5, by the denominator, 6.

$$5 \div 6 = 0.8\overline{3}$$

Multiply by 100 to convert the decimal to a percent.

$$0.8\overline{3} \cdot 100 = 83.\overline{3}$$

$$0.8\overline{3} = 83.\overline{3}\%$$

The fraction $\frac{5}{6}$ is equivalent to $83.\overline{3}\%$.

To convert a percent to a decimal, divide the percent by 100 and omit the percent sign.

Rewrite 53.2% as a decimal.

Divide 53.2 by 100. This moves the decimal point two places to the left.

$$53.2 \div 100 = 0.532$$

The value 53.2% is equivalent to the decimal 0.532.

To convert a percent to a fraction, express the percent as a fraction with a denominator of 100. If the percent is greater than 100%, you will have to express it as a mixed number.

Rewrite 48% as a fraction.

Use 48 as the numerator and 100 as the denominator.

$$\frac{48}{100}$$

Simplify the fraction.

$$\frac{48}{100} = \frac{12}{25}$$

The value 48% is equivalent to $\frac{12}{25}$.

Rewrite 225% as a mixed number.

Use 225 as the numerator and 100 as the denominator.

$$\frac{225}{100}$$

Rewrite the improper fraction as a mixed number.

Divide 225 by 100.

$$225 \div 100 = 2 \text{ R}25$$

Place the remainder over 100.

$$\frac{225}{100} = 2\frac{25}{100}$$

Simplify the fractional part of the mixed number.

$$\frac{25}{100} = \frac{1}{4}$$

The value 225% is equivalent to $2\frac{1}{4}$.

Here are some equivalent fractions, decimals, and percents you need to know:

Fraction	Decimal	Percent	Fraction	Decimal	Percent
$\frac{1}{2}$	= 0.5	= 50%	$\frac{3}{5}$	= 0.6	= 60%
$\frac{2}{2}$	= 1.0	= 100%	$\frac{4}{5}$	= 0.8	= 80%
$\frac{1}{3}$	= $0.\overline{3}$	= $33\frac{1}{3}\%$	$\frac{5}{5}$	= 1.0	= 100%
$\frac{2}{3}$	= $0.\overline{6}$	= $66\frac{2}{3}\%$	$\frac{1}{8}$	= 0.125	= 12.5%
$\frac{3}{3}$	= 1.0	= 100%	$\frac{2}{8}$	= 0.25	= 25%
$\frac{1}{4}$	= 0.25	= 25%	$\frac{3}{8}$	= 0.375	= 37.5%
$\frac{2}{4}$	= 0.5	= 50%	$\frac{4}{8}$	= 0.5	= 50%
$\frac{3}{4}$	= 0.75	= 75%	$\frac{5}{8}$	= 0.625	= 62.5%
$\frac{4}{4}$	= 1.0	= 100%	$\frac{6}{8}$	= 0.75	= 75%
$\frac{1}{5}$	= 0.2	= 20%	$\frac{7}{8}$	= 0.875	= 87.5%
$\frac{2}{5}$	= 0.4	= 40%	$\frac{8}{8}$	= 1.0	= 100%

Try It

Sarah answered 22 out of 25 questions correctly on her quiz. What percent of the quiz questions did she answer correctly?

The fraction of questions Sarah answered correctly is $\frac{\square}{\square}$.

Convert this fraction to a decimal by dividing _____ by _____.

) _____

The fraction $\frac{\square}{\square}$ is equivalent to the decimal _____.

Convert the decimal to a percent by moving the decimal point _____ places to the _____.

The decimal _____ is equivalent to _____%.

Sarah answered _____% of the quiz questions correctly.

The fraction of questions Sarah answered correctly is $\frac{22}{25}$. Convert this fraction to a decimal by dividing 22 by 25: $22 \div 25 = 0.88$. The fraction $\frac{22}{25}$ is equivalent to the decimal 0.88. Convert the decimal to a percent by moving the decimal point **two** places to the **right**. The decimal 0.88 is equivalent to **88%**. Sarah answered **88%** of the quiz questions correctly.

Try It

At a school football game, 35% of the people watching the game were middle school students. What fraction of the people watching the game were middle school students?

Convert _____ to a decimal. Move the decimal point _____ places to the _____.

_____ % = _____

Rewrite the decimal 0.35 as a fraction:

$0.35 = \frac{\square}{100}$

Simplify the fraction:

$\frac{\square}{100} = \frac{\square}{\square}$

Of the people watching the game, $\frac{\square}{\square}$ were middle school students.

Convert **35%** to a decimal. Move the decimal point **two** places to the **left**: $35\% = 0.35$. Rewrite the decimal 0.35 as a fraction: $0.35 = \frac{35}{100}$. Simplify the fraction: $\frac{35}{100} = \frac{7}{20}$. Of the people watching the game, $\frac{7}{20}$ were middle school students.

How Do You Compare and Order Rational Numbers?

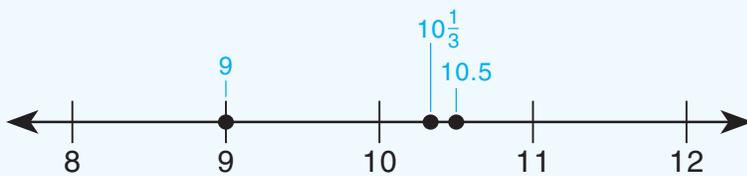
To place a group of rational numbers in order, first convert them to the same form, such as fractions or decimals, and then place them in order. The form you use will depend on the numbers with which you are working.

Here are some guidelines for comparing numbers and placing them in order.

- To compare whole numbers, compare the digits in each place value, starting at the left.
- To compare fractions with the same denominator, compare the numerators.
- To compare fractions with different denominators, rewrite the fractions as equivalent fractions with the same denominator. Then compare the numerators.
- To compare mixed numbers, first compare the whole-number parts. If the whole-number parts are equal, then compare the fractional parts.
- To compare decimal numbers, compare the digits in each place value, starting at the left. Remember that when you compare decimals, the numbers should all have the same number of places to the right of the decimal point. Place zeros to the right of the last digit if necessary.

Some problems ask you to find a number that is between two other numbers. A number is between two numbers if it is greater than one of the numbers and less than the other number.

Of the numbers $10\frac{1}{3}$, 9, and 10.5, which is between the other two numbers?



- Look at the three numbers plotted on the number line above. The number $10\frac{1}{3}$ is to the left of 10.5, so $10\frac{1}{3}$ is less than 10.5. The number 9 is to the left of $10\frac{1}{3}$, so 9 is less than $10\frac{1}{3}$. From least to greatest, the numbers are 9, $10\frac{1}{3}$, and 10.5.
- You can also use symbols ($>$, $<$, or $=$) to represent the relationship between numbers.

$$10\frac{1}{3} < 10.5$$

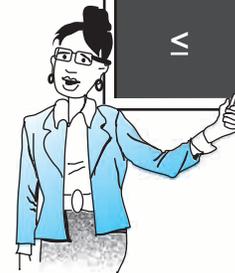
$$9 < 10\frac{1}{3}$$

$$9 < 10\frac{1}{3} < 10.5$$

The number $10\frac{1}{3}$ is between the numbers 9 and 10.5.

Here are some math symbols you need to know.

Symbol	Meaning
=	is equal to
>	is greater than
<	is less than
\geq	is greater than or equal to
\leq	is less than or equal to



Compare the following numbers. How are these numbers related?

$$33\frac{1}{3}\% \quad \frac{1}{3} \quad 2.5 \quad 2\frac{1}{2}$$

- One way to compare the numbers is to convert them all to fractions.

$$33\frac{1}{3}\% = \frac{1}{3} \qquad \frac{1}{3} = \frac{1}{3}$$

$$2.5 = 2\frac{1}{2} \qquad 2\frac{1}{2} = 2\frac{1}{2}$$

- Two of the numbers are equal to $\frac{1}{3}$.

$$33\frac{1}{3}\% = \frac{1}{3} \qquad \frac{1}{3} = \frac{1}{3}$$

- Two of the numbers are equal to $2\frac{1}{2}$.

$$2.5 = 2\frac{1}{2} \qquad 2\frac{1}{2} = 2\frac{1}{2}$$

- The numbers that equal $2\frac{1}{2}$ are greater than the numbers that equal $\frac{1}{3}$.

The numbers 2.5 and $2\frac{1}{2}$ are greater than $33\frac{1}{3}\%$ and $\frac{1}{3}$.

In other problems you may be asked to find the greatest or least number in a group of rational numbers.

Which of these three rational numbers is the greatest?

$$0.237 \quad \frac{1}{4} \quad 24\%$$

- Convert all the numbers to decimals so you can compare the place value of the digits. Write zeros as needed so the numbers have the same number of decimal places.

$$0.237 = 0.237$$

$$\frac{1}{4} = 0.250 \quad \text{Divide the numerator, 1, by the denominator, 4.}$$

$$24\% = 0.240 \quad \text{Move the decimal point two places to the left.}$$

- Compare the decimals.

Look at the ones place. The numbers all have a 0 in the ones place.

Look at the next place, tenths. The numbers all have a 2 in the tenths place.

Look at the next place, hundredths.

$$0.237 \quad 0.250 \quad 0.240$$

Since 5 is the greatest value, 0.25 or $\frac{1}{4}$ is the greatest number.

Some problems ask you to place a group of rational numbers in order.

Place this list of numbers in order from least to greatest.

$$72\% \quad 0.713 \quad \frac{3}{4} \quad \frac{2}{3}$$

- Convert all the numbers to decimals.

$$72\% = 0.72 \quad \text{Move the decimal point two places to the left.}$$

$$0.713 = 0.713$$

$$\frac{3}{4} = 0.75 \quad \text{Divide the numerator, 3, by the denominator, 4.}$$

$$\frac{2}{3} = 0.6\overline{66} \quad \text{Divide the numerator, 2, by the denominator, 3.}$$

- Compare the decimals. Write zeros as needed to create the same number of decimal places.

$$0.720 \quad 0.713 \quad 0.750 \quad 0.6\overline{66}$$

Look at the ones place. The numbers all have a 0 in the ones place.

Look at the next place, tenths.

Since 6 is the least value, $0.6\overline{66}$ is the least number. List $\frac{2}{3}$ first.

- The remaining numbers all have a 7 in the tenths place. Look to the next place, hundredths.

$$0.7\overline{20} \quad 0.7\overline{13} \quad 0.7\overline{50}$$

Since $1 < 2 < 5$, the three numbers from least to greatest are

$$0.7\overline{13} \quad 0.7\overline{20} \quad 0.7\overline{50}$$

This is the same as: $0.713 \quad 72\% \quad \frac{3}{4}$

The four numbers listed in order from least to greatest are as follows:

$$\frac{2}{3} \quad 0.713 \quad 72\% \quad \frac{3}{4}$$



To finish first in a race, do you want to have the greatest or least time?

Try It

The table shows the times it took several students to run a 1-mile race. In what order did the students finish the race?

Student	Time (minutes)
Barb	7.23
Gary	$7\frac{1}{2}$
Wallace	8.2
Tanya	$7\frac{3}{4}$

The student with the least time will finish the race _____.

The student with the greatest time will finish the race _____.

The greatest number is _____ because _____ is greater than _____, so it will be the last number in the list.

The other three numbers all have _____ as their whole-number part.

The mixed number $7\frac{1}{2}$ expressed as a decimal is _____.

The mixed number $7\frac{3}{4}$ expressed as a decimal is _____.

Since $2 < \underline{\hspace{1cm}} < 7$, it follows that _____ $<$ _____ $<$ _____.

The numbers in order from least to greatest are

_____, _____, _____, and _____.

The original numbers in order from least to greatest are _____,

_____, _____, and _____.

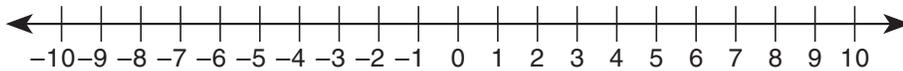
The order in which the students finished the race is

_____, _____, _____, and _____.

The student with the least time will finish the race **first**. The student with the greatest time will finish the race **last**. The greatest number is **8.2** because **8** is greater than **7**. The other three numbers all have **7** as their whole-number part. The number $7\frac{1}{2} = 7.5$, and $7\frac{3}{4} = 7.75$. Since $2 < 5 < 7$, it follows that $7.23 < 7.5 < 7.75$. The numbers in order from least to greatest are **7.23**, **7.5**, **7.75**, and **8.2**. The original numbers in order from least to greatest are **7.23**, $7\frac{1}{2}$, $7\frac{3}{4}$, and **8.2**. The order in which the students finished the race is **Barb**, **Gary**, **Tanya**, and **Wallace**.

How Do You Compare and Order Integers?

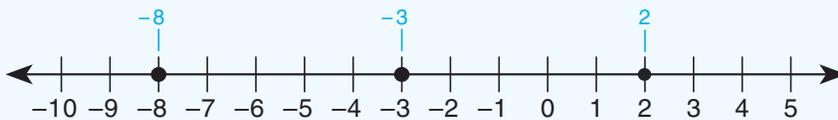
Integers are the set of all positive and negative numbers and zero. You can represent integers on a number line that extends in both directions from 0.



You can use a number line to compare any two integers, x and y .

- If the integer x is to the left of the integer y on the number line, then $x < y$.
- If the integer x is to the right of the integer y on the number line, then $x > y$.

Use the number line below to compare 2, -8 , and -3 .



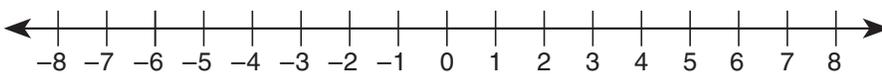
Since -8 is to the left of -3 on the number line, $-8 < -3$.

Since -3 is to the left of 2 on the number line, $-3 < 2$.

$$-8 < -3 < 2$$

Try It

Use a number line to order -4 , 3, and -1 from least to greatest.



Since _____ is to the left of -1 on the number line,

$$\underline{\hspace{2cm}} < \underline{\hspace{2cm}} .$$

Since _____ is to the left of 3 on the number line,

$$\underline{\hspace{2cm}} < \underline{\hspace{2cm}} .$$

The numbers in order from least to greatest are

$$\underline{\hspace{2cm}} , \underline{\hspace{2cm}} , \text{ and } \underline{\hspace{2cm}} .$$

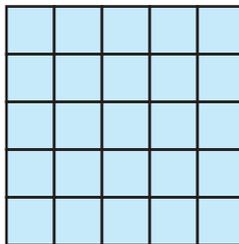
Since -4 is to the left of -1 on the number line, $-4 < -1$. Since -1 is to the left of 3 on the number line, $-1 < 3$. The numbers in order from least to greatest are -4 , -1 , and 3.

What Are the Square of a Number and the Square Root of a Number?

The **square** of a number is the product of a number and itself. For example, the square of 5 is 25 because $5 \cdot 5 = 25$.

This relationship can also be written as $5^2 = 25$. The expression $5^2 = 25$ is read *five squared equals 25*.

The figure below illustrates why the term *square* is used to describe the relationship between 5 and 25. A square with a side of 5 units has an area of 25 square units: 5 squared equals 25.

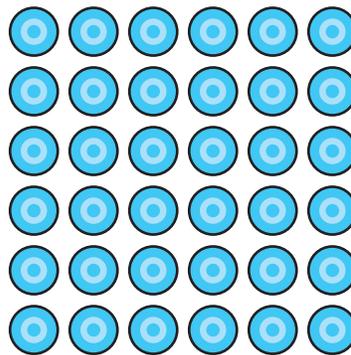


$$5 \cdot 5 = 5^2 = 25$$

The **square root** of a given number is a number that when multiplied by itself equals the given number. For example, the square root of 36 is 6 because $6 \cdot 6 = 36$. The symbol for square root is $\sqrt{\quad}$. The square root of 36 is written as $\sqrt{36}$ and is read *the square root of 36*. The figure below illustrates one way to find the square root of 36.

How can you arrange 36 s so they form a square?

The only way to do so is to put them in 6 rows, with 6 s in each row.



$$36 = 6 \cdot 6$$

The figure shows that $6 \cdot 6 = 36$, and that $\sqrt{36} = 6$.

Here are some more examples of squares and square roots.

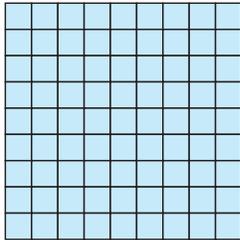
$$4^2 = 16, \quad \sqrt{16} = 4$$

$$7^2 = 49, \quad \sqrt{49} = 7$$

$$10^2 = 100, \quad \sqrt{100} = 10$$

Try It

The model below can be used to find the square root of what number?



Each side of the square is _____ units long.

There are _____ unit squares in the large square.

You can use this information to write the equation

$$\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} = \underline{\hspace{2cm}}.$$

This model could be used to find $\sqrt{\underline{\hspace{2cm}}}$.

Each side of the square is 9 units long. There are 81 unit squares in the large square. You can use this information to write the equation $9 \cdot 9 = 81$. This model could be used to find $\sqrt{81}$.

How Can You Represent Multiplication and Division of Fractions and Decimals?

You can represent multiplication and division of fractions and decimals by using models, pictures, words, and numbers. A model shows the relationship between the decimals or fractions in the problem. The model may be an actual model, such as one made out of blocks, or a picture, an equation, or an expression.

Francis is making cookies. Each cookie needs $\frac{3}{4}$ teaspoon of colored sprinkles. Francis has $13\frac{1}{2}$ teaspoons of colored sprinkles.

Write an expression to find how many cookies he can decorate with this quantity of sprinkles.

- The whole, $13\frac{1}{2}$ teaspoons, will be separated into a number of equal smaller parts, each $\frac{3}{4}$ teaspoon.
- Use division to separate a whole into equal parts.

The expression $13\frac{1}{2} \div \frac{3}{4}$ represents how many cookies Francis can decorate with $13\frac{1}{2}$ teaspoons of sprinkles.

Try It

Zena estimates that she needs $3\frac{1}{2}$ yards of fabric to make a new dress. The fabric she wants costs \$8.75 per yard. What expression can Zena use to find the cost of the fabric needed to make the dress?

Use the operation of _____ to find the total cost of the fabric.

Convert $3\frac{1}{2}$ to a decimal: $3\frac{1}{2} = \underline{\hspace{2cm}}$.

The expression _____ \cdot _____ can be used to find the total cost of the fabric.

Use the operation of **multiplication** to find the total cost of the fabric. The number $3\frac{1}{2} = 3.5$.

The expression $\$8.75 \cdot 3.5$ can be used to find the total cost of the fabric.

How Do You Multiply and Divide Fractions and Decimals?

When you multiply fractions, first multiply the numerators to get the numerator of the product. Then multiply the denominators to get the denominator of the product. The fractions do not need a common denominator.

Multiply $\frac{9}{10}$ by $\frac{4}{5}$.

$$\frac{9}{10} \cdot \frac{4}{5} = \frac{9 \cdot 4}{10 \cdot 5} = \frac{36}{50}$$

Simplify your answer.

$$\frac{36}{50} = \frac{18}{25}$$

$$\frac{9}{10} \cdot \frac{4}{5} = \frac{18}{25}$$

When you multiply mixed numbers, first convert each mixed number to a fraction. Then multiply the fractions using the method above.

Do you see
that . . .



Multiply $3\frac{2}{7}$ by $\frac{1}{3}$.

- Convert the mixed number $3\frac{2}{7}$ to a fraction.

$$3\frac{2}{7} = \frac{(7 \cdot 3) + 2}{7} = \frac{23}{7}$$

- Multiply the fractions.

$$\frac{23}{7} \cdot \frac{1}{3} = \frac{23 \cdot 1}{7 \cdot 3} = \frac{23}{21}$$

- Convert the answer to a mixed number.

$$\frac{23}{21} = 23 \div 21 = 1 \text{ R}2$$

- Express the remainder as a fraction. Use the remainder, 2, as the numerator. Use the divisor, 21, as the denominator.

$$1 \text{ R}2 = 1\frac{2}{21}$$

$$3\frac{2}{7} \cdot \frac{1}{3} = 1\frac{2}{21}$$

To divide a number by a fraction, multiply the number by the reciprocal of the divisor.

How many $\frac{2}{3}$ -cup servings of punch can be obtained from 4 cups of punch?

- Use the operation of division to divide a whole (4 cups) into equal parts ($\frac{2}{3}$ cup).

$$4 \div \frac{2}{3} \quad \text{The fraction } \frac{2}{3} \text{ is the divisor.}$$

- To divide, multiply by the reciprocal of the divisor.

$$4 \div \frac{2}{3} = 4 \cdot \frac{3}{2} \quad \text{The reciprocal of } \frac{2}{3} \text{ is } \frac{3}{2}.$$

- The whole number 4 is the same as the fraction $\frac{4}{1}$.

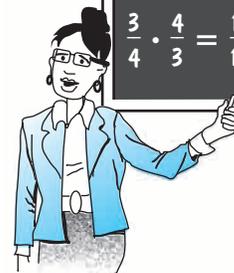
$$\frac{4}{1} \cdot \frac{3}{2} = \frac{4 \cdot 3}{1 \cdot 2} = \frac{12}{2} = \frac{6}{1} = 6$$

There are 6 servings of $\frac{2}{3}$ cup each in 4 cups of punch.

Reciprocals are numbers whose products are equal to 1.

The numbers $\frac{3}{4}$ and $\frac{4}{3}$ are reciprocals because

$$\frac{3}{4} \cdot \frac{4}{3} = \frac{12}{12} = 1.$$



Try It

Divide $\frac{5}{12}$ by $\frac{5}{8}$.

The fraction $\frac{\square}{\square}$ is the divisor.

The reciprocal of $\frac{5}{8}$ is $\frac{\square}{\square}$.

Multiply $\frac{\square}{\square}$ by the reciprocal of the divisor.

$$\begin{aligned} \frac{5}{12} \div \frac{5}{8} &= \frac{5}{12} \cdot \frac{\square}{\square} \\ &= \frac{5 \cdot \square}{12 \cdot \square} \\ &= \frac{40}{60} \\ &= \frac{\square}{\square} \end{aligned}$$

$$\frac{5}{12} \div \frac{5}{8} = \frac{\square}{\square}$$

The fraction $\frac{5}{8}$ is the divisor. The reciprocal of $\frac{5}{8}$ is $\frac{8}{5}$. Multiply $\frac{5}{12}$ by the reciprocal of the divisor.

$$\frac{5}{12} \div \frac{5}{8} = \frac{5}{12} \cdot \frac{8}{5} = \frac{5 \cdot 8}{12 \cdot 5} = \frac{40}{60} = \frac{2}{3}$$

$$\frac{5}{12} \div \frac{5}{8} = \frac{2}{3}$$

To multiply decimals, first multiply the numbers as if they were whole numbers. Then place the decimal point correctly in the product. You do not need to line up the decimal points in multiplication as you do in addition and subtraction.

Before you multiply decimals, you should round to the nearest whole number and estimate the answer. This is a good way to be certain you have placed the decimal point correctly in the product.



Do you see that . . .

Multiply 2.14 by 3.2.

- Estimate the answer by rounding: $2.14 \cdot 3.2$ is approximately $2 \cdot 3$, which is 6. Your answer should be close to 6.
- Multiply the numbers.

$$\begin{array}{r}
 2.14 \quad \leftarrow \text{Factor} \\
 \times 3.2 \quad \leftarrow \text{Factor} \\
 \hline
 428 \\
 + 6420 \\
 \hline
 6848 \quad \leftarrow \text{Product}
 \end{array}$$

- To place the decimal point correctly in the answer, count the number of decimal places to the right of the decimal point in each of the factors.

2.14 2 decimal places to the right of the decimal point

3.2 1 decimal place to the right of the decimal point

Since there are a total of 3 decimal places to the right of the decimal points in the two factors, there should be 3 decimal places to the right of the decimal point in the product.

6.848

- Compare 6.848 to your estimate, which was about 6. Since 6.848 is close to 6, you placed the decimal point correctly in the product.

$$2.14 \cdot 3.2 = 6.848$$

Divide 4.5 by 0.75.

- Estimate the answer by rounding: $4.5 \div 0.75$ is approximately $5 \div 1$, which is equal to 5. Your answer should be about 5.
- Count the number of decimal places to the right of the decimal point in the divisor. In this case, it is two places. Move the decimal points and divide.

$$\begin{array}{r} \text{Divisor} \rightarrow 0.75 \overline{) 4.50} \end{array}$$

← Quotient
← Dividend

$$\begin{array}{r} 6. \\ 75 \overline{) 450} \\ - 450 \\ \hline 0 \end{array}$$

Move the decimal two places to the right in the divisor and the dividend. Since 4.5 has only one digit to the right of the decimal point, place a 0 to the right of the 5. Then move the decimal point in the dividend straight up into the quotient. Divide.

- Compare 6 to your estimate, which was about 5. Since 6 is close to 5, you placed the decimal point correctly in the quotient.

$$4.5 \div 0.75 = 6$$

Try It

Multiply 15 by 4.12.

Estimate the answer. Your answer should be about

_____ • _____, or _____.

Multiply the numbers.

$$\begin{array}{r} 4.12 \\ \times 15 \\ \hline \end{array}$$

Place the decimal point correctly in the answer. There are a total of _____ decimal places to the right of the decimal point in the two factors.

The product of 15 and 4.12 is _____.

Your answer should be about $15 \cdot 4$, or 60. There are a total of **two** decimal places to the right of the decimal point in the two factors. The product of 15 and 4.12 is **61.80**.

$$\begin{array}{r} 4.12 \\ \times 15 \\ \hline 2060 \\ 4120 \\ \hline 61.80 \end{array}$$

Try It

Divide 55 by 2.5.

Estimate the answer. The problem $55 \div 2.5$ is approximately

$60 \div \underline{\hspace{2cm}}$, which is about 20.

Set up the problem.

$$\begin{array}{r} \underline{\hspace{2cm}} \\) \end{array}$$

There is digit to the right of the decimal in the divisor, 2.5.

Move the decimal in the divisor and the dividend place to

the . In order to move the decimal in the dividend, place a

 after the 5 in the ones place.

$$55 \div 2.5 = \underline{\hspace{2cm}}$$

The problem $55 \div 2.5$ is approximately $60 \div 3$, which is about 20. There is **one** digit to the right of the decimal in the divisor, 2.5. Move the decimal in the divisor and the dividend **one** place to the **right**. In order to move the decimal in the dividend, place a **0** after the 5 in the ones place.

$$55 \div 2.5 = 22$$

$$\begin{array}{r} 22 \\ 25 \overline{)550} \\ \underline{-50} \\ 50 \\ \underline{-50} \\ 0 \end{array}$$

How Do You Solve Problems Involving Fractions and Decimals?

You solve problems that involve fractions and decimals using the same steps as any other problem. First make sure you understand the problem. Identify the quantities involved and the relationships between them. Write an equation that can be used to find the answer. Solve the equation and then check your answer to see if it is reasonable.

Troy has 9 cans of fish. If each can holds 12.5 ounces, how many ounces of canned fish does Troy have in all?

- There are 9 cans of fish. Each can holds 12.5 ounces.

Use multiplication to combine equal groups.

The total ounces of canned fish equals $9 \cdot 12.5$.

$$\begin{array}{r} 12.5 \\ \times 9 \\ \hline 112.5 \end{array}$$

There is one decimal place to the right of the decimal point in the two factors. So there will be one decimal place to the right of the decimal point in the product. The product of 9 and 12.5 is 112.5.

- Check to see if your answer is reasonable.

Since $9 \cdot 12.5$ is close to 120, the product of 10 and 12, the answer 112.5 seems reasonable.

Troy has a total of 112.5 ounces of canned fish.



What operation is used to separate a whole into equal parts?

Try It

Molly has $3\frac{1}{4}$ pounds of flour in a container. She also has a bag with 2.5 pounds of flour in it. If Molly pours half the flour from the bag into the container, how much flour will be in the container?

Use the operation of _____ to separate the flour in the bag into two equal parts.

$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Use the operation of _____ to find how much flour will then be in the container.

The flour in the container can be represented by the expression

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} .$$

Convert $3\frac{1}{4}$ to an equivalent decimal: $3\frac{1}{4} = \underline{\hspace{2cm}}$

$$\underline{\hspace{2cm}} + 1.25 = \underline{\hspace{2cm}}$$

The container will have _____ pounds of flour in it.

Use the operation of **division** to separate the flour in the bag into two equal parts: $2.5 \div 2 = 1.25$. Use the operation of **addition** to find how much flour will then be in the container. The flour in the container can be represented by the expression $3\frac{1}{4} + 1.25$. The fraction $3\frac{1}{4} = 3.25$, and $3.25 + 1.25 = 4.5$. The container will have 4.5 pounds of flour in it.

How Can You Model Addition, Subtraction, Multiplication, and Division of Integers?

You can model addition and subtraction of integers using a number line. These operations can be modeled with an arithmetic expression.

Use the number line below to model the addition problem $-6 + 2$.



- Start to model the addition problem at 0.
- Since -6 is a negative integer, it can be modeled with an arrow 6 units to the left of 0.

Draw an arrow from 0 to -6 , which is 6 units to the left of 0.

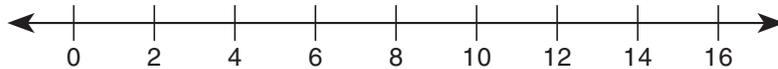
- Since 2 is a positive integer, it can be modeled with an arrow 2 units to the right of -6 .

Draw an arrow from -6 to -4 , which is 2 units to the right of -6 .

The model shows that the sum of -6 and 2 is -4 .

Try It

Linda scored 14 points in a board game. On her next turn she lost 6 points, and then she lost 5 more points. On her final turn Linda gained 8 points. Determine Linda's final score by modeling the problem on a number line.



Start at 0 on the number line. Linda's beginning score is 14. Represent this score with the integer _____. To add 14, count up 14 places from 0.

On her next turn Linda lost 6 points. Represent this with the integer _____. To add -6 , count back 6 places from 14 to _____.

On her next turn Linda lost 5 points. Represent this with the integer _____. To add -5 , count back 5 places from 8 to _____.

On her final turn Linda scored 8 points. Represent this with the integer _____.

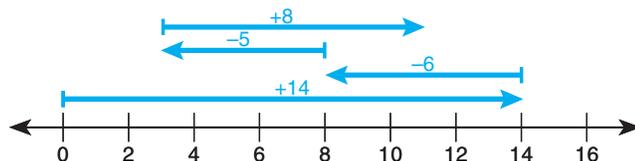
To add 8, count up 8 places from 3 to _____.

Represent Linda's final score with the expression

_____ + _____ + _____ + _____.

Linda's final score was _____.

Linda's beginning score is 14. Represent this score with the integer 14. On her next turn Linda lost 6 points. Represent this with the integer -6 . To add -6 , count back 6 places from 14 to 8. On her next turn Linda lost 5 points. Represent this with the integer -5 . To add -5 , count back 5 places from 8 to 3. On her final turn Linda scored 8 points. Represent this with the integer 8. To add 8, count up 8 places from 3 to 11. Represent Linda's final score with the expression $14 + (-6) + (-5) + 8$. Linda's final score was 11.



Some problems may require you to multiply and divide integers.

Gloria had \$123 in her savings account in January. During the year she made 3 deposits of \$25 each and 2 withdrawals of \$30 each. Write an expression to represent the total amount of money Gloria had in the bank after her deposits and withdrawals.

The expression $3 \cdot \$25$ represents the total amount deposited. The expression $2 \cdot \$30$ represents the total amount withdrawn.

The expression $\$123 + (3 \cdot \$25) - (2 \cdot \$30)$ represents the total amount of money Gloria had in the bank after her deposits and withdrawals.

Try It

Mr. Taylor purchased hamburger patties and buns for a party. Each package of hamburger patties contained 10 patties. Each package of buns contained 8 buns. Mr. Taylor purchased 9 packages of patties and 11 packages of buns. What expression could be used to represent how many more hamburger patties Mr. Taylor had than buns?

Each package of hamburger patties contained _____ patties.

Mr. Taylor purchased 9 packages of patties. Use the operation of

_____ to find the total number of patties.

$$\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$$

Each package of buns contained _____ buns. Mr. Taylor purchased

11 packages of buns. Use the operation of _____ to find the total number of buns.

$$\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$$

Use the operation of _____ to find the difference between the number of hamburger patties and the number of buns.

The following expression represents how many more hamburger patties Mr. Taylor had than buns.

$$(\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}) - (\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}})$$

Each package of hamburger patties contained 10 patties. Use **multiplication** to find the total number of patties: $9 \cdot 10$. Each package of buns contained 8 buns. Use **multiplication** to find the total number of buns: $11 \cdot 8$. Use **subtraction** to find the difference between the number of hamburger patties and the number of buns. The following expression represents how many more hamburger patties Mr. Taylor had than buns: $(9 \cdot 10) - (11 \cdot 8)$.

How Can You Use a Unit Rate to Solve Problems?

Some problems can be solved by expressing the ratio of quantities in the problem as a unit rate, as a ratio compared to 1.

A **ratio** is a comparison of two quantities. For example, if you go to school 5 days out of every week, the ratio of days at school to days in the week is $\frac{5}{7}$.

A rate is also a ratio. If you use 2 gallons of gasoline to drive 42 miles, then the rate at which you are using gasoline is 42 miles: 2 gallons, or $\frac{42}{2}$.

A **unit rate** compares a quantity to 1. In the example above, the rate at which you are using gasoline, $\frac{42}{2}$, can be simplified.

$$\frac{\text{miles}}{\text{gallons}} \quad \frac{42}{2} = \frac{21}{1}$$

The unit rate is 21 miles to 1 gallon, 21:1, or 21 miles per 1 gallon.

Unit rates are usually written without the 1, such as 21 miles per gallon.

Unit rates can be helpful in comparing prices or working with recipes.



Do you see
that . . .

Martha is baking pies. Her recipe calls for 3 cups of flour to make 2 pie crusts. How many cups of flour will Martha use per pie crust?

- First write a ratio that compares the number of cups of flour to the number of pie crusts.

$$\frac{\text{cups of flour}}{\text{pie crusts}} \quad \frac{3}{2}$$

This shows a rate of 3 cups of flour to every 2 pie crusts.

- Divide the numerator and denominator by 2 to find the unit rate.

$$\frac{\text{cups of flour}}{\text{pie crusts}} \quad \frac{3}{2} = \frac{1.5}{1}$$

Martha will use 1.5 cups of flour per pie crust.

Rae needs a piece of chain to lock her gate. The hardware store sells 3-foot lengths of chain for \$6.30 each. Use a unit rate to find the cost of the chain per foot.

- First write a ratio that compares the total cost to the length of the chain.

$$\frac{\text{total cost}}{\text{length of chain}} = \frac{\$6.30}{3 \text{ ft}}$$

- Divide the numerator and denominator by 3 to find the unit rate.

$$\frac{\text{total cost}}{\text{length of chain}} = \frac{\$6.30}{3 \text{ ft}} = \frac{\$2.10}{1 \text{ ft}}$$

The cost of the chain is \$2.10 per foot.

Try It

Joe and his cousin are driving from Houston, Texas, to Panama City, Florida. After 11 hours they have driven 605 miles. What is their average driving speed in miles per hour?

Write a ratio that compares the number of miles Joe and his cousin have driven to the number of hours they have driven.

$$\frac{\text{miles}}{\text{hours}} = \frac{\square}{\square}$$

Their average driving speed is a _____ rate. To find this rate, divide the numerator and denominator by _____.

$$\frac{\text{miles}}{\text{hours}} = \frac{605}{11} = \frac{\square}{\square}$$

Joe and his cousin are driving at an average speed of _____ miles per hour.

The ratio is $\frac{605}{11}$. Their average driving speed is a **unit** rate. To find this rate, divide the numerator and denominator by **11**: $\frac{605}{11} = \frac{55}{1}$. Joe and his cousin are driving at an average speed of **55** miles per hour.

How Do You Use the Order of Operations to Simplify Numerical Expressions?

Many calculations require you to perform several arithmetic operations to reach a solution. There are rules for the order in which these operations are performed.

To simplify an expression, follow this order of operations:

1. Simplify any operations in parentheses and brackets. If there is more than one operation within a set of parentheses, follow the order of operations in steps 2, 3, and 4.
2. Simplify any terms with exponents.
3. Do all multiplication and division from left to right.
4. Do all addition and subtraction from left to right.

Simplify the expression $3 \cdot 2 + 4 \cdot 5 - 4 \cdot 2$.

- There are no parentheses or exponents.
- Begin at the left and multiply from left to right.

$$\begin{aligned} 3 \cdot 2 + 4 \cdot 5 - 4 \cdot 2 &= \\ 6 + 20 - 8 & \end{aligned}$$

- Then begin at the left and add or subtract from left to right.

$$\begin{aligned} 6 + 20 - 8 &= \\ 26 - 8 &= \\ 18 & \end{aligned}$$

The expression $3 \cdot 2 + 4 \cdot 5 - 4 \cdot 2$ simplifies to 18.

Simplify the expression $4 + (5 \cdot 2 - 1) \div 3 \cdot 2^2$.

- First perform any operations in parentheses. There are multiplication and subtraction signs within the parentheses. The order of operations says to multiply before you subtract.

$$\begin{aligned} 4 + (5 \cdot 2 - 1) \div 3 \cdot 2^2 &= \\ 4 + (10 - 1) \div 3 \cdot 2^2 &= \\ 4 + 9 \div 3 \cdot 2^2 & \end{aligned}$$

- Then simplify any expressions with exponents.

$$\begin{aligned} 4 + 9 \div 3 \cdot 2^2 &= \\ 4 + 9 \div 3 \cdot 4 & \end{aligned}$$

Objective 1

- Next divide and multiply from left to right.

$$4 + 9 \div 3 \cdot 4 =$$

$$4 + 3 \cdot 4 =$$

$$4 + 12$$

- Finally, add and subtract from left to right.

$$4 + 12 =$$

$$16$$

The expression $4 + (5 \cdot 2 - 1) \div 3 \cdot 2^2$ simplifies to 16.

Try It

Simplify the expression $(5 \cdot 7 + 3) - 8 \div 4$.

Follow the order of operations.

$$(5 \cdot 7 + 3) - 8 \div 4 =$$

$$(\underline{\quad\quad} + 3) - 8 \div 4 =$$

$$\underline{\quad\quad} - 8 \div 4 =$$

$$\underline{\quad\quad} - \underline{\quad\quad} =$$

$$\underline{\quad\quad}$$

$$(5 \cdot 7 + 3) - 8 \div 4 = \underline{\quad\quad}$$

$$(5 \cdot 7 + 3) - 8 \div 4 =$$

$$(35 + 3) - 8 \div 4 =$$

$$38 - 8 \div 4 =$$

$$38 - 2 =$$

$$36$$

$$(5 \cdot 7 + 3) - 8 \div 4 = 36$$

Try It

Simplify the expression $1 + 8 \div 2 \cdot 3 - 1 + 3^3$.
Follow the order of operations.

$$\begin{aligned}
 1 + 8 \div 2 \cdot 3 - 1 + 3^3 &= \\
 1 + 8 \div 2 \cdot 3 - 1 + \underline{\quad\quad\quad} &= \\
 1 + \underline{\quad\quad\quad} \cdot 3 - 1 + \underline{\quad\quad\quad} &= \\
 1 + \underline{\quad\quad\quad} - 1 + 27 &= \\
 \underline{\quad\quad\quad} - 1 + 27 &= \\
 \underline{\quad\quad\quad} + 27 &= \\
 \underline{\quad\quad\quad} &= \\
 1 + 8 \div 2 \cdot 3 - 1 + 3^3 &= \underline{\quad\quad\quad}
 \end{aligned}$$

$$\begin{aligned}
 1 + 8 \div 2 \cdot 3 - 1 + 3^3 &= \\
 1 + 8 \div 2 \cdot 3 - 1 + 27 &= \\
 1 + 4 \cdot 3 - 1 + 27 &= \\
 1 + 12 - 1 + 27 &= \\
 13 - 1 + 27 &= \\
 12 + 27 &= \\
 39 &= \\
 1 + 8 \div 2 \cdot 3 - 1 + 3^3 &= 39
 \end{aligned}$$

How Do You Determine Whether a Solution to a Problem Is Reasonable?

One way to determine whether an answer to a problem is reasonable (makes sense) is to round the numbers in the problem before you do the arithmetic. Then solve the problem using the rounded numbers. When you do this, you are making an **estimate** of the answer. The estimate tells you about how big or small the exact answer should be. It is always a good idea to estimate first. Then you will know whether your exact answer is reasonable.

You can also estimate when you do not need an exact answer to a problem. For example, some problems ask *about how many* or *approximately how much*. Use estimation to solve such problems.

The sticker on Mr. Hart's new car shows that its average gas mileage is 29 miles per gallon of gas. Mr. Hart drives about 87 miles each day. About how much gas does Mr. Hart use in 12 days of driving?

- Estimate how many miles Mr. Hart drives in 12 days.

87 miles per day \cdot 12 days = number of miles Mr. Hart drives

Round 87 to 90, and round 12 to 10.

$$90 \cdot 10 = 900$$

Mr. Hart drives about 900 miles in 12 days.

- Estimate how much gas Mr. Hart will use to drive 900 miles.

900 miles \div 29 miles per gallon = number of gallons of gas Mr. Hart uses

Round 29 to 30.

$$900 \div 30 = 30$$

Mr. Hart uses about 30 gallons of gas in 12 days.

Try It

A high school yearbook adviser knows that last year about 74% of graduating students purchased a yearbook. This year's graduating class has 233 students. Based on last year's purchase rate, the yearbook adviser estimates that 172 graduating students will purchase a yearbook this year. Is this a reasonable estimate?

The number 233 rounded to the nearest 10 is _____.

The value 74% is between 70% and 80%. Use these values to estimate the range in which the answer should lie.

$$70\% \text{ of } 230 = 0.70 \cdot 230 = \underline{\hspace{2cm}}$$

$$80\% \text{ of } 230 = \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

The number of students who will purchase a yearbook this year is between _____ and _____.

Is 172 students a reasonable estimate? _____.

The number 233 rounded to the nearest 10 is **230**.

70% of 230 = $0.70 \cdot 230 = 161$. 80% of 230 = $0.80 \cdot 230 = 184$. The number of students who will purchase a yearbook this year is between **161** and **184**. Is 172 students a reasonable estimate? **Yes**.



Where do you put the decimal point in the product when you multiply decimals?

Now practice what you've learned.

Question 1

Bob tried to use an $\frac{11}{16}$ -inch wrench to remove a bolt, but the wrench was too small. Which size wrench might be large enough to remove the bolt?

- A $\frac{5}{8}$ in
- B $\frac{7}{16}$ in.
- C $\frac{3}{4}$ in.
- D $\frac{1}{2}$ in.



Answer Key: page 236

Question 2

In Tim's class, 15 of the 25 students have traveled outside their home state. Which number does NOT represent the part of the class that has traveled outside their home state?

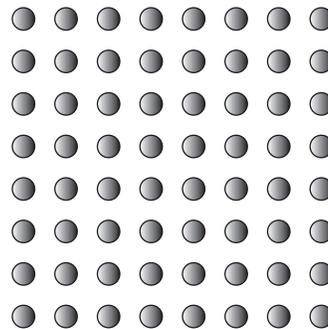
- A $\frac{10}{15}$
- B 60%
- C 0.6
- D $\frac{3}{5}$



Answer Key: page 236

Question 3

Look at the model below. Which value can this model be used to find?



- A $\sqrt{16}$
- B $\sqrt{32}$
- C $\sqrt{8}$
- D $\sqrt{64}$



Answer Key: page 236

Question 4

Which expression shows how many $\frac{3}{8}$ -pound hamburger patties can be made from $4\frac{1}{3}$ pounds of ground beef?

- A $4\frac{1}{3} \cdot \frac{3}{8}$
- B $4\frac{1}{3} \div \frac{3}{8}$
- C $\frac{3}{8} \cdot \frac{1}{3}$
- D $\frac{3}{8} \div \frac{1}{3}$



Answer Key: page 236

Question 5

Tammy, María, and their three brothers own a business. Tammy owns $\frac{1}{3}$ of the business. María and their three brothers equally share ownership of the remaining part of the business. What fraction of the business does María own?

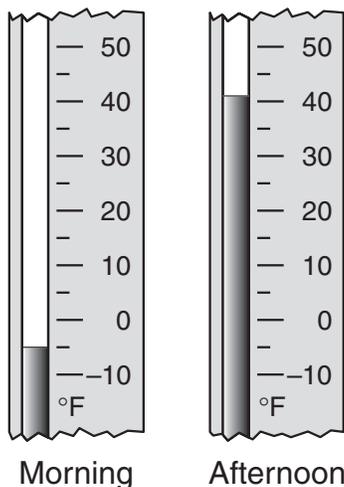
- A $\frac{1}{6}$
- B $\frac{1}{4}$
- C $\frac{1}{2}$
- D $\frac{1}{12}$



Answer Key: page 236

Question 6

The low temperature recorded one morning was -5°F . The high temperature recorded that afternoon was 41°F . What was the change in temperature from the morning low to the afternoon high?



- A $+36^{\circ}\text{F}$
- B $+46^{\circ}\text{F}$
- C -36°F
- D -46°F



Answer Key: page 236

Question 7

Glenn is buying 2 pounds of cheese for \$7.50. Which expression could be used to represent the cost of 4.5 pounds of cheese?

- A $4.5 + 2 \cdot 7.50$
- B $4.5 \cdot \frac{2}{7.50}$
- C $7.50 \div \frac{4.5}{2}$
- D $7.50 \div 2 \cdot 4.5$



Answer Key: page 236

Question 8

Which of the following should be performed first to simplify this expression?

$$5 + 3 \cdot 2 \div 3^3 - 12$$

- A $3 \cdot 2$
- B $5 + 3$
- C 3^3
- D $2 \div 3$



Answer Key: page 237

Question 9

Peter walked at a rate of 4 miles in 50 minutes. Jan walked at a rate of 3 miles in 30 minutes. Which statement correctly describes this situation?

- A Jan's walking rate was 0.18 mile per minute faster than Peter's.
- B Jan's walking rate was 0.18 mile per minute slower than Peter's.
- C Peter's walking rate was 0.02 mile per minute faster than Jan's.
- D Peter's walking rate was 0.02 mile per minute slower than Jan's.



Answer Key: page 237

Question 10

Every day the Thompson family eats about $\frac{3}{8}$ box of cereal. At this rate, how many boxes of cereal does the Thompson family need to buy for 1 week?

- A 1
- B 3
- C 21
- D 8



Answer Key: page 237

Objective 2

The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

For this objective you should be able to

- solve problems involving proportional relationships;
- represent a relationship in numerical, geometric, verbal, and symbolic form; and
- use equations to solve problems.

What Are Ratios and Proportions?

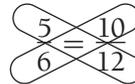
A **ratio** is a comparison of two quantities. For example, a recipe might call for 2 cups of flour for every 1 cup of milk. You can compare the number of cups of flour used to the number of cups of milk used with the ratio two to one. This ratio can be written in several different forms:

$$\frac{2}{1} \quad 2 \text{ to } 1 \quad 2:1$$

A **proportion** is a statement that two ratios are equal. For example, the ratio 2 to 1 is the same as the ratio 6 to 3. This can be written as $2:1 = 6:3$. It can also be written as follows:

$$\frac{2}{1} = \frac{6}{3}$$

If two ratios form a proportion, then their cross products are equal. **Cross products** are the product of the numerator of the first fraction and the denominator of the second fraction and the product of the denominator of the first fraction and the numerator of the second fraction.



$$2 \cdot 3 = 1 \cdot 6$$

$$6 = 6$$

Compare the ratios 2:5 and 6:15. Do they form a proportion?

- Write the ratios as fractions.

$$\frac{2}{5} \text{ and } \frac{6}{15}$$

- Cross products of proportions are equivalent. Use the cross products to determine whether $\frac{2}{5}$ and $\frac{6}{15}$ form a proportion.

$$2 \cdot 15 \stackrel{?}{=} 5 \cdot 6$$

$$30 = 30$$

Since the cross products are equal, $\frac{2}{5}$ and $\frac{6}{15}$ form a proportion.

How Do You Solve Problems Involving Proportional Relationships?

There are many problems that involve proportional relationships. To solve such problems, follow these steps:

- Identify the ratios being compared. Be certain to compare the corresponding quantities, in the same order.
- Write a proportion using the two ratios.
- Use cross products to solve the proportion.

Find the value of k that makes the following proportion true.

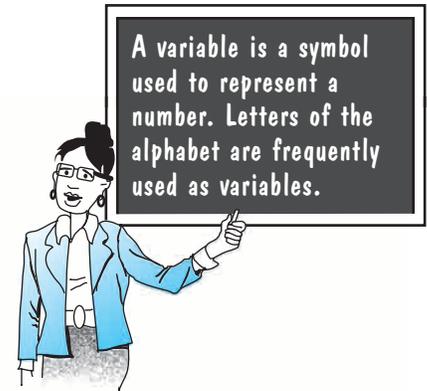
$$\frac{k}{10.5} = \frac{1.5}{3.5} \quad \text{Set the fractions equal.}$$

$$3.5k = 1.5 \cdot 10.5 \quad \text{Use cross products.}$$

$$\frac{3.5k}{3.5} = \frac{15.75}{3.5} \quad \text{Divide both sides of the equation by 3.5.}$$

$$k = 4.5$$

The value for k that makes the proportion true is 4.5.



Many real-life problems can be solved using proportions.

If a 5-pound bag of rice costs \$3, how much would a 25-pound bag of rice cost at that rate?

- Identify the quantities being compared.

Pounds of Rice	Cost of Rice
5 pounds	\$3
25 pounds	x

- Write a proportion. Let x equal the cost of 25 pounds of rice.

$$\frac{\text{pounds}}{\text{cost}} \quad \frac{5}{3} = \frac{25}{x}$$

- Solve the proportion.

$$\frac{5}{3} = \frac{25}{x}$$

$$5x = 25 \cdot 3 \quad \text{Use cross products.}$$

$$\frac{5x}{5} = \frac{75}{5} \quad \text{Divide both sides of the equation by 5.}$$

$$x = 15$$

A 25-pound bag of rice would cost \$15.

Do you see
that . . .



Proportions can be set up in different ways, as long as the relationship between the numbers stays the same. For example, in the previous problem there are four ways to set up the proportion.

$\frac{5 \text{ pounds}}{25 \text{ pounds}} = \frac{\$3}{x}$	$\frac{25 \text{ pounds}}{5 \text{ pounds}} = \frac{x}{\$3}$
$\frac{5 \text{ pounds}}{\$3} = \frac{25 \text{ pounds}}{x}$	$\frac{\$3}{5 \text{ pounds}} = \frac{x}{25 \text{ pounds}}$

The cross products are the same in each equation: $5x = 75$.

Try It

Gina has been present at school for 42 of the first 45 days of the school year. The school year is 180 days long. If Gina continues to attend school at the same rate, how many days, d , will she attend school during the school year?

Identify the quantities being compared:

_____ days present in the first _____ days of school, and total days present during the school year, d , in _____ days in the school year.

Write a proportion. Remember that d equals the total number of days Gina will attend school.

$$\frac{\text{days present}}{\text{days of school}} = \frac{\boxed{}}{\boxed{}} = \frac{d}{\boxed{}}$$

To solve the proportion, first use cross products.

$$\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$$

Then divide both sides of the equation by _____.

$$d = \underline{\hspace{2cm}}$$

At this rate, Gina will attend school _____ days during the school year.

Compare: 42 days present in the first 45 days of school, and total days present during the school year, d , in 180 days in the school year.

The proportion is $\frac{42}{45} = \frac{d}{180}$. To solve the proportion, first use cross products:

$42 \cdot 180 = 45 \cdot d$. Then divide both sides of the equation by 45: $d = 168$.

At this rate, Gina will attend school 168 days during the school year.

How Do You Solve Problems Involving Percent?

You can use proportions or decimals to solve problems involving percent.

Larry scored 80% on a test with 60 questions. How many questions did he answer correctly?

Proportion Method

- Let x represent the number of questions Larry answered correctly.
- Set up a proportion using $\frac{80}{100}$ for 80%.

$$\frac{\text{part}}{\text{whole}} = \frac{80}{100} = \frac{x}{60}$$

- Solve the proportion.

$$\frac{80}{100} = \frac{x}{60}$$

$$4,800 = 100x \quad \text{Use cross products.}$$

$$\frac{4,800}{100} = \frac{100x}{100} \quad \text{Divide both sides by 100.}$$

$$48 = x$$

Larry answered 48 questions correctly.

Decimal Method

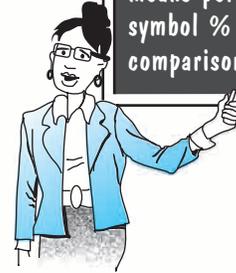
- Convert 80% to a decimal.
- Multiply 0.80 by 60, the total number of questions.

$$80\% = \frac{80}{100} = 0.80$$

$$0.80 \cdot 60 = 48$$

Larry answered 48 questions correctly.

A percent is a ratio comparing a number to 100. The word percent means per 100. The symbol % indicates the comparison to 100.



A survey of 250 people showed that 105 of them had never seen the ocean. What percent of the people surveyed had never seen the ocean?

- Express the ratio 105 to 250 as a fraction.

$$\frac{105}{250}$$

- Remember that percent means per 100. Use the fraction $\frac{n}{100}$ to represent the percent. Write a proportion.

$$\frac{105}{250} = \frac{n}{100}$$

- Solve for n .

$$\frac{105}{250} = \frac{n}{100}$$

$$250n = 10,500 \quad \text{Use cross products.}$$

$$\frac{250n}{250} = \frac{10,500}{250} \quad \text{Divide both sides by 250.}$$

$$n = 42$$

Of the people surveyed, 42% had never seen the ocean.



How do you convert a percent to a decimal?

An office-supply store has school supplies on sale for 20% off the original price. If Allie buys supplies that had an original price of \$45.60, how much will she actually pay for the school supplies?

- First find the discount: 20% of \$45.60.

Convert 20% to a decimal.

$$20\% = \frac{20}{100} = 0.20$$

Multiply 0.20 by 45.60, the original price.

$$0.20 \cdot 45.60 = 9.12$$

Allie's discount is \$9.12.

- Then find what Allie will pay after the discount.

Subtract the discount from the original price.

$$45.60 - 9.12 = 36.48$$

Allie will pay \$36.48 for the school supplies.

Try It

In a science experiment 12.5 grams of salt crystals were left out in an open dish. After 24 hours the total mass of the crystals had increased by 3%. What was the mass in grams of the salt crystals after 24 hours?

To find the number of grams by which the mass increased,

find 3% of _____ .

Convert _____% to a decimal.

$$\text{_____} \% = \text{_____}$$

Multiply _____ by _____ grams.

$$\text{_____} \cdot \text{_____} = \text{_____}$$

The mass of the salt crystals increased by _____ gram.

To find the mass after 24 hours, add the increase in mass to the original mass.

$$\text{_____} + \text{_____} = \text{_____}$$

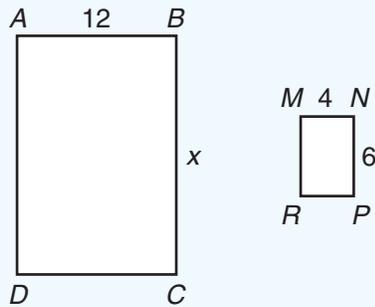
The mass of the salt crystals after 24 hours was _____ grams.

To find the number of grams by which the mass increased, find 3% of 12.5. Convert 3% to a decimal: $3\% = 0.03$. Multiply 0.03 by 12.5 grams: $0.03 \cdot 12.5 = 0.375$. The mass of the salt crystals increased by 0.375 gram, and $12.5 + 0.375 = 12.875$. The mass of the salt crystals after 24 hours was 12.875 grams.

How Are Proportions Used to Solve Problems Involving Similar Figures?

Another type of real-life problem that can be solved using a proportion is a problem involving similar figures. **Similar figures** are geometric figures that have the same shape but not necessarily the same size. In similar figures the ratios of the lengths of corresponding sides are proportional. Corresponding sides are sides that are in the same relative position in the two figures.

Rectangle $ABCD$ is similar to rectangle $MNPR$. What is the length of side BC in rectangle $ABCD$?



- Corresponding sides of similar figures are sides that are in the same relative position.

\overline{AB} corresponds to \overline{MN} \overline{BC} corresponds to \overline{NP}
 \overline{DC} corresponds to \overline{RP} \overline{AD} corresponds to \overline{MR}

- If two figures are similar, then the ratios of corresponding sides form a proportion.

$$\frac{\text{large}}{\text{small}} = \frac{AB}{MN} = \frac{BC}{NP}$$

- Substitute the lengths of the sides in the proportion.

$$\frac{12}{4} = \frac{x}{6}$$

- To find the value of x , solve the proportion.

$$\frac{12}{4} = \frac{x}{6}$$

$$4x = 72 \quad \text{Use cross products.}$$

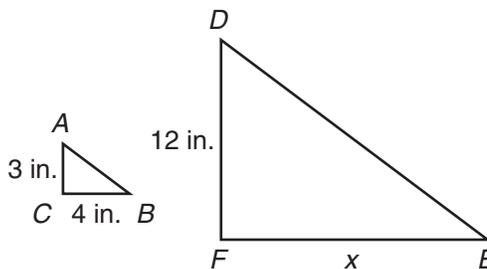
$$\frac{4x}{4} = \frac{72}{4} \quad \text{Divide both sides of the equation by 4.}$$

$$x = 18$$

The length of side BC is 18 units.

Try It

Right triangles ABC and DEF are similar. Find the length in inches of side EF .



Since the triangles are similar, their corresponding sides are

_____.

\overline{AB} corresponds to _____.

\overline{AC} corresponds to _____.

\overline{BC} corresponds to _____.

If two figures are similar, then the ratios of corresponding sides

form a _____.

$$\frac{\text{small}}{\text{large}} = \frac{AC}{\square} = \frac{BC}{\square}$$

Substitute the lengths of the sides in the proportion.

$$\frac{\square}{\square} = \frac{\square}{\square}$$

To find the value of x , solve the proportion.

$$\text{_____} x = \text{_____}$$

Divide both sides of the equation by _____.

$$x = \text{_____}$$

The length of side EF is _____ inches.

Since the triangles are similar, their corresponding sides are **proportional**. \overline{AB} corresponds to \overline{DE} , \overline{AC} corresponds to \overline{DF} , and \overline{BC} corresponds to \overline{EF} . If two figures are similar, then the ratios of corresponding sides form a **proportion**.

$$\begin{aligned} \frac{AC}{DF} &= \frac{BC}{EF} \\ \frac{3}{12} &= \frac{4}{x} \\ 3x &= 48 \end{aligned}$$

Divide both sides of the equation by 3: $x = 16$. The length of side EF is 16 inches.

Scale drawings involve similar figures, so you can use proportions to solve problems which include scale drawings.

Try It

On a scale drawing of a doghouse, the entrance is 3.5 inches high. The scale used was 2 inches equals 1 foot. What is the height of the actual entrance to the doghouse?

Identify the quantities being compared. Let h equal the height of the actual doghouse.

height in scale drawing	to	actual height
_____ in.		_____ ft
_____ in.		h ft

Write a proportion.

$$\frac{\text{height in scale drawing}}{\text{actual height}} = \frac{\square}{\square} = \frac{\square}{h}$$

To find the value of h , solve the proportion.

First use _____.

$$\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} = \underline{\hspace{2cm}} h$$

Then _____ both sides by _____.

$$h = \underline{\hspace{2cm}}$$

The actual doghouse entrance is _____ feet high.

Compare 2 in. to 1 ft, and 3.5 in. to h ft. The proportion is $\frac{2}{1} = \frac{3.5}{h}$. First use **cross products**: $1 \cdot 3.5 = 2h$. Then **divide** both sides by 2; $h = 1.75$.

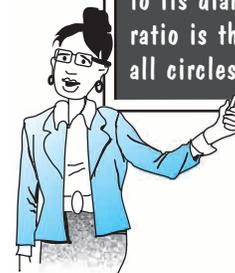
The actual doghouse entrance is 1.75 feet high.

How Can You Generate Formulas to Solve Problems?

In math you often use formulas to solve problems. Formulas use different variables to show the relationship between quantities. Often you will know the value of all but one of the variables.

Write a formula that can be used to find the radius when given the circumference of a circle.

The formula for the circumference of a circle in the Mathematics Chart is $C = 2\pi r$. The formula is useful in this form if you know the radius of the circle and want to find the circumference.



The symbol π (pi) represents the ratio of a circle's circumference to its diameter. This ratio is the same for all circles.

However, if you know the circumference and want to find the radius, you can rewrite the formula.

Write the formula so that the variable representing the radius, r , is on one side of the equal sign, and everything else is on the other side of the equal sign.

- Start with the formula for the circumference of a circle.

$$C = 2\pi r$$

- Divide both sides of the equation by 2π .

$$\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$$

$$\frac{C}{2\pi} = r$$

The formula $\frac{C}{2\pi} = r$ can be used to find the radius when given the circumference of a circle.

Try It

Write a formula that could be used to find the side of a square, s , given the perimeter of the square, P .

The formula in the Mathematics Chart that relates the side of a square to its perimeter is $P = \underline{\hspace{2cm}}$.

Rewrite the formula so that it gives s in terms of P .

To do so, divide both sides of the equation by $\underline{\hspace{2cm}}$.

$$\frac{P}{\square} = \frac{4s}{\square}$$

$$\frac{P}{\square} = \square$$

The new formula is $s = \frac{\square}{\square}$.

The formula is $P = 4s$. Rewrite the formula so that it gives s in terms of P .

To do so, divide both sides of the equation by 4: $\frac{P}{4} = \frac{4s}{4}$, and $\frac{P}{4} = s$. The new formula is $s = \frac{P}{4}$.

How Can You Use Tables and Graphs to Interpret Formulas?

A formula like $P = 4s$ expresses a relationship between a pair of values. For every value of s , there will be a corresponding value of P . Tables and graphs can also express a relationship between pairs of values. You can use information given in a table or graph to help you see the relationship between the quantities in a formula more clearly.

The formula $\frac{f}{3} = y$ gives y , the number of yards in f feet. The formula means that the number of feet divided by 3 equals the number of yards. You can use this formula to build a table. For each value of f , there is a corresponding value of y . For example, 3 feet = 1 yard, and 6 feet = 2 yards.

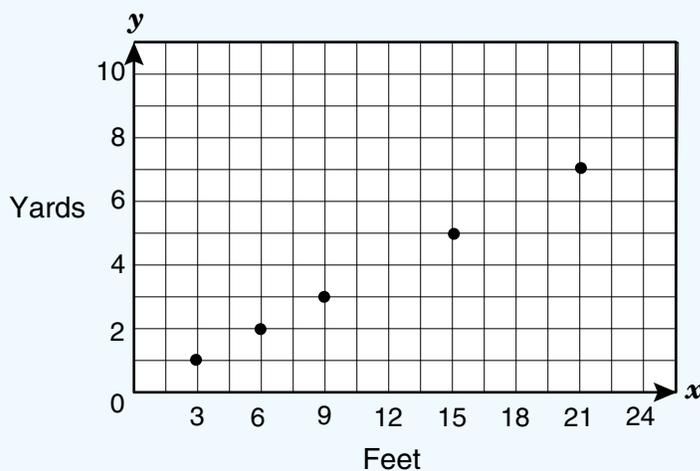
The table below shows the relationship between feet and yards.

$$\frac{f}{3} = y$$

Feet	Yards
3	1
6	2
9	3
15	5
21	7

By considering the number pairs in the table as ordered pairs, you can also graph this relationship on a coordinate grid.

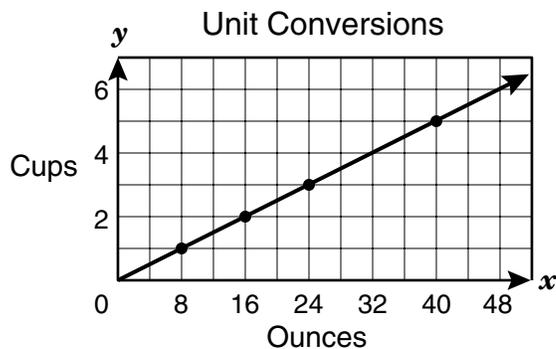
Graph the ordered pairs (3, 1), (6, 2), (9, 3), (15, 5), and (21, 7).



The graph shows the same relationship between feet and yards that the table shows.

Try It

This graph shows the relationship between two customary units of capacity, cups and ounces.



Build a table that represents the data in the above graph.

Write the coordinates of the four points plotted on the graph.

(____, ____), (____, ____), (____, ____), (____, ____)

The x-coordinates of the points represent _____.

The y-coordinates of the points represent _____.

Fill in the table so that it shows the same relationship between cups and ounces that the graph shows.

Unit Conversions

Ounces	Cups

The coordinates of the four points are (8, 1), (16, 2), (24, 3), and (40, 5). The x-coordinates represent **ounces**. The y-coordinates represent **cups**.

Unit Conversions

Ounces	Cups
8	1
16	2
24	3
40	5

What Is a Sequence?

A **sequence** of numbers is a set of numbers written in a particular order. For example, 5, 9, 13, 17 is a sequence of four numbers. The number 5 is the first term in the sequence, 9 is the second term, 13 is the third term, and 17 is the fourth term.

Here is another sequence of numbers: 3, 6, 9, 12, ...
The table below shows the same sequence.

Position	Value of Term
1	3
2	6
3	9
4	12
7	
10	
n	

- The position column indicates a value's position in the sequence: first, second, and so on.
- The value-of-term column shows the actual numbers in the sequence: 3, 6, 9, 12, and so on.

Find a rule that tells the value for any term in the sequence using the position number.

Look for a pattern. The value of the first term is 3. The value of the second term is 6. Each value in the sequence is 3 times its position number.

What is the value of the seventh term in this sequence?
The value is 21 because $3 \cdot 7 = 21$.

What is the value of the tenth term in this sequence?
The value is 30 because $3 \cdot 10 = 30$.

What is the value of the n th term in this sequence?
The value is $3n$ because $3 \cdot n = 3n$.

The rule for this sequence can be represented by the expression $3n$. You can choose any position and use the rule to find the value of the number in the sequence for that position.



Look at this sequence of numbers: 4, 7, 12, 19, 28, ...

Find an expression that shows the relationship between the value of any term and n , its position in the sequence.

Look at this sequence in terms of the position number of each term. Is the rule $4n$?

Position	$4n$	Value of Term	Correct?
1	$4(1) = 4$	4	Yes
2	$4(2) \neq 7$	7	No
3	$4(3) = 12$	12	Yes
4	$4(4) \neq 19$	19	No
5	$4(5) \neq 28$	28	No

The rule $4n$ is not the rule for the n th term in this sequence, because the rule does not work for all terms in the sequence.

Consider the following possibility: the n th term = $n^2 + 3$. Look at the sequence in the table below.

Position	$n^2 + 3$	Value of Term	Correct?
1	$1^2 + 3 = 4$	4	Yes
2	$2^2 + 3 = 7$	7	Yes
3	$3^2 + 3 = 12$	12	Yes
4	$4^2 + 3 = 19$	19	Yes
5	$5^2 + 3 = 28$	28	Yes

The expression that shows the relationship between any term and n , its position in this sequence, is $n^2 + 3$.

Try It

Look at this sequence of numbers: 2, 6, 12, 20, 30, ...

Which of these three expressions can you use as the rule to find the value of the n th term in the sequence?

$$2n \qquad n^2 + 2 \qquad n^2 + n$$

Check the first expression, $2n$.

When $n = 1$, the expression $2n =$ _____ .

When $n = 2$, the expression $2n =$ _____ . But the second term should be _____ .

Check the second expression, $n^2 + 2$.

When $n = 1$, the expression $n^2 + 2 =$ _____ + _____ = _____ .

But the first term should be _____ .

Check the third expression, $n^2 + n$.

When $n = 1$, the expression $n^2 + n =$ _____ + _____ = _____ .

When $n = 2$, the expression $n^2 + n =$ _____ + _____ = _____ .

When $n = 3$, the expression $n^2 + n =$ _____ + _____ = _____ .

When $n = 4$, the expression $n^2 + n =$ _____ + _____ = _____ .

When $n = 5$, the expression $n^2 + n =$ _____ + _____ = _____ .

The expression _____ can be used as the rule to find the value of the n th term in this sequence.

When $n = 1$, the expression $2n = 2$. When $n = 2$, the expression $2n = 4$. But the second term should be 6. When $n = 1$, the expression $n^2 + 2 = 1 + 2 = 3$. But the first term should be 2. When $n = 1$, the expression $n^2 + n = 1 + 1 = 2$. When $n = 2$, the expression $n^2 + n = 4 + 2 = 6$. When $n = 3$, the expression $n^2 + n = 9 + 3 = 12$. When $n = 4$, the expression $n^2 + n = 16 + 4 = 20$. When $n = 5$, the expression $n^2 + n = 25 + 5 = 30$. The expression $n^2 + n$ can be used as the rule to find the value of the n th term in this sequence.

How Do You Solve Equations?

Some equations use a variable to represent a quantity. To solve an equation containing a variable, find the value of the variable. The value of the variable is the number that makes the equation true.

In the equation $2b - 5 = 11$, the value for b that makes the equation true is 8.

$$2 \cdot 8 - 5 = 11$$

$$16 - 5 = 11$$

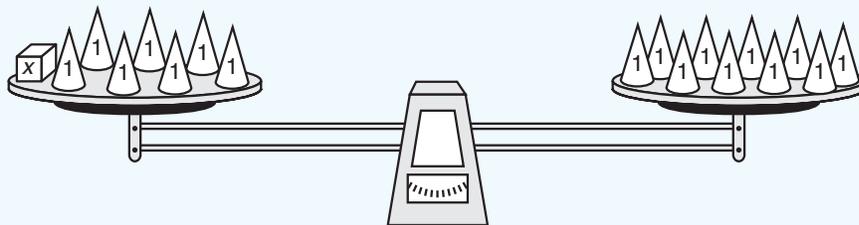
$$11 = 11$$

The equation is true.

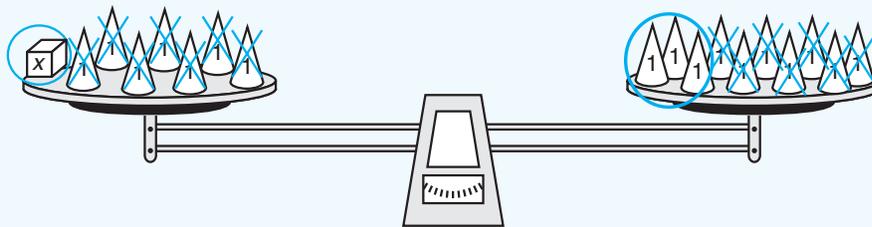
The value 8 is the solution for b in the equation $2b - 5 = 11$.

There are many different methods to find solutions for different types of equations. One way to solve equations is to use models to represent quantities. This will help you find the value of the variable that makes the equation true.

The model below represents the equation $x + 7 = 10$.



Use the model to find the value of x . Remove equivalent values from each side of the balance until x is left by itself on one side of the scale.

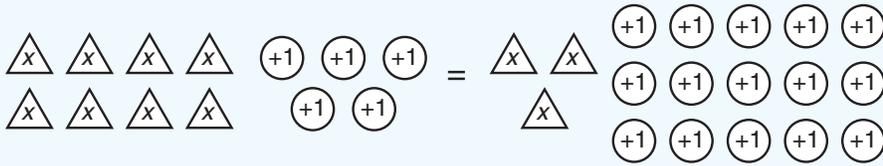


The model shows that if

$$x + 7 = 10, \text{ then}$$

$$x = 3.$$

The model below represents the equation $8x + 5 = 3x + 15$.

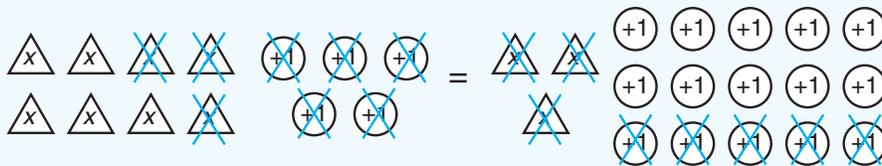


Use the model to find the value of x that makes the equation true.

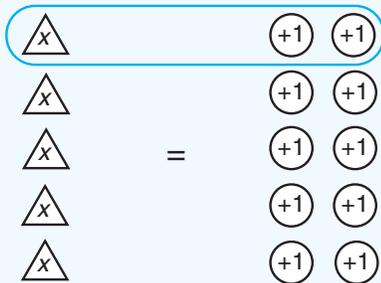
- Remove like quantities from each side.

Subtract (cross off) 5 circles from both sides of the equation.

Subtract (cross off) 3 triangles from both sides of the equation.



- There are 5 triangles remaining on the left side and 10 circles remaining on the right side. Divide both sides of the equation by 5.



- If 1 triangle = 2 circles, then $x = 2$.
- Check to see if 2 is the solution. Replace x in the equation with 2 and see if the resulting equation is true.

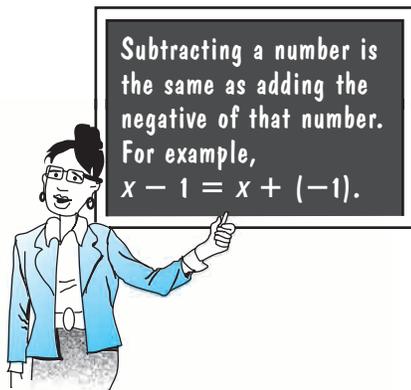
$$8x + 5 = 3x + 15$$

$$8(2) + 5 \stackrel{?}{=} 3(2) + 15$$

$$16 + 5 \stackrel{?}{=} 6 + 15$$

$$21 = 21$$

The equation is true. The solution is $x = 2$.



Try It

The model below represents the equation $4x - 3 = 2x - 9$.

$$\begin{array}{ccc} \boxed{x} & \boxed{x} & \ominus \ominus \ominus \\ \boxed{x} & \boxed{x} & \ominus \ominus \ominus \end{array} = \begin{array}{ccc} \boxed{x} & \boxed{x} & \ominus \ominus \ominus \\ \ominus \ominus \ominus & \ominus \ominus \ominus & \ominus \ominus \ominus \end{array}$$

Use the model to find the value of x .

Cross out _____ squares from each side of the equation.

Cross out _____ circles from each side of the equation.

This leaves _____ squares on the left side and _____ circles on the right side.

Since _____ squares equal _____ circles, _____ square must equal _____ circles.

The value of each circle is -1 , so 3 times -1 equals -3 .

So the value of x is _____ .

Cross out **2** squares from each side of the equation. Cross out **3** circles from each side of the equation. This leaves **2** squares on the left side and **6** circles on the right side. Since **2** squares equal **6** circles, **1** square must equal **3** circles. So the value of x is **-3** .

How Do You Match a Problem Situation with an Equation?

Sometimes you need to determine whether a given equation represents a particular problem situation. To do this, you might have to work backwards by writing an equation for a situation. Then see if your equation matches the given equation. Or you might look at the operations in the given equation to see if they make sense based on what is explained in the problem situation.

Look at the equation $8x = 104$. Which problem situation matches this equation?

Situation A

Mr. Jones has a small rectangular brick patio. One dimension is 8 feet. The perimeter of the patio is 104 feet. What is the other dimension?

Does the given equation represent Situation A?

- The formula for finding the perimeter of a rectangle is $P = 2(l + w)$.
- In this problem the perimeter is 104 ft, and one of the dimensions of the rectangle is 8 ft. Let x equal the other dimension of the rectangle.
- Substitute these values in the formula $P = 2(l + w)$ to find the equation for this problem situation.

$$104 = 2(8 + x)$$

The given equation, $8x = 104$, does not represent Situation A.

Situation B

Mr. Jones has a small rectangular brick patio. One dimension is 8 feet. The area of the patio is 104 square feet. What is the other dimension?

Does the given equation represent Situation B?

- The formula for finding the area of a rectangle is $A = lw$.
- In this problem the area is 104 ft^2 , and one of the dimensions of the rectangle is 8 ft. Let x equal the other dimension of the rectangle.
- Substitute these values in the formula $A = lw$ to find the equation for this problem situation.

$$104 = 8x$$

The given equation, $8x = 104$, does represent Situation B.

Try It

Frank works the same number of hours each workday. He works 5 days per week and earns \$10.50 per hour. Frank earns \$115.50 each week. How many hours per day does Frank work?

Does the equation $115.50 = (5 + x) \cdot (10.50)$ match the problem situation?

First write an equation that could be used to find the amount of money Frank earns in a week.

Weekly money earned =

(Total _____ worked) • (Hourly _____)

Next find what those quantities are in this problem.

The weekly money earned is \$_____.

Let x equal the number of hours Frank works in 1 day.

Let _____ x equal the total number of hours he works each week.

Frank's pay rate is \$_____ per hour.

Finally, substitute these values in the formula to find the equation for this problem situation.

Weekly money earned = (Total hours worked) • (Hourly pay rate)

_____ = _____ • _____

Compare this equation to the given equation.

The given equation, _____ = _____ • _____,

_____ match the problem situation.

Weekly money earned = (Total **hours** worked) • (Hourly **pay rate**). The weekly money earned is \$**115.50**. Let **$5x$** equal the total number of hours he works each week. Frank's pay rate is \$**10.50** per hour. The equation for this problem situation is **$115.50 = 5x \cdot 10.50$** . The given equation, **$115.50 = (5 + x) \cdot 10.50$** , **does not** match the problem situation.

Now practice what you've learned.

Question 11

A family went to a restaurant. The total cost of the meal was \$48.30. The family had a coupon for 20% off the total. What was the final cost of the meal after the coupon was used?

- A \$9.66
- B \$28.30
- C \$48.10
- D \$38.64



Answer Key: page 237

Question 12

Perry took a survey of 125 students at his school to see how many have their own e-mail account. Of the students surveyed, 35 students have their own e-mail account. What percent of the students surveyed have their own e-mail account?

- A 90%
- B 28%
- C 72%
- D 3.57%



Answer Key: page 237

Question 13

A 2-pint bottle of soy sauce costs \$1.79. If the unit price remains the same, how much will 2 gallons of soy sauce cost?

- A \$7.16
- B \$14.32
- C \$28.64
- D \$57.28

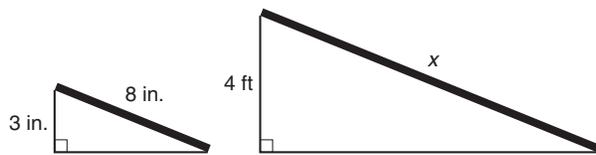


Answer Key: page 238

Objective 2

Question 14

A designer drew a scale model of a ramp that will be used to load crates onto a truck.



What will be the length, x , of the ramp?

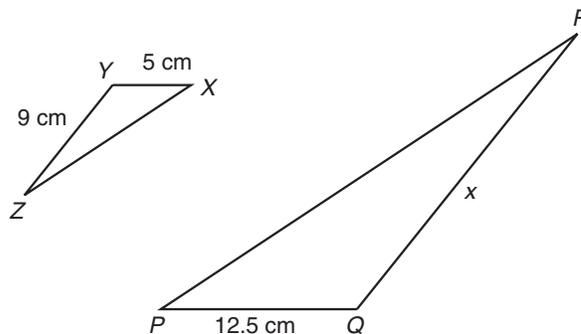
- A $10\frac{2}{3}$ feet
- B $5\frac{1}{3}$ feet
- C $2\frac{2}{3}$ feet
- D $21\frac{1}{3}$ feet



Answer Key: page 238

Question 15

Triangle XYZ is similar to triangle PQR .



Which equation could be used to find the length of side QR ?

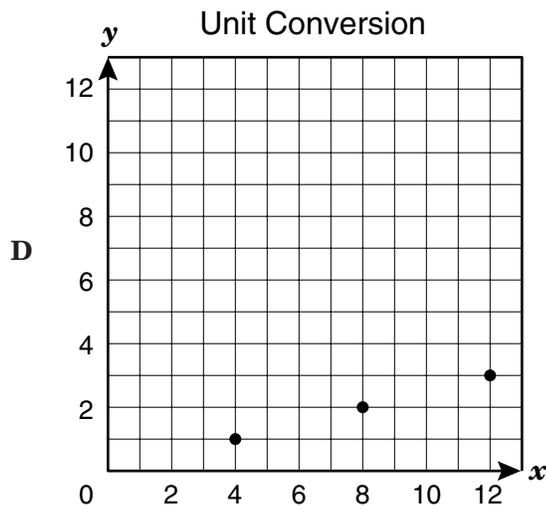
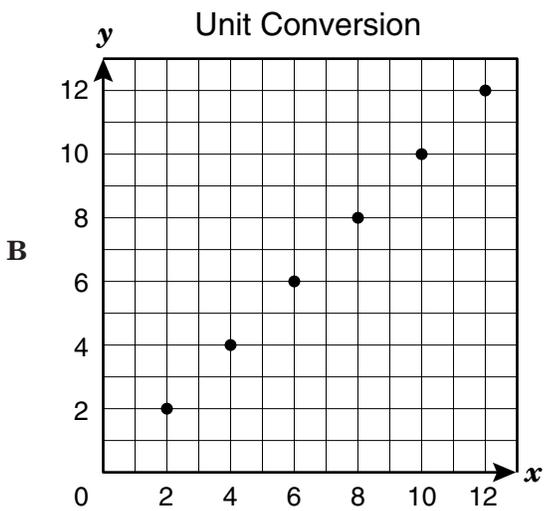
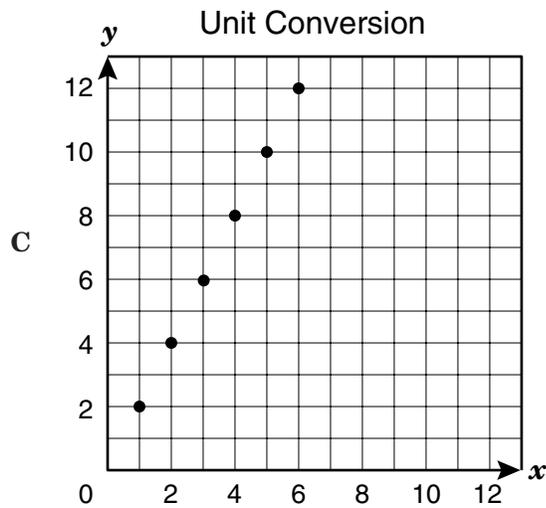
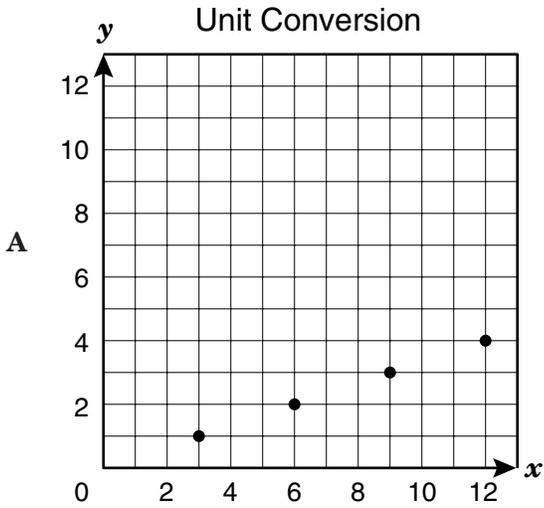
- A $\frac{12.5}{14} = \frac{9}{x}$
- B $\frac{5}{12.5} = \frac{x}{9}$
- C $\frac{14}{9} = \frac{12.5}{x}$
- D $\frac{5}{12.5} = \frac{9}{x}$



Answer Key: page 238

Question 16

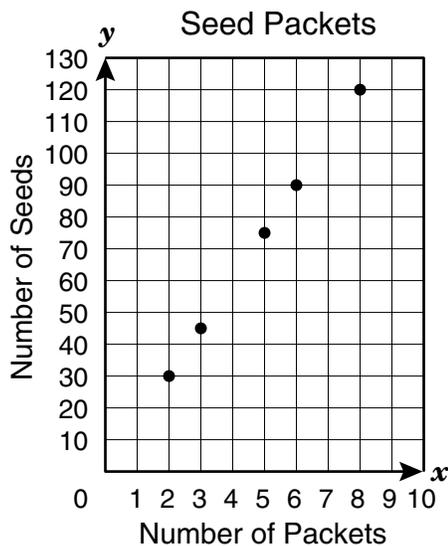
Which graph best represents the number of quarts, x , for different numbers of pints, y ?



Answer Key: page 238

Question 17

Yolanda was packaging seeds for a seed company. She put the same number of seeds in each packet. She graphed the total number of seeds for different numbers of packets. Which table best represents the data in the graph?



Seed Packets

A

Number of Packets	Number of Seeds
2	30
3	45
5	75
6	90
8	120

Seed Packets

C

Number of Packets	Number of Seeds
30	2
45	3
75	5
90	6
120	8

Seed Packets

B

Number of Packets	Number of Seeds
2	3
3	4.5
5	7.5
6	9
8	12

Seed Packets

D

Number of Packets	Number of Seeds
2	2
3	3
5	5
6	6
8	8



Answer Key: page 238

Question 18

Which sequence follows the rule $(n + 1)^2 - 3n$, where n equals the number's position in the sequence?

- A $-4, -2, 0, 4, 10, \dots$
- B $4, 9, 16, 25, 36, \dots$
- C $1, 3, 7, 13, 21, \dots$
- D $1, 3, 7, 9, 10, \dots$



Answer Key: page 238

Question 19

In the equation $7x + 3 = 4x + 15$ modeled below, find the value of x that makes the equation true.

$$\begin{array}{ccccccc}
 \triangle x & \triangle x & \triangle x & \triangle x & \bigcirc +1 & \bigcirc +1 & \bigcirc +1 \\
 \triangle x & \triangle x & \triangle x & & = & \triangle x & \triangle x & \triangle x & \triangle x & \bigcirc +1 & \bigcirc +1 & \bigcirc +1 \\
 \triangle x & \triangle x & \triangle x & & & & & & & \bigcirc +1 & \bigcirc +1 & \bigcirc +1 \\
 & & & & & & & & & \bigcirc +1 & \bigcirc +1 & \bigcirc +1
 \end{array}$$

- A 2
- B 3
- C 4
- D 5



Answer Key: page 239

Question 20

Which problem situation matches the equation shown below?

$$(128 + 145 + 139 + 157 + x) \div 5 = 148$$

- A The weights of four brothers are 128 pounds, 145 pounds, 139 pounds, and 157 pounds. Find x , the average weight of the brothers.
- B The number of miles four people drove on trips were 128, 145, 139, and 157. Find x , the difference between the total sum of the distances and the number of miles for the fifth person, 148.
- C The number of students in fourth through seventh grade are 128, 145, 139, and 157. Find x , the average number of students in each grade.
- D A person bowled four games and scored 128, 145, 139, and 157. Find x , the score the person would need to have in the fifth game to average 148 for all five games.



Answer Key: page 239

Objective 3

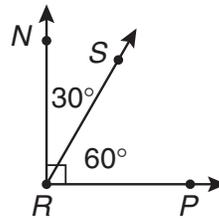
The student will demonstrate an understanding of geometry and spatial reasoning.

For this objective you should be able to

- compare and classify shapes and solids using geometric vocabulary and properties;
- use coordinate geometry to describe locations on a plane; and
- use geometry to model and describe the physical world.

What Are Complementary and Supplementary Angles?

Two angles are **complementary** if the sum of their measures is 90° .

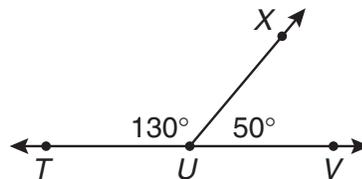


$\angle NRS$ and $\angle SRP$ are complementary angles.

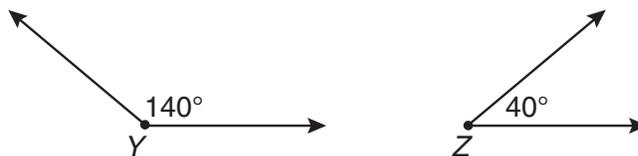


$\angle A$ and $\angle B$ are also complementary angles.

Two angles are **supplementary** if the sum of their measures is 180° .

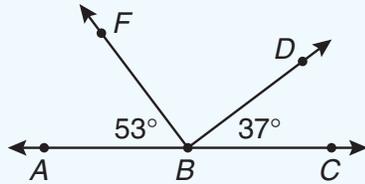


$\angle TUX$ and $\angle XUV$ are supplementary angles.



$\angle Y$ and $\angle Z$ are also supplementary angles.

$\angle ABC$ is a straight angle. Identify two angles that are complementary and two different pairs of angles that are supplementary.



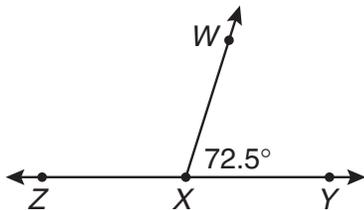
- $\angle DBC$ measures 37° , and $\angle FBA$ measures 53° .
 $m\angle DBC + m\angle FBA = 37^\circ + 53^\circ = 90^\circ$
 Therefore, $\angle DBC$ and $\angle FBA$ are complementary angles.
- The sum of the measures of $\angle CBD$ and $\angle DBA$ equals the measure of $\angle ABC$.
 Because $\angle ABC$ is a straight angle, $m\angle ABC = 180^\circ$.
 $m\angle CBD + m\angle DBA = 180^\circ$
 Therefore, $\angle CBD$ and $\angle DBA$ are supplementary angles.
- The sum of the measures of $\angle CBF$ and $\angle FBA$ equals the measure of $\angle ABC$.
 Because $\angle ABC$ is a straight angle, $m\angle ABC = 180^\circ$.
 $m\angle CBF + m\angle FBA = 180^\circ$
 Therefore, $\angle CBF$ and $\angle FBA$ are supplementary angles.



A straight angle is an angle that measures 180° .

Try It

If $m\angle WXY = 72.5^\circ$, what is the measure of its supplement?



The measure of $\angle WXY$ is _____ $^\circ$.

\angle _____ is the supplement of $\angle WXY$.

$m\angle$ _____ + $m\angle WXY =$ _____ $^\circ$; $m\angle$ _____ = _____ $^\circ$

The measure of the supplement of $\angle WXY$ is _____ $^\circ$.

The measure of $\angle WXY$ is 72.5° . $\angle ZXW$ is the supplement of $\angle WXY$.
 $m\angle ZXW + m\angle WXY = 180^\circ$; $m\angle ZXW = 107.5^\circ$. The measure of the supplement of $\angle WXY$ is 107.5° .

Some plane figures have congruent sides or angles. These sides or angles can be indicated by identical markings. If two sides are of equal length, they are congruent. If two angles have equal measure, they are congruent.



How Can You Classify Plane Figures?

You can classify plane, two-dimensional, figures based on information about their sides and angles. Plane figures include triangles, quadrilaterals, other polygons, and circles.

A **triangle** is a 3-sided polygon. The sum of the measures of the three angles of any triangle is 180° . Here are some types of triangles with which you should be familiar.

Classifying Triangles by Sides

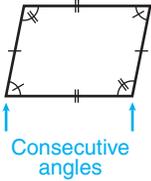
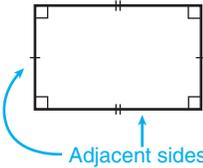
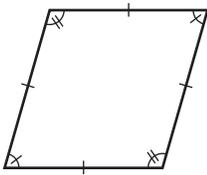
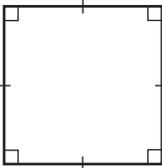
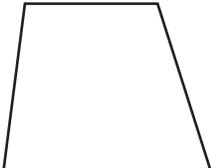
Type	Example	Properties
Scalene triangle		<ul style="list-style-type: none"> No sides are congruent. No angles are congruent.
Isosceles triangle		<ul style="list-style-type: none"> At least two sides are congruent. Two angles, called the base angles, are congruent.
Equilateral triangle		<ul style="list-style-type: none"> All three sides are congruent. All three angles are congruent.

Classifying Triangles by Angles

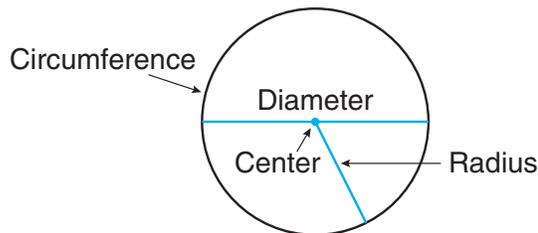
Type	Example	Properties
Right triangle		<ul style="list-style-type: none"> Exactly one angle is a right angle. The acute angles are complementary. The side opposite the right angle, called the hypotenuse, is the longest side.
Acute triangle		<ul style="list-style-type: none"> All three angles are acute.
Obtuse triangle		<ul style="list-style-type: none"> Exactly one angle is an obtuse angle.

A **quadrilateral** is a 4-sided polygon. The sum of the measures of the four angles of any quadrilateral is 360° . Some types of quadrilaterals with which you should be familiar are shown below.

Quadrilaterals

Type	Example	Properties
Parallelogram		<ul style="list-style-type: none"> • Both pairs of opposite sides are parallel. • Both pairs of opposite sides are congruent. • Both pairs of opposite angles are congruent. • Consecutive angles are supplementary.
Rectangle		<ul style="list-style-type: none"> • Both pairs of opposite sides are parallel. • Both pairs of opposite sides are congruent. • All pairs of adjacent sides are perpendicular. • All angles are right angles.
Rhombus		<ul style="list-style-type: none"> • Both pairs of opposite sides are parallel. • All sides are congruent. • Both pairs of opposite angles are congruent. • Consecutive angles are supplementary.
Square		<ul style="list-style-type: none"> • Both pairs of opposite sides are parallel. • All sides are congruent. • All pairs of adjacent sides are perpendicular. • All angles are right angles.
Trapezoid		<ul style="list-style-type: none"> • Exactly one pair of opposite sides is parallel. • Exactly two pairs of consecutive angles are supplementary.

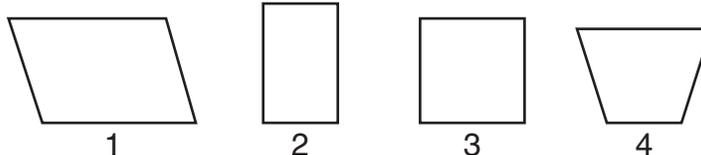
A **circle** is the set of all points in a plane that are the same distance from a given point called the **center**.



- A **radius** (r) of a circle is a line segment joining the center of the circle and any point on the circle.
The radius of a circle is half the diameter, or $r = \frac{1}{2}d$.
- A **diameter** (d) of a circle is a line segment that joins any two points on the circle and passes through the center of the circle.
The diameter of a circle is twice the radius, or $d = 2r$.
- The **circumference** (C) of a circle is the distance around the circle.

Try It

Look at these plane figures.



Which figure does not appear to have both pairs of opposite sides parallel, nor all pairs of consecutive angles supplementary?

Figure 1 appears to be a _____.

In a _____ both pairs of opposite sides are _____, and all pairs of consecutive angles are _____.

Figure 2 appears to be a _____.

In a _____ both pairs of opposite sides are _____, and all pairs of consecutive angles are _____.

Figure 3 appears to be a _____.

In a _____ both pairs of opposite sides are _____, and all pairs of consecutive angles are _____.

Figure 4 appears to be a _____ .

In a _____ only _____ pair of opposite sides is parallel, and only two pairs of consecutive angles are

_____ .

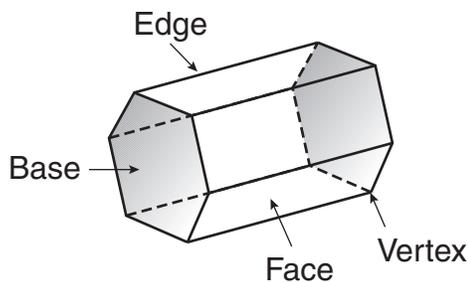
Only the sides and angles in Figure _____ meet the requirements.

Figure 1 appears to be a **parallelogram**. In a **parallelogram** both pairs of opposite sides are **parallel**, and all pairs of consecutive angles are **supplementary**. Figure 2 appears to be a **rectangle**. In a **rectangle** both pairs of opposite sides are **parallel**, and all pairs of consecutive angles are **supplementary**. Figure 3 appears to be a **square**. In a **square** both pairs of opposite sides are **parallel**, and all pairs of consecutive angles are **supplementary**. Figure 4 appears to be a **trapezoid**. In a **trapezoid** only **one** pair of opposite sides is parallel, and only two pairs of consecutive angles are **supplementary**. Only the sides and angles in Figure 4 meet the requirements.

How Can You Classify Solid Figures?

You can classify solid, three-dimensional, figures based on information about their faces, bases, edges, and vertices. Solid figures include prisms and pyramids, as well as figures with curved surfaces.

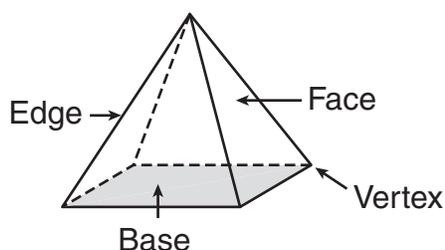
A **prism** is a solid with two parallel, congruent bases. The bases, which are also two of the faces, can be any polygon. The other faces are rectangles. A prism is named according to the shape of its bases. For example, the bases in the prism below are hexagons, so the figure is a hexagonal prism.



A face is a flat surface in the shape of a polygon.
An edge is a line segment where two faces meet.
A vertex is a point where three or more edges meet. The plural of "vertex" is "vertices."

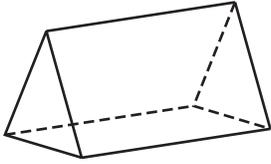
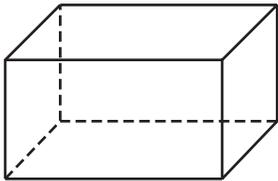
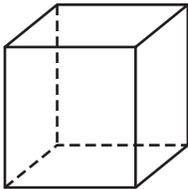
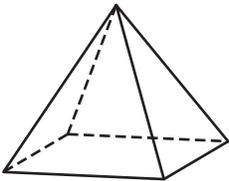
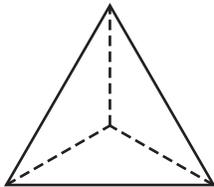


A **pyramid** is a solid with only one base. The base can be any polygon. The other faces are triangles. A pyramid is named according to the shape of its base. For example, the base in the pyramid below is a square, so the figure is a square pyramid.



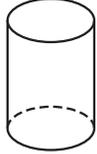
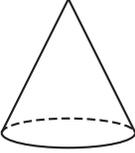
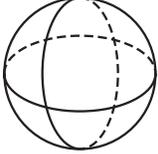
Here are some three-dimensional figures with which you should be familiar.

Prisms and Pyramids

Type	Example	Properties
Triangular prism		<ul style="list-style-type: none"> ● 5 faces 2 triangular bases 3 rectangular faces ● 9 edges ● 6 vertices
Rectangular prism		<ul style="list-style-type: none"> ● 6 faces 2 rectangular bases 4 rectangular faces ● 12 edges ● 8 vertices
Cube		<ul style="list-style-type: none"> ● 6 faces 2 square bases 4 square faces ● 12 edges ● 8 vertices
Square pyramid		<ul style="list-style-type: none"> ● 5 faces 1 square base 4 triangular faces ● 8 edges ● 5 vertices
Triangular pyramid		<ul style="list-style-type: none"> ● 4 faces 1 triangular base 3 triangular faces ● 6 edges ● 4 vertices

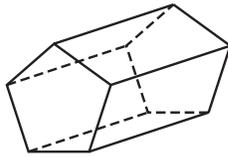
You should also be familiar with three-dimensional figures that have curved surfaces. These figures include cylinders, cones, and spheres. You can classify these solid figures based on information about their bases and surfaces.

Three-Dimensional Figures with Curved Surfaces

Type	Example	Properties
Cylinder		<ul style="list-style-type: none"> • 2 circular bases • 1 curved surface
Cone		<ul style="list-style-type: none"> • 1 circular base • 1 curved surface • 1 vertex
Sphere		<ul style="list-style-type: none"> • 1 curved surface

Try It

Look at the figure below.



The figure shown has _____ bases, each shaped like a _____.

The 2 bases of the figure are parallel and _____.

The figure has _____ rectangular faces.

The figure has _____ edges.

The figure has _____ vertices.

The figure is a _____.

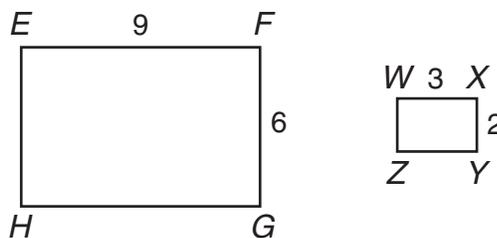
The figure shown has 2 bases, each shaped like a **pentagon**. The 2 bases of the figure are parallel and **congruent**. The figure has 5 rectangular faces. The figure has 15 edges. The figure has 10 vertices. The figure is a **pentagonal prism**.

What Are Similar Figures?

Two geometric figures are **similar** if the following conditions are true:

- Both figures are the same shape.
- The corresponding angles of the figures are congruent.
- The ratios of the lengths of corresponding sides are equal, so they form a proportion.

Rectangle $EFGH$ is similar to rectangle $WXYZ$.



$\angle E$ corresponds to $\angle W$.

$\angle F$ corresponds to $\angle X$.

$\angle G$ corresponds to $\angle Y$.

$\angle H$ corresponds to $\angle Z$.

Side EF corresponds to side WX .

Side FG corresponds to side XY .

Side GH corresponds to side YZ .

Side HE corresponds to side ZW .

All the angles are right angles, so all corresponding angles are congruent.

- The length of the larger rectangle is 9 units, and the length of the smaller rectangle is 3 units. The ratio is $\frac{9}{3}$.
- The width of the larger rectangle is 6 units, and the width of the smaller rectangle is 2 units. The ratio is $\frac{6}{2}$.

The proportion $\frac{9}{3} = \frac{6}{2}$ is true, so the ratios of the lengths of the corresponding sides are proportional.

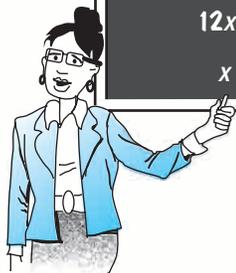
A proportion is a statement that two ratios are equal. A proportion can be solved by setting the cross products equal to each other.

$$\frac{12}{5} = \frac{24}{x}$$

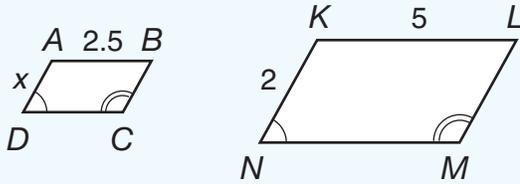
$$12x = 5 \cdot 24$$

$$12x = 120$$

$$x = 10$$



Parallelogram $ABCD$ is similar to parallelogram $KLMN$. Write and solve a proportion to find x , the length of side AD .



- Corresponding sides of similar figures are proportional.

$$\begin{array}{l} \overline{AB} \text{ corresponds to } \overline{KL}. \\ \overline{AD} \text{ corresponds to } \overline{KN}. \end{array}$$

- Write a proportion that compares the ratios of corresponding sides.

$$\frac{\text{small}}{\text{large}} \quad \frac{AB}{KL} = \frac{AD}{KN}$$

- Substitute the values into the proportion.

$$\frac{2.5}{5} = \frac{x}{2}$$

- Use cross products.

$$2.5 \cdot 2 = 5x$$

$$5 = 5x$$

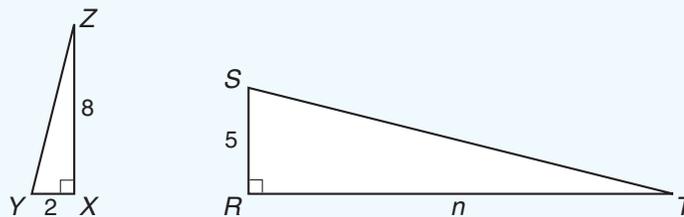
- Divide both sides by 5 to find the value of x .

$$\frac{5}{5} = \frac{5x}{5}$$

$$1 = x$$

The length of side AD is 1 unit.

Right triangles XYZ and RST are similar.



Find n , the length of side RT .

- Side XY corresponds to side RS .
- Side XZ corresponds to side RT .
- Write a proportion that compares the ratios of corresponding sides.

$$\frac{\text{small}}{\text{large}} = \frac{XY}{RS} = \frac{XZ}{RT}$$

- Substitute the values into the proportion.

$$\frac{2}{5} = \frac{8}{n}$$

- Solve the proportion.

$$2n = 5 \cdot 8$$

$$2n = 40$$

$$\frac{2n}{2} = \frac{40}{2}$$

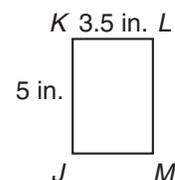
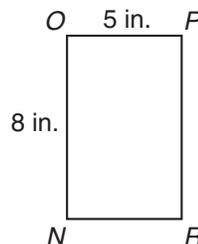
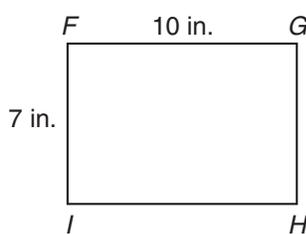
$$n = 20$$

Use cross products to find the value of n .

The length of side RT is 20 units.

Try It

Which rectangle is similar to rectangle $FGHI$?



Corresponding angles of similar figures are congruent.

All the angles in a rectangle are _____ angles, so both of the other rectangles have angles that are _____ to the corresponding angles in rectangle $FGHI$.

The ratios of the lengths of corresponding sides of similar figures form proportions. Match up the corresponding sides of rectangles $FGHI$ and $NOPR$.

Side FG corresponds to side NO .

Side FI corresponds to side _____ .

Express this as two ratios.

$$\frac{FG}{NO} = \frac{10}{\square} \qquad \frac{FI}{NR} = \frac{\square}{5}$$

Write a proportion that compares the ratios of the corresponding sides. If the proportion is true, the cross products will be equal.

$$\frac{10}{\square} = \frac{\square}{5}$$

$$56 \neq \underline{\hspace{2cm}}$$

The proportion is not true. Rectangles $FGHI$ and $NOPR$ are _____ similar.

Match up the corresponding sides of rectangles $FGHI$ and $JKLM$.

Side FG corresponds to side JK .

Side FI corresponds to side _____ .

Express this as two ratios.

$$\frac{FG}{JK} = \frac{\square}{\square} \qquad \frac{FI}{JM} = \frac{\square}{\square}$$

Write a proportion that compares the ratios of the corresponding sides. If the proportion is true, the cross products will be equal.

$$\frac{10}{5} = \frac{7}{3.5}$$

$$35 = \underline{\hspace{2cm}}$$

The proportion is true. Rectangles $FGHI$ and $JKLM$ are _____ .

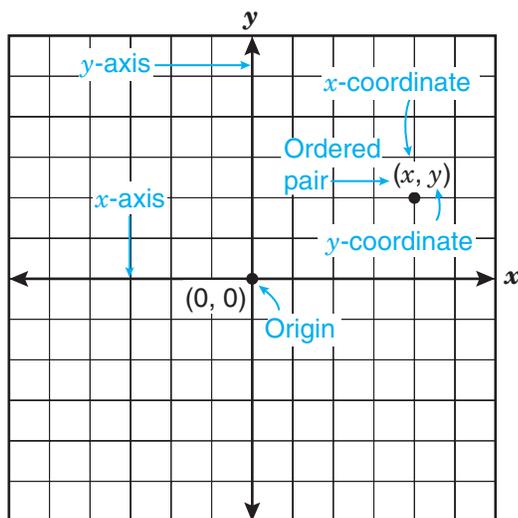
All the angles in a rectangle are **right** angles, so both of the other rectangles have angles that are **congruent** to the corresponding angles in rectangle $FGHI$.

Side FI corresponds to side NR . $\frac{FG}{NO} = \frac{10}{8}$; $\frac{FI}{NR} = \frac{7}{5}$; $\frac{10}{8} = \frac{7}{5}$; $56 \neq 50$.

Rectangles $FGHI$ and $NOPR$ are **not** similar. Side FI corresponds to side JM . $\frac{FG}{JK} = \frac{10}{5}$; $\frac{FI}{JM} = \frac{7}{3.5}$; $\frac{10}{5} = \frac{7}{3.5}$; $35 = 35$. Rectangles $FGHI$ and $JKLM$ are **similar**.

How Can You Locate and Name Points on a Coordinate Plane?

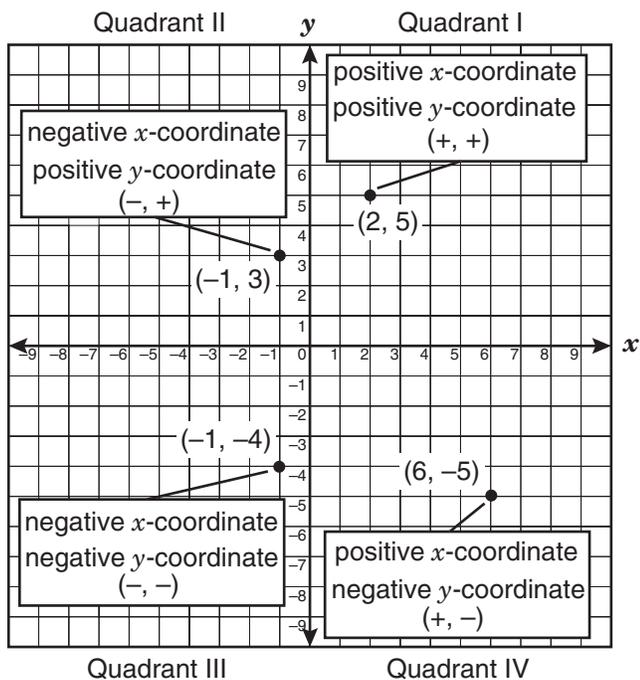
A coordinate grid is used to locate and name points on a plane. The coordinate grid is formed by two perpendicular number lines. A point is located by using an **ordered pair** of numbers. The two numbers that form the ordered pair are called the **coordinates** of the point.



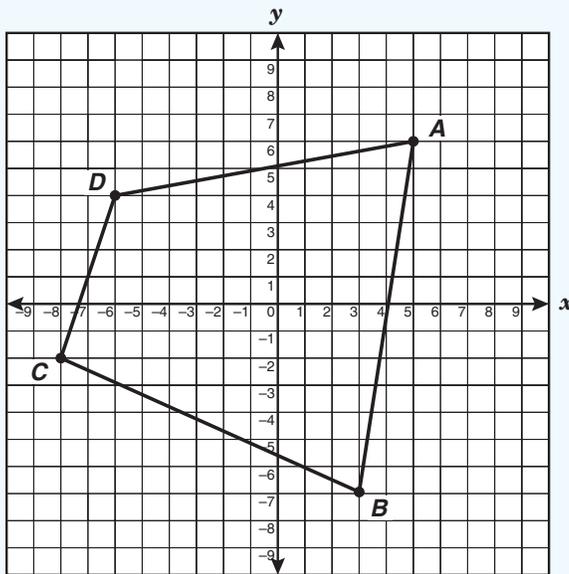
Do you see that . . .



The x-axis and y-axis divide the coordinate plane into 4 regions called **quadrants**. The quadrants are usually referred to by the Roman Numerals I, II, III, and IV.



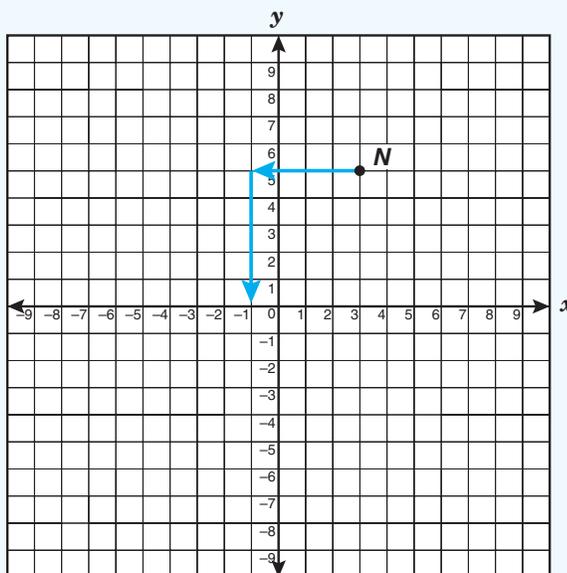
Quadrilateral $ABCD$ is drawn on the coordinate grid below.



What are the coordinates of points A , B , C , and D ?

- Point A is located at $(5, 6)$. It is 5 units to the right of the origin and 6 units above the origin.
- Point B is located at $(3, -7)$. It is 3 units to the right of the origin and 7 units below the origin.
- Point C is located at $(-8, -2)$. It is 8 units to the left of the origin and 2 units below the origin.
- Point D is located at $(-6, 4)$. It is 6 units to the left of the origin and 4 units above the origin.

What are the coordinates of the point that is 4 units to the left of and 5 units below point N ?

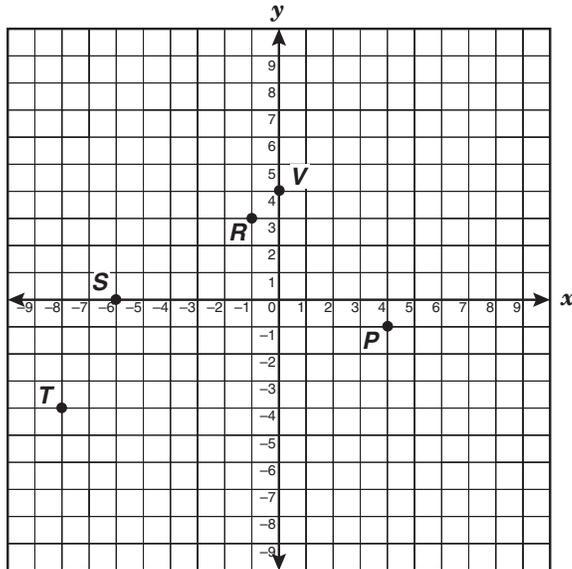


- The coordinates of point N are $(3, 5)$ because point N is 3 units to the right of the origin and 5 units above the origin.
- The new point is 4 units to the left of point N . If you move 4 units to the left of 3, you are at -1 . The x -coordinate is -1 .
- The new point is 5 units below point N . If you move 5 units down from 5, you are at 0. The y -coordinate is 0.

The coordinates of the point 4 units to the left of and 5 units below point N are $(-1, 0)$.

Try It

Look at the points plotted on the coordinate plane. Which point has the coordinates $(-8, -4)$?



Point P is _____ units to the right of the origin.

Point P is _____ unit below the origin.

The coordinates of point P are (_____, _____).

Point V is _____ units to the right of the origin.

Point V is _____ units above the origin.

The coordinates of point V are (_____, _____).

Point R is _____ unit to the left of the origin.

Point R is _____ units above the origin.

The coordinates of point R are (_____, _____).

Point S is _____ units to the left of the origin.

Point S is _____ units above the origin.

The coordinates of point S are (_____, _____).



Are the numbers
below the origin
positive or negative?

Objective 3

Point T is _____ units to the left of the origin.

Point T is _____ units below the origin.

The coordinates of point T are (_____, _____).

Only point _____ has the coordinates $(-8, -4)$.

Point P is 4 units to the right of the origin. Point P is 1 unit below the origin.
The coordinates of point P are $(4, -1)$.

Point V is 0 units to the right of the origin. Point V is 4 units above the origin.
The coordinates of point V are $(0, 4)$.

Point R is 1 unit to the left of the origin. Point R is 3 units above the origin.
The coordinates of point R are $(-1, 3)$.

Point S is 6 units to the left of the origin. Point S is 0 units above the origin.
The coordinates of point S are $(-6, 0)$.

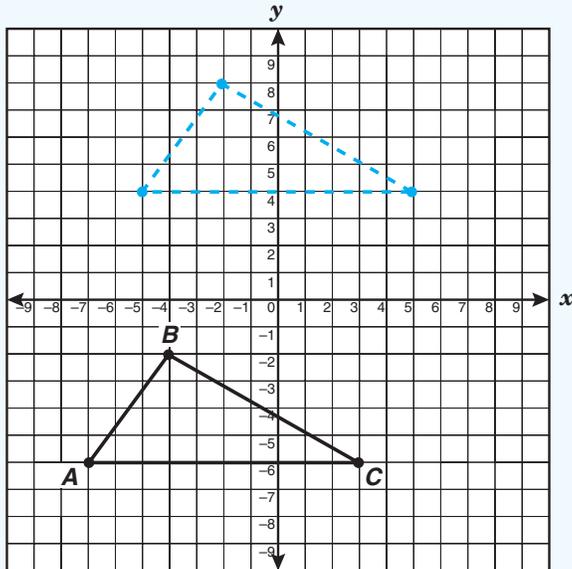
Point T is 8 units to the left of the origin. Point T is 4 units below the origin.
The coordinates of point T are $(-8, -4)$.

Only point T has the coordinates $(-8, -4)$.

What Is a Translation?

A **translation** is a movement of a figure or point along a line. A translation can be described by how many units a figure is moved to the left or right and how many units it is moved up or down. A figure and its translated image are always congruent.

If triangle ABC is translated 2 units to the right and 10 units up, what will be the new coordinates of point A ?

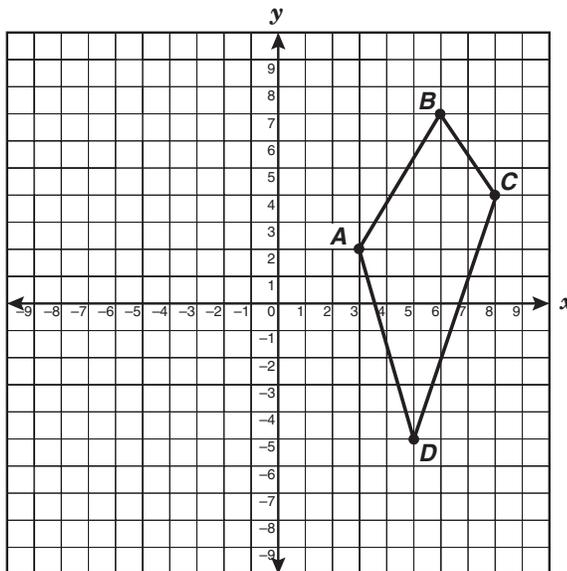


- The coordinates of point A are $(-7, -6)$.
- The x -coordinate of point A is -7 . When point A is translated 2 units to the right, its new x -coordinate will be -5 .
- The y -coordinate of point A is -6 . When point A is translated 10 units up, its new y -coordinate will be 4 .

The new coordinates of point A will be $(-5, 4)$.

Try It

If quadrilateral $ABCD$ is translated 7 units to the left and 3 units down, what will be the coordinates of the vertices of the new figure?



The coordinates of point A are (____, ____).

After translation, the new coordinates of point A will be (____, ____).

The coordinates of point B are (____, ____).

After translation, the new coordinates of point B will be (____, ____).

The coordinates of point C are (____, ____).

After translation, the new coordinates of point C will be (____, ____).

The coordinates of point D are (____, ____).

After translation, the new coordinates of point D will be (____, ____).

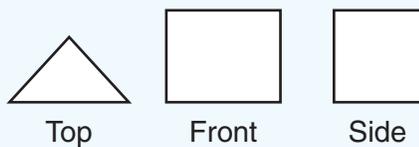
The coordinates of point A are $(3, 2)$. After translation, the new coordinates of point A will be $(-4, -1)$. The coordinates of point B are $(6, 7)$. After translation, the new coordinates of point B will be $(-1, 4)$. The coordinates of point C are $(8, 4)$. After translation, the new coordinates of point C will be $(1, 1)$. The coordinates of point D are $(5, -5)$. After translation, the new coordinates of point D will be $(-2, -8)$.

How Can You Sketch a Solid When Given Its Top, Front, and Side Views?

Sometimes you are given the top, front, and side views of a solid figure. To sketch the solid, you need to imagine how these different views are related to the solid.

- **Top View:** What would the figure look like if you were standing over it, looking straight down on it?
- **Front View:** What would the figure look like if you were standing in front of it, looking at it straight on?
- **Side View:** What would the figure look like if you were standing at the side of it, looking at it straight on?

Look at these views of a solid: top view, front view, and side view.



Which solid figure do the views above represent?

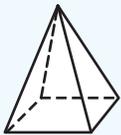


Figure 1

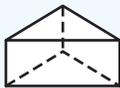


Figure 2

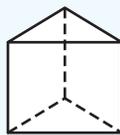


Figure 3



Figure 4

To determine which solid is represented by the views above, compare the different views to the solids.

The top view is a triangle. Imagine yourself above each of the solids. Imagine looking straight down on them.

- Only Figures 2 and 3 have a triangle as their top view, so Figures 1 and 4 cannot be the correct answer.
- Consider the other two views for Figures 2 and 3.

The front view is a rectangle that is slightly longer than it is wide. Imagine yourself in front of each of the solids. Imagine yourself looking straight at them.

- The front view of Figure 2 is a rectangle, but its length is much greater than its width. It does not match the front view shown. Figure 2 cannot be the correct answer.



Figure 2
Front

- The front view of Figure 3 is also a rectangle. The front view of Figure 3 matches the front view given.



Figure 3
Front

- The side view of Figure 3 also matches the side view given.



Figure 3
Side

Figure 3 is the solid that the three views represent.

Try It

Look at the top, front, and side views of a solid figure.



Top

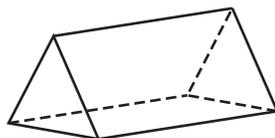


Front



Side

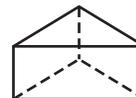
Which solid below is represented by the views above?



Solid 1



Solid 2



Solid 3

The top view given is a _____.

The front view given is a _____.

The side view given is a _____.

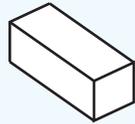
Solid _____ is best represented by the views above.

The top view given is a **rectangle**. The front view given is a **triangle**. The side view given is a **rectangle**. Solid **1** is best represented by the views above.

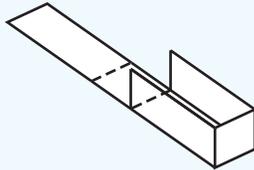
What Is a Net?

A **net** is a two-dimensional pattern of a solid figure. When the net is folded up, it forms the solid figure. You should be able to match a drawing of a solid figure with its net.

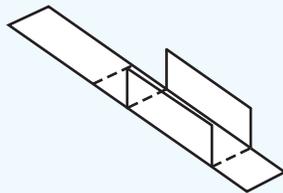
Suppose you want to make a net of the box shown below. The box is shaped like a rectangular prism. One way to make a net of the box is shown below.



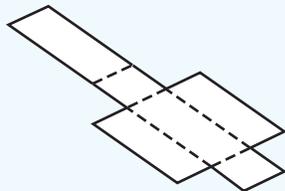
- The first step in drawing the net is to fold down the top and the back panel of the box and place them on the same plane as the bottom of the box. The dotted lines show where the box was folded.



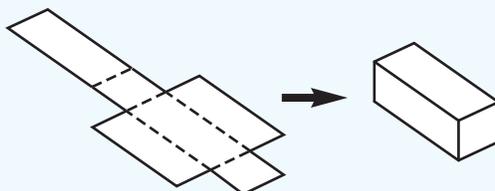
- The next step is to fold down the front of the box. Now the top, back, bottom, and front of the box form one long strip.



- The last step is to fold down the sides of the box.

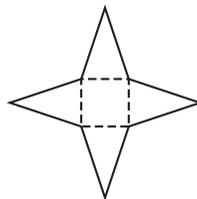


The net includes all the faces of the box. You could reconstruct the box by folding the net along the dotted lines.



Try It

Look at the net below. Which solid figure does it represent?



The shape that forms the middle of the net, the base of the figure, is a _____ .

The shapes that form the sides of the net are all _____ .

Since there is one base that is a polygon, the solid is a _____ .

Since the polygon that forms the base is a _____ , the solid is a _____ .

The shape that forms the middle of the net is a **square**. The shapes that form the sides of the net are all **triangles**. Since there is one base that is a polygon, the solid is a **pyramid**. Since the polygon that forms the base is a **square**, the solid is a **square pyramid**.

How Can You Solve Problems Using Geometric Concepts and Properties?

To solve problems that involve geometric concepts, you must first understand the problem. Then identify the quantities involved and the relationships between them. Finally, solve for the missing information.

A crew of workers is pouring cement for the foundation of a road. Each slab of the foundation is a rectangular prism that measures 12.25 feet by 10 feet by 1.5 feet. If the job requires 8 slabs, how many cubic feet of cement will the crew need?

Find the volume of 1 slab.

- The cement slab is a rectangular prism. Use the formula for the volume of a rectangular prism.

$$V = lwh$$

- Identify what the variables represent.

$$l = \text{length} = 12.25 \text{ ft}$$

$$w = \text{width} = 10 \text{ ft}$$

$$h = \text{height} = 1.5 \text{ ft}$$

- Substitute the values you know into the formula and simplify.

$$V = (12.25)(10)(1.5)$$

$$V = 183.75 \text{ ft}^3$$

Each slab requires 183.75 cubic feet of cement.

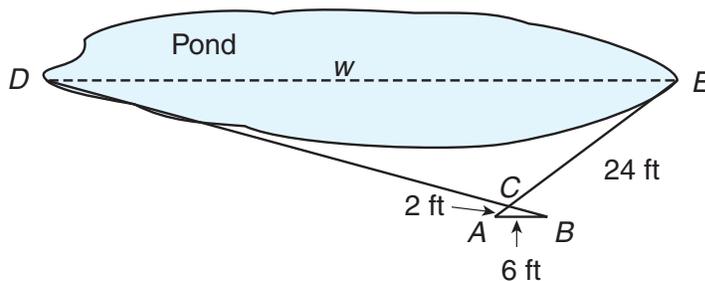
Find the volume of 8 slabs. Multiply to combine equal parts.

$$183.75 \cdot 8 = 1,470$$

The crew will need 1,470 cubic feet of cement.

Try It

The Hernández family bought a piece of property with a pond on it. They measured the distances shown below and used similar triangles to find the width of the pond. What is the width of the pond, w , in feet?



Side AB corresponds to side _____ .

Side AC corresponds to side _____ .

Write a proportion that compares the ratios of corresponding sides.

$$\frac{\square}{\square} = \frac{\square}{\square}$$

Objective 3

Substitute the values from the problem into the proportion.

$$\frac{\square}{w} = \frac{\square}{\square}$$

Solve the proportion.

$$\begin{aligned} \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} &= \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} &= \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} &= \underline{\hspace{2cm}} \end{aligned}$$

The pond on the Hernández property is _____ feet wide.

Side AB corresponds to side ED . Side AC corresponds to side EC .

$$\frac{AB}{ED} = \frac{AC}{EC}$$

$$\frac{6}{w} = \frac{2}{24}$$

$$6 \cdot 24 = 2w$$

$$144 = 2w$$

$$72 = w$$

The pond on the Hernández family's property is **72** feet wide.

Now practice what you've learned.

Question 21

The measure of $\angle Y$ is 15.5° . What is the measure of its complement in degrees?

Record your answer and fill in the bubbles. Be sure to use the correct place value.

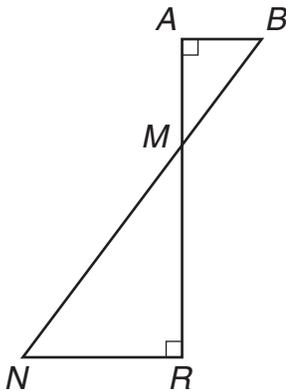
				.		
0	0	0	0		0	0
1	1	1	1		1	1
2	2	2	2		2	2
3	3	3	3		3	3
4	4	4	4		4	4
5	5	5	5		5	5
6	6	6	6		6	6
7	7	7	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9



Answer Key: page 239

Question 22

Triangle MNR is similar to triangle MBA . Which segment corresponds to MN ?



- A \overline{AB}
- B \overline{BN}
- C \overline{MB}
- D \overline{MA}



Answer Key: page 239

Question 23

Which of the following statements is always true about parallelograms?

- A All angles are congruent.
- B All sides are congruent.
- C Adjacent sides are perpendicular.
- D Opposite sides are parallel.



Answer Key: page 239

Question 24

Which of these describes the faces of an octagonal pyramid?

- A 8 rectangular faces, 2 octagonal bases
- B 8 triangular faces, 1 octagonal base
- C 6 triangular faces, 1 octagonal base
- D 8 rectangular faces, 1 octagonal base



Answer Key: page 239

Question 25

In parallelogram $DEFG$, $m\angle E = 70^\circ$. What is the measure of $\angle F$ in degrees?

Record your answer and fill in the bubbles. Be sure to use the correct place value.

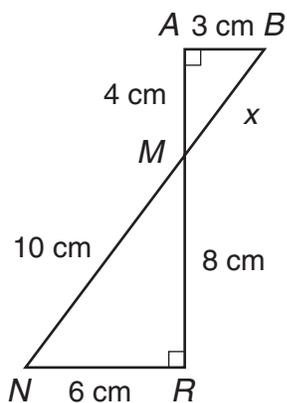
				.		
0	0	0	0		0	0
1	1	1	1		1	1
2	2	2	2		2	2
3	3	3	3		3	3
4	4	4	4		4	4
5	5	5	5		5	5
6	6	6	6		6	6
7	7	7	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9



Answer Key: page 239

Question 26

Triangle MNR is similar to triangle MBA . Which proportion can be used to find the value of x ?



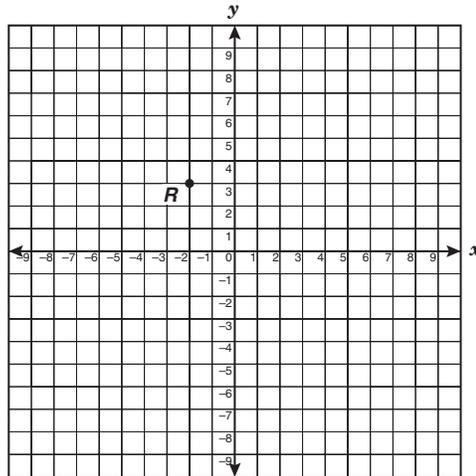
- A $\frac{6}{3} = \frac{x}{10}$
 B $\frac{4}{8} = \frac{10}{x}$
 C $\frac{6}{3} = \frac{10}{x}$
 D $\frac{x}{3} = \frac{6}{10}$



Answer Key: page 240

Question 27

What are the coordinates of a point located 4 units to the right of and 5 units down from point R ?



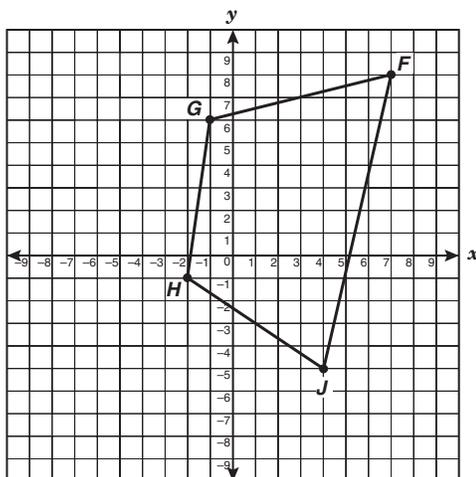
- A (2, 8)
- B (2, -2)
- C (-6, -2)
- D (-6, 8)



Answer Key: page 240

Question 28

If the polygon in the grid below is translated to the right 1 unit and down 7 units, what will be the new coordinates of point F ?



- A (0, 9)
- B (0, 7)
- C (6, 1)
- D (8, 1)

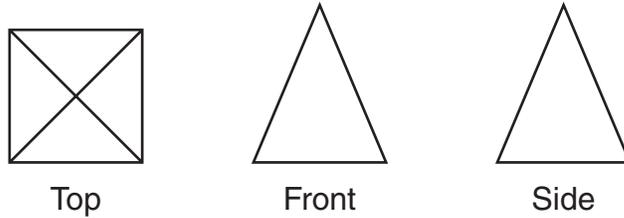


Answer Key: page 240

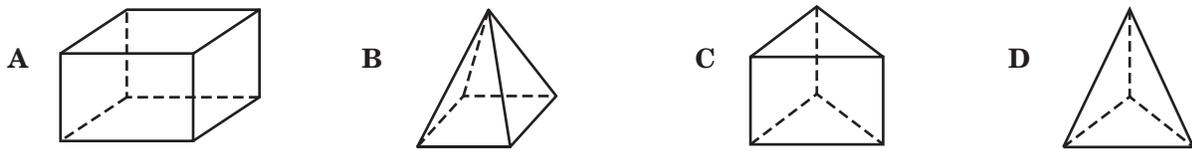
Objective 3

Question 29

Look at the top, front, and side views of a solid figure.



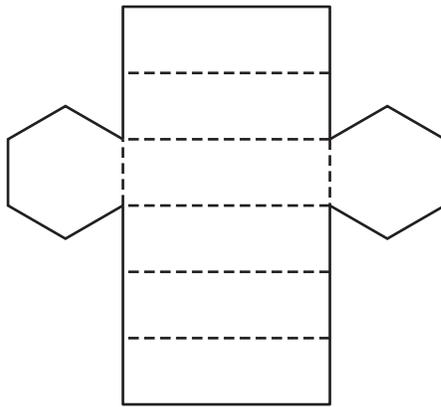
Which solid is represented by the views above?



 Answer Key: page 240

Question 30

Which solid is represented by the net shown below?



- A Hexagonal prism
- B Hexagonal pyramid
- C Pentagonal prism
- D Pentagonal pyramid

 Answer Key: page 240

Objective 4

The student will demonstrate an understanding of the concepts and uses of measurement.

For this objective you should be able to solve problems involving estimation and measurement of length, area, and volume.

How Can You Use Estimation in Measurement Problems?

In some problems you may be given only approximate values for measurements. In these cases you must estimate an answer. For example, some measurement problems ask *about how many* or *approximately how long*. Use estimation when solving such problems.

You can also estimate the answer to any problem before you find the exact answer. One way to estimate is to round the numbers in a problem before working it out. The estimate tells you approximately what the answer will be. If you estimate first, you will know whether the answer you calculate is reasonable. For example, some problems ask whether a certain number is a *reasonable answer* to a problem. Use estimation to answer such questions.

Another type of estimation involves pi, or π . The value of π is given in the Mathematics Chart as 3.14 or $\frac{22}{7}$. These numbers are only estimates of the value of π . The actual value of π is a number that starts 3.1415926... and continues forever without repeating a pattern.

Whenever you use a formula containing π , the answer is not exact.

Michelle is designing a circular sign. The sign will have a circumference of 48 inches. What is the minimum width to the nearest inch of the piece of wood from which she can cut the sign?



- The minimum width of the piece of wood she can use is equal to the diameter of the circle.
- Use the formula for the circumference of a circle, $C = \pi d$, to find the diameter. The formula for the circumference of a circle contains π , so the answer you calculate will be approximate.
- Substitute 48 for C and 3.14 for π .

$$48 \approx 3.14d$$

- Solve for d .

$$\frac{48}{3.14} \approx \frac{3.14d}{3.14} \quad \text{Divide both sides by 3.14.}$$

$$15.29 \approx d$$

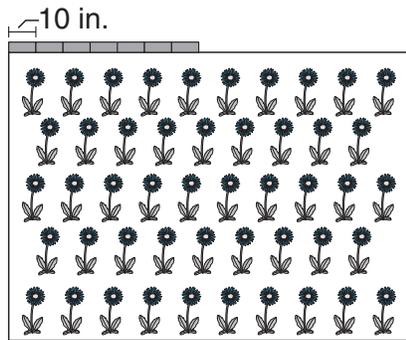
The diameter of the circle is about 15.29 inches. Therefore, the minimum width to the nearest inch of the piece of wood from which Michelle can cut the sign is 16 inches.

The symbol \approx means approximately equal to.



Try It

John plans to lay bricks around the edge of a rectangular garden. The garden is 12 feet long and 8.5 feet wide. Each brick is 10 inches long. What is the minimum number of bricks he will need to buy to complete the project?



Use the formula for _____
to find the distance around the garden.

$$P = 2(\text{_____} + \text{_____})$$

$$P = 2(\text{_____} + \text{_____})$$

$$P = 2(\text{_____})$$

$$P = \text{_____}$$

The perimeter of the garden is _____ feet.

The length of the bricks is given in _____, but the perimeter of the garden is expressed in _____.

Convert the perimeter to an equivalent number of inches.

$$1 \text{ foot} = \text{_____} \text{ inches}$$

$$41 \text{ feet} \cdot \text{_____} \text{ inches per foot} = \text{_____} \text{ inches}$$

Divide _____ by _____ to find the number of bricks he will need.

$$\text{_____} \div 10 = \text{_____}$$

John will need _____ bricks. Since John cannot buy part of a brick, he will need to buy at least _____ bricks to complete the project.

Use the formula for **the perimeter of a rectangle** to find the distance around the garden: $P = 2(l + w)$; $P = 2(12 + 8.5)$; $P = 2(20.5)$; $P = 41$. The perimeter of the garden is **41** feet. The length of the bricks is given in **inches**, but the perimeter is expressed in **feet**. Convert the perimeter to an equivalent number of inches: 1 foot = **12** inches; 41 feet \cdot **12** inches per foot = **492** inches. Divide **492** by **10** to find the number of bricks he will need. $492 \div 10 = 49.2$. John will need **49.2** bricks. Since John cannot buy part of a brick, he will need to buy at least **50** bricks to complete the project.



How many inches are in 1 foot?

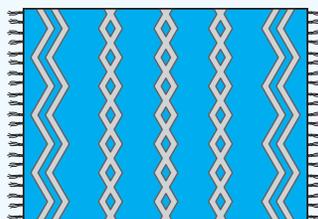
How Can You Use Formulas to Solve Problems?

The Mathematics Chart lists formulas for perimeter, circumference, area, and volume.

When using a formula to solve a problem, follow these steps:

- Identify the formula that applies to the problem you are solving.
- Identify what the variables in the formula stand for.
- Substitute the variables in the formula with their values from the problem.
- Perform the calculations. Remember to use the correct order of operations.
- State the solution to the problem using the appropriate units of measurement.

Connie wants to sew some fringe across both short ends of a rectangular rug. The perimeter of the rug is 7 yards. The length of the rug is 2 yards. How many inches of fringe will Connie need?



- Identify the formula that applies to the problem you are solving.

The problem involves the perimeter of a rectangle: $P = 2l + 2w$.

- Identify what the variables in the formula stand for.

P stands for perimeter, l stands for length, and w stands for width.

- Replace the variables in the formula with their values from the problem.

$$\begin{aligned} P &= 2l + 2w \\ 7 &= 2(2) + 2w \end{aligned}$$

- Solve for w .

$$\begin{aligned} 7 &= 4 + 2w \\ -4 &= -4 \\ \hline 3 &= 2w \\ \frac{3}{2} &= \frac{2w}{2} \\ 1.5 &= w \end{aligned}$$

- State the solution to the problem using the appropriate units of measurement.

Do you see
that . . .



Connie will need $2(1.5) = 3$ yards of fringe. The problem asks how many inches of fringe Connie will need, so convert 3 yards to inches.

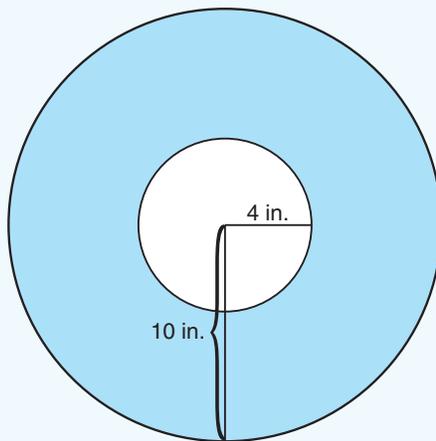
Remember that 12 inches = 1 foot, and 3 feet = 1 yard.

$$\left(\frac{3 \text{ feet}}{1 \text{ yard}}\right) \cdot \left(\frac{12 \text{ inches}}{1 \text{ foot}}\right) = \frac{36 \text{ inches}}{1 \text{ yard}}$$

$$3 \text{ yards} \cdot \frac{36 \text{ inches}}{1 \text{ yard}} = 108 \text{ inches}$$

Connie will need 108 inches of fringe.

Pat is painting the shaded part of the larger circle below. Approximately how many square inches will he paint?



- Find the area of the shaded part of the larger circle by subtracting the area of the circle with a radius of 4 inches from the area of the circle with a radius of 10 inches.
- Use the formula for the area of a circle, $A = \pi r^2$.
- Find the area of the circle with a radius (r) of 10 inches. Use 3.14 as an estimate of the value of π .

$$A \approx (3.14)(10^2)$$

$$A \approx (3.14)(100) \approx 314 \text{ in.}^2$$

- Find the area of the circle with a radius of 4 inches.

$$A \approx (3.14)(4^2)$$

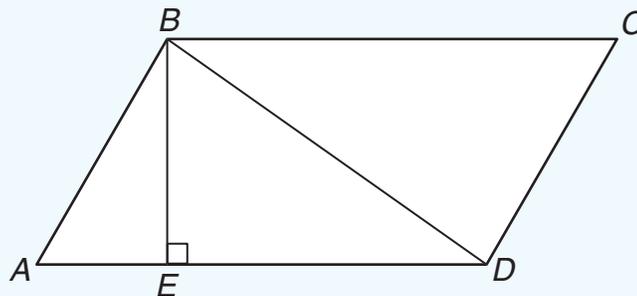
$$A \approx (3.14)(16) \approx 50.24 \text{ in.}^2$$

- To find the area of the shaded part, subtract the area of the 4-inch circle from the area of the 10-inch circle.

$$314 - 50.24 \approx 263.76 \text{ in.}^2$$

Pat will paint about 264 square inches.

In parallelogram $ABCD$, \overline{BE} is perpendicular to \overline{AD} .



What is the area of triangle ABD ?

- Identify the formula that applies to the problem you are solving.

The problem involves the area of a triangle. The formula for the area of a triangle is $A = \frac{1}{2}bh$.

- Identify what the variables in the formula represent.
 A stands for area, b stands for base, and h stands for height.
- Since \overline{BE} is perpendicular to \overline{AD} , \overline{BE} is the height of triangle ABD .
- Use the ruler on the Mathematics Chart to measure the length of \overline{BE} and the length of \overline{AD} in centimeters.

$BE = 3$ centimeters and $AD = 6$ centimeters.

- Replace the variables in the formula with their values from the problem.

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2} \cdot 6 \cdot 3$$

- Perform the calculations called for in the formula.

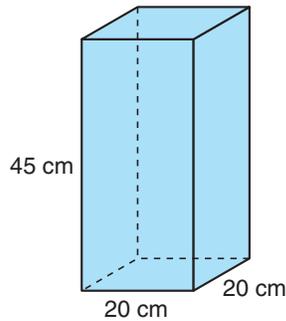
$$A = 9 \text{ cm}^2$$

- State the solution to the problem using the appropriate units of measurement.

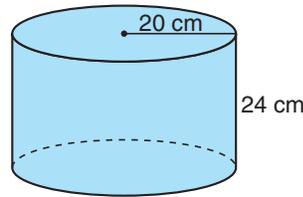
The area of triangle ABD is 9 square centimeters.

Try It

André has a cube filled with water. Each edge of the cube is 30 centimeters long. André wants to pour all the water into another container. Which of the two containers shown below will hold all the water from André's cube?



Container A



Container B

The formula for the volume of a cube is $V = \underline{\hspace{2cm}}$.

$$V = \underline{\hspace{1cm}} = \underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}}$$

$$V = \underline{\hspace{2cm}} \text{ cm}^3$$

André's cube holds cubic centimeters of water.

Container A is a rectangular prism. The formula for the volume of a rectangular prism is $V = \underline{\hspace{2cm}}$.

$$V_A = \underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}}$$

$$V_A = \underline{\hspace{2cm}} \text{ cm}^3$$

Container B is a cylinder. The formula for the volume of a cylinder is $V = \underline{\hspace{2cm}}$.

The radius (r) is equal to cm. Use 3.14 as an approximate value for π .

$$V_B = \underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}}$$

$$V_B = \underline{\hspace{2cm}} \text{ cm}^3$$

The water in André's cube will fit in Container , because $27,000 \text{ cm}^3$ is less than cm^3 .

The formula for the volume of a cube is $V = s^3$. $V = 30^3 = 30 \cdot 30 \cdot 30 = 27,000 \text{ cm}^3$. André's cube holds **27,000** cubic centimeters of water. The formula for the volume of a rectangular prism is $V = lwh$. $V_A = 20 \cdot 20 \cdot 45 = 18,000 \text{ cm}^3$. The formula for the volume of a cylinder is $V = \pi r^2 h$. The radius (r) is equal to **20** cm. $V_B = 3.14 \cdot 20^2 \cdot 24 = 30,144 \text{ cm}^3$. The water in André's cube will fit in Container **B**, because $27,000 \text{ cm}^3$ is less than **30,144** cm^3 .

Now practice what you've learned.

Question 31

An architect is looking at plans for a new building. One rectangular window in the building will measure 3 feet by 4.5 feet. If he replaces it with a circular window that has a diameter of 4 feet, about how much less will the area of the circular window be than the area of the rectangular window?

- A 1.06 ft²
- B 13.5 ft²
- C 0.94 ft²
- D 36.74 ft²



Answer Key: page 240

Question 32

A rectangular deck has a perimeter of 50 feet. The width of the deck is 7 feet. What is the area of the deck?

- A 18 ft²
- B 126 ft²
- C 50 ft²
- D 350 ft²



Answer Key: page 240

Question 33

Mr. Hall wants to cover his living room floor with new carpet. His living room floor is a rectangle measuring 22 feet by 18 feet. What is the minimum number of square yards of carpet he will need to buy?

- A 9 yd²
- B 44 yd²
- C 3,564 yd²
- D 720 yd²



Answer Key: page 241

Question 34

At a packaging factory, workers pack small boxes into large crates. The boxes are cubes measuring 4 inches on each edge. It takes 81 boxes to fill each crate. What is the volume of each crate in cubic inches?

- A 324 in.³
- B 1,296 in.³
- C 5,184 in.³
- D 64 in.³



Answer Key: page 241

Question 35

George has a large circular table with a circumference of 18 feet. What is the approximate area of the table?

- A 108 ft²
- B 12 ft²
- C 27 ft²
- D 36 ft²



Answer Key: page 241

Question 36

Mr. Borders wants to make 32 hamburger patties for a barbecue. If each hamburger patty requires $5\frac{1}{4}$ ounces of ground beef, how much ground beef to the nearest pound will he need to buy?

- A 10 lb
- B 68 lb
- C 168 lb
- D 11 lb



Answer Key: page 241

Question 37

A grain bag contains 128 cups of horse feed. If Victor feeds $2\frac{1}{3}$ cups of grain from the bag to each of 4 horses, how many cups of grain will be left in the bag?

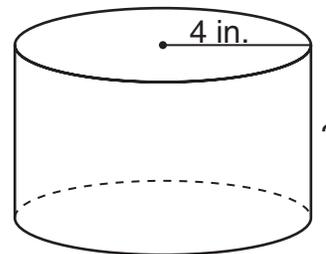
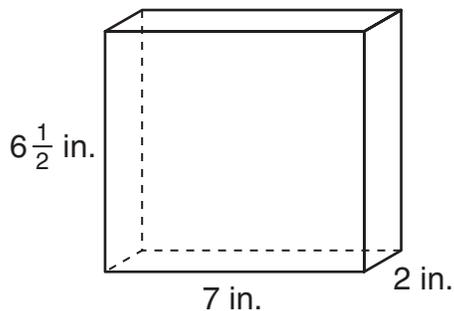
- A $118\frac{2}{3}$ c
- B $121\frac{2}{3}$ c
- C $119\frac{1}{3}$ c
- D $117\frac{1}{3}$ c



Answer Key: page 241

Question 38

Allan filled an aquarium shaped like a rectangular prism with water. The aquarium was 2 inches wide, 7 inches long, and $6\frac{1}{2}$ inches high. What would be the approximate height of a cylinder that would hold the same volume of water if the cylinder has a radius of 4 inches?



- A 1.8 in.
- B 1.0 in.
- C 3.6 in.
- D 0.8 in.



Answer Key: page 241

Objective 5

The student will demonstrate an understanding of probability and statistics.

For this objective you should be able to

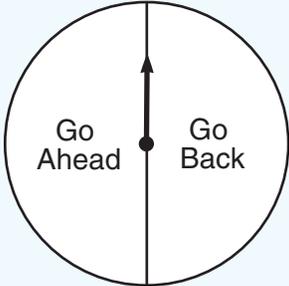
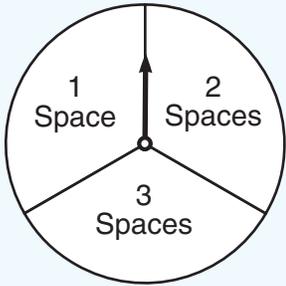
- recognize that physical or mathematical models can be used to describe the probability of real-life events;
- understand that the way a set of data is displayed influences its interpretation; and
- use measures of central tendency and range to describe a set of data.

What Is a Sample Space?

The **sample space** for an event or experiment is the set of all possible outcomes. A sample space can be shown as a list, table, or diagram of all possible outcomes.

Some experiments involve two or more events. When you construct a sample space for two events, each possibility for the first event is paired with each possibility for the second.

Mary, Jim, and Brett are playing a game that uses two spinners. The first spinner has 2 sections: “Go ahead” and “Go back.” The second spinner has 3 sections: “1 space,” “2 spaces,” and “3 spaces.” Each player spins both spinners to determine the next move. Find all the possible outcomes.

The list below is a sample space that shows all the possibilities for the two spins.

Go ahead, 1 space	Go back, 1 space
Go ahead, 2 spaces	Go back, 2 spaces
Go ahead, 3 spaces	Go back, 3 spaces

There are a total of 6 possible outcomes for this experiment.

Try It

A theme park provides its workers with several choices of uniform. Shirts come in green, red, blue, and black. Shorts come in white, khaki, and gray. How many uniform combinations are possible for the theme-park workers?

What sample space shows all the possible outcomes for this event? Use the lines below to show the sample space.

<u>Shirt, shorts</u>	<u>Shirt, shorts</u>	<u>Shirt, shorts</u>
<u>green</u> , <u>white</u>	<u>green</u> , <u>khaki</u>	<u>green</u> , _____
_____, _____	_____, _____	_____, _____
_____, _____	_____, _____	_____, _____
_____, _____	_____, _____	_____, _____

There are a total of _____ possible uniform combinations for the theme-park workers.

<u>Shirt, shorts</u>	<u>Shirt, shorts</u>	<u>Shirt, shorts</u>
<u>green</u> , <u>white</u>	<u>green</u> , <u>khaki</u>	<u>green</u> , <u>gray</u>
<u>red</u> , <u>white</u>	<u>red</u> , <u>khaki</u>	<u>red</u> , <u>gray</u>
<u>blue</u> , <u>white</u>	<u>blue</u> , <u>khaki</u>	<u>blue</u> , <u>gray</u>
<u>black</u> , <u>white</u>	<u>black</u> , <u>khaki</u>	<u>black</u> , <u>gray</u>

There are 12 possible uniform combinations for the theme-park workers.

What Is the Difference Between Independent and Dependent Events?

In an experiment with compound events, if the outcome of the first event does not affect the possible outcomes for the second event, the events are called **independent events**. In other words, the outcome of the second event does not depend on the first event. If the outcome of the first event does affect the possible outcomes for the second event, the events are called **dependent events**. In other words, the outcome of the second event depends on the first event.

The examples in the previous section were all independent events. The following example shows some dependent events.

Suppose you pack a lunch that includes 5 wheat crackers and 1 rye cracker. You eat one cracker, and then you eat a second cracker. What are all the possible combinations of crackers you can eat in this experiment?

When you construct a sample space for a series of events, each possibility for the first event is paired with each possibility for the second event. In this experiment the outcome of the first event does affect the possible outcomes for the second event.

- If you eat a wheat cracker first, then the second cracker eaten can be wheat or rye.
- If you eat a rye cracker first, then the second cracker eaten must be a wheat cracker, because there is only 1 rye cracker.

The sample space for this experiment is displayed below.

wheat, wheat rye, wheat
wheat, rye

There are a total of 3 possible outcomes for this experiment.

Do you see
that . . .



Try It

Brittany is playing a game that involves removing marbles from a bag containing these color marbles: 3 red, 2 blue, and 1 green. What are all the possible outcomes when one marble is removed and not replaced, and then another marble is removed?

Use the table below to display all the possible outcomes for this experiment.

All Possible Outcomes

First Marble	Second Marble
red	
blue	

The outcome _____ and _____ is not possible, because there is only _____ green marble. Once the green marble is removed, it is not possible to pick another _____ marble.

There are a total of _____ possible outcomes for this experiment.

All Possible Outcomes

First Marble	Second Marble
red	red
red	blue
red	green
blue	red
blue	blue
blue	green
green	red
green	blue

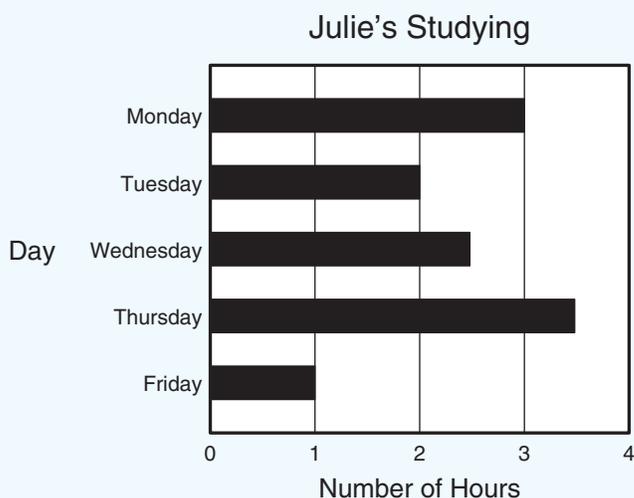
The outcome **green** and **green** is not possible, because there is only **1** green marble. Once the green marble is removed, it is not possible to pick another **green** marble. There are a total of **8** possible outcomes for this experiment.

How Can You Select an Appropriate Way to Represent Data?

You can represent data in a variety of ways, including tables, line graphs, bar graphs, and circle graphs. When data are organized and displayed in a graph or diagram, it is easier to see relationships between the pieces of data. The type of graph you use depends on the data you are representing and the relationships you want to analyze.

A **bar graph** uses either vertical or horizontal bars of different heights or lengths to display data. A bar graph has a scale and labels so that the reader can tell what the bars represent. Bar graphs are useful for analyzing and comparing data.

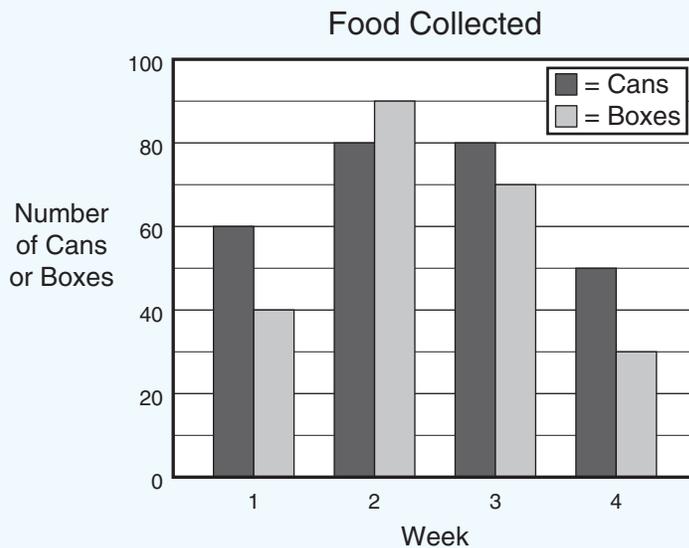
Last week Julie studied for 3 hours on Monday, 2 hours on Tuesday, $2\frac{1}{2}$ hours on Wednesday, $3\frac{1}{2}$ hours on Thursday, and 1 hour on Friday. The graph below helps you compare the number of hours she studied on each day.



- The scale on the horizontal axis shows the number of hours Julie spent studying.
- The vertical axis shows the days of the week for which there are data.
- The length of each bar shows the number of hours Julie studied on that particular day. For example, the bar for Wednesday ends halfway between 2 and 3 on the scale. This shows that Julie studied for $2\frac{1}{2}$ hours on that day.
- When you compare the lengths of the bars, it is easy to see that Julie studied for the greatest number of hours on Thursday and the least number of hours on Friday.

A **double bar graph** is useful for analyzing and comparing two sets of related data. A double bar graph uses vertical or horizontal bars of different heights or lengths to display data. A double bar graph shows 2 sets of related data for a particular value. A key indicates what each bar represents.

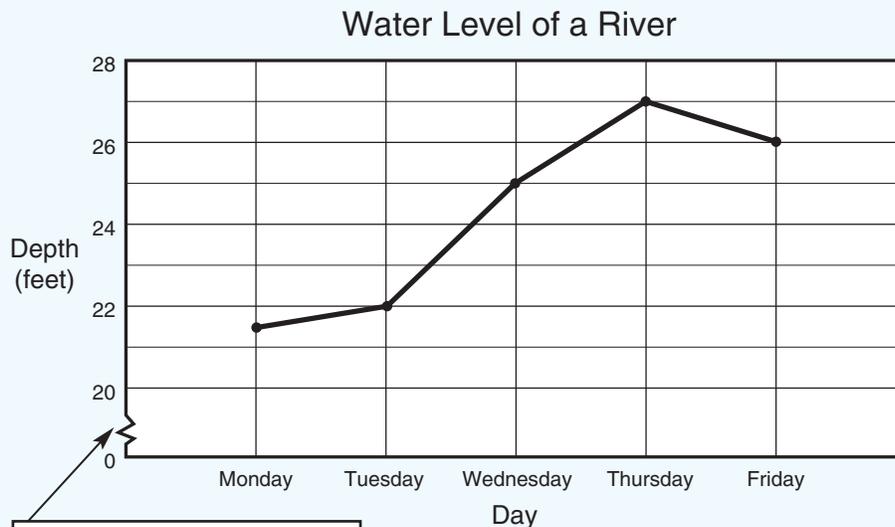
A school had a 4-week food drive. Students brought food in cans or boxes. The double bar graph below compares the number of cans to the number of boxes of food students brought each of the 4 weeks in the food drive.



- The scale on the horizontal axis shows the weeks of the food drive.
- The scale on the vertical axis shows the number of cans or boxes of food brought by students.
- The key indicates which bars represent cans and which bars represent boxes.
- By looking at the heights of the bars on the graph, you can see that, except in the second week, students brought more cans than boxes of food each week.

A **line graph** shows points plotted on a coordinate grid and connected by line segments. The plotted points represent ordered pairs of numbers taken from the data being described by the graph. Line graphs are particularly useful for showing trends, or changes in data over a period of time.

Heavy rainstorms in an area caused local streams and rivers to rise. This line graph shows the depth of a river over the course of 5 days.



This symbol means there is a break in the scale.

Do you see that . . .



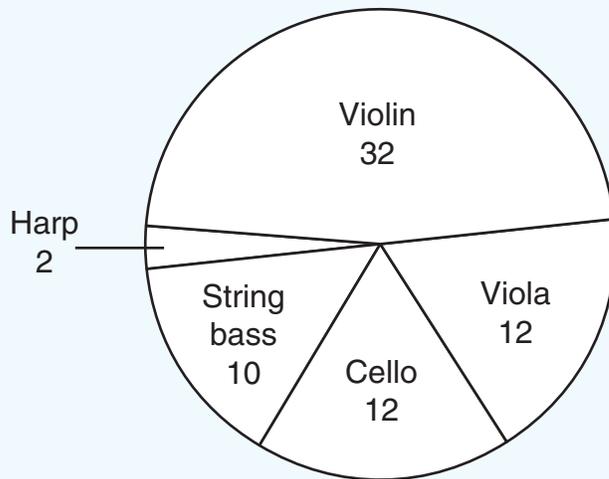
The broken line on the vertical axis indicates that the values between 0 and 20 are not included. The relative height of the points can be used to compare the water level of the river each day over the course of 5 days.

Here are some conclusions that can be drawn from this graph:

- Between Monday and Tuesday the water level increased by about $\frac{1}{2}$ foot.
- The water level increased between every two days, except between Thursday and Friday.
- The water level reached its highest point on Thursday.

A **circle graph** compares the numbers in a set of data by showing the relative sizes of the parts that make up a whole. The circle represents the whole, which is made up of all the data elements. Each section of the circle represents part of the whole.

There are 68 musicians in an orchestra's string section. The circle graph below shows the number of people who play the different instruments.



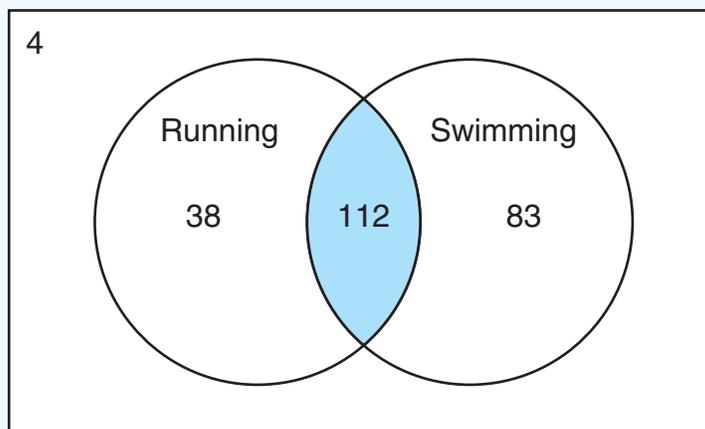
The whole, shown by the circle, represents the total number of stringed instruments, 68. The sections represent the number of people who play different instruments. The size of each section of the circle is determined by the fraction of the whole that represents the number of people playing a certain instrument.

You can use the circle graph to compare the number of people who play each instrument.

- The greatest fraction of people in the string section play the violin. This group is the largest section of the circle.
- The same number of people play the cello as play the viola. These sections of the circle are the same size.
- The number of people who play the string bass (10), the cello (12), and the viola (12) is 34. This is half of the 68 musicians. These sections altogether are half of the circle.

A **Venn diagram** is used to show how many pieces of data have a certain property in common. The data in each section of a Venn diagram show how many values fall within each category.

This Venn diagram shows the number of students in Jim's class who went running, swimming, both, or neither at least once last week.



- The diagram includes a box and two overlapping circles. The box represents the universal set that is made up of all the students in Jim's class.
- The 4 shown in the box but not in the circles represents the 4 students who did not go running or swimming last week.
- The part where the two circles overlap shows the number of students who went both running and swimming: 112.
- The two circles show that 38 students went running only and 83 students went swimming only.

You could use the Venn diagram to find that a total of $38 + 112 = 150$ students in all went running last week.

Try It

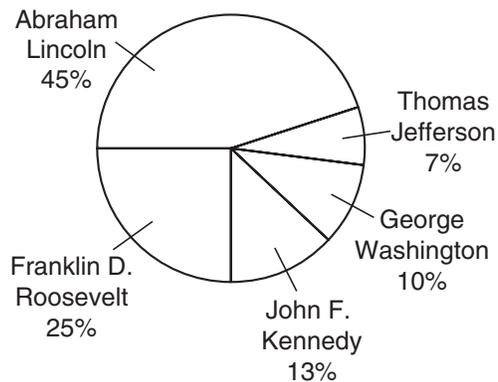
As part of a history project, Kelly asked 100 people who they thought was the best U.S. president before 1965. Here are the results of Kelly's survey:

Best U.S. President

President	Number of Votes
George Washington	
Thomas Jefferson	
Abraham Lincoln	
Franklin D. Roosevelt	
John F. Kennedy	

Kelly organized the survey results in a circle graph. Does the circle graph represent Kelly's data correctly?

Best U.S. President



A total of _____ people were surveyed.

George Washington was chosen by _____ out of 100 people, or _____%.

Thomas Jefferson was chosen by _____ out of 100 people, or _____%.

Abraham Lincoln was chosen by _____ out of 100 people, or _____%.

Franklin D. Roosevelt was chosen by _____ out of 100 people, or _____%.

John F. Kennedy was chosen by _____ out of 100 people, or _____%.

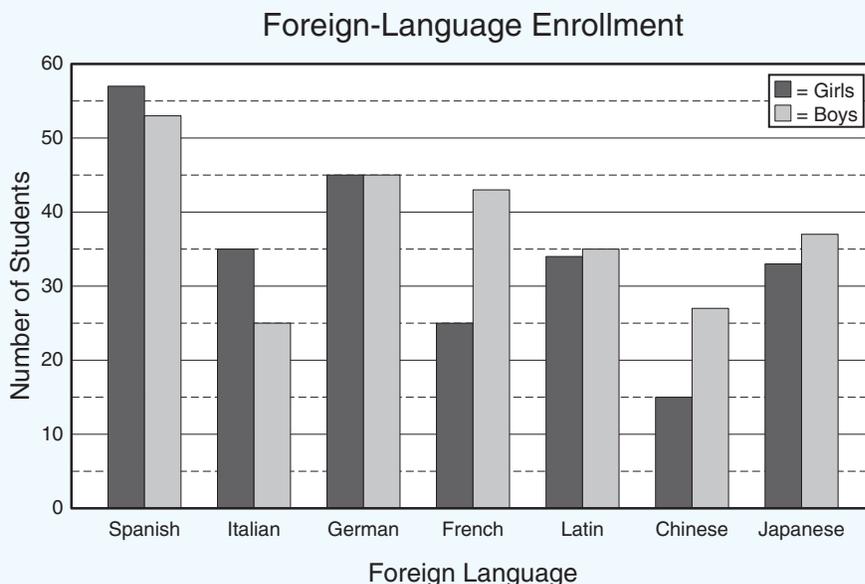
Does the circle graph represent Kelly's data correctly? _____.

A total of 100 people were surveyed. George Washington was chosen by 10 out of 100 people, or 10%. Thomas Jefferson was chosen by 7 out of 100 people, or 7%. Abraham Lincoln was chosen by 45 out of 100 people, or 45%. Franklin D. Roosevelt was chosen by 25 out of 100 people, or 25%. John F. Kennedy was chosen by 13 out of 100 people, or 13%. Does the circle graph represent Kelly's data correctly? **Yes.**

How Can You Draw Conclusions and Make Convincing Arguments About Data?

Sometimes you need to draw conclusions or make convincing arguments about data. To do this, you need to review the data carefully and find evidence that supports your conclusion or argument.

This double bar graph shows the number of boys and girls enrolled in each of several foreign-language classes at a school.



In order to make a convincing argument, you need to have data to support your conclusions.

Here are some conclusions that can be drawn from the data shown in the graph above:

- The number of girls taking German is the same as the number of boys taking German.

This statement is supported by the fact that the bar representing the number of girls taking German and the bar representing the number of boys taking German are the same height. They are both at 45.

- More girls than boys take Spanish.

This statement is supported by the fact that the bar representing the number of girls taking Spanish is higher than the bar representing the number of boys taking Spanish. There are 57 girls and 53 boys taking Spanish.

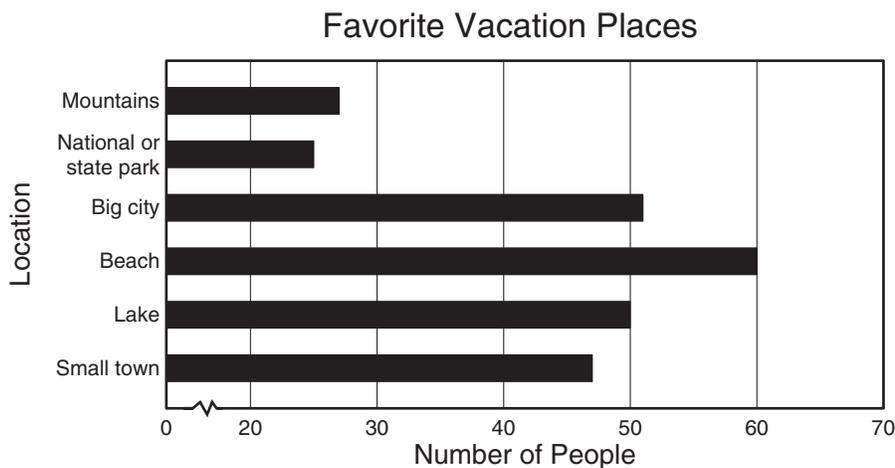
- More boys than girls take French, Latin, Chinese, and Japanese.

This statement is supported by the fact that the bars for these languages are all higher for boys than for girls.

Incorrect conclusions can also be drawn from the graph. For instance, since there is a total of 244 girls and 265 boys represented on the graph, someone might conclude that boys enjoy studying foreign languages more than girls do. This is not a valid conclusion; there could simply be more boys than girls attending that particular school.

Try It

This bar graph shows the favorite vacation places of 260 people surveyed.



Read each statement. Mark a “✓” by the statements that are supported by the data in the graph. Mark an “X” by the statements that are not supported by the data in the graph. State the reason for your choice in the blank below each statement.

	The number of people who like to vacation in the mountains and the number of people who like to vacation in a national or state park are about the same.
	Reason: _____
	The number of people who like to vacation at the beach is almost half the number who like to vacation in the mountains.
	Reason: _____
	About 25% of the people surveyed like to vacation in a small town.
	Reason: _____
	Slightly fewer than $\frac{1}{5}$ of the people surveyed like to vacation at the lake.
	Reason: _____

✓	The number of people who like to vacation in the mountains and the number of people who like to vacation in a national or state park are about the same.
	The first statement is supported by the data because the bar lengths are about equal. There are about 27 people who like to vacation in the mountains and about 25 people who like to vacation at a national or state park.
X	The number of people who like to vacation at the beach is almost half the number who like to vacation in the mountains.
	The bar for people who like to vacation at the beach is actually more than twice as long as the bar for people who like to vacation in the mountains.
X	About 25% of the people surveyed like to vacation in a small town.
	A total of 260 people were surveyed. The number 65 is 25% of 260. The bar for people who like to vacation in a small town shows about 47 people. This is less than 25% of 260.
✓	Slightly fewer than $\frac{1}{5}$ of the people surveyed like to vacation at the lake.
	One fifth of the 260 people surveyed is 52 people. The bar for people who like to vacation at the lake shows 50 people. The value 50 is slightly less than 52.

How Can You Describe a Set of Data?

One way to describe a set of data is to find the difference between the greatest and least numbers in the set. This difference is called the **range** of the data.

Look at this set of data. What is its range?

74, 105, 91, 82, 74, 52, 98

Find the difference between the greatest and least values in the set.

$$105 - 52 = 53$$

The range of this set of data is 53.

A set of data can also be described by the median, mode, and mean, each of which tells about the central tendency of the data.

The **median** of a set of data is the middle value of all the numbers. To find the middle value, list the numbers in order from least to greatest or from greatest to least. If there are two middle values, their average is the median.



Do you see
that . . .

Look again at the set of data above. What is its median?

- The numbers in order are as follows:

105, 98, 91, 82, 74, 74, 52

- Cross out numbers starting at either end to help you find the middle value.

~~105~~, ~~98~~, ~~91~~, 82, 74, 74, ~~52~~

The median of this set of data is 82.

Look at this set of data. What is its median?

52, 163, 45, 49, 62, 270

- The numbers in order are as follows:

45, 49, 52, 62, 163, 270

- Cross out numbers starting at either end. The middle values are 52 and 62.

~~45~~, ~~49~~, 52, 62, ~~163~~, ~~270~~

- The average of the middle values is $(52 + 62) \div 2$, or $114 \div 2$, or 57.

The median of this set of data is 57.

Objective 5

The **mode** of a set of data is the value or values that occur most often in the set. If all the values in a set of data appear the same number of times, the set has no mode.

Look at this set of data. What is its mode?

55, 60, 60, 75, 75, 75, 80

The value 75 occurs three times. The value 60 occurs only twice, and each other number occurs only once.

The mode of this set of data is 75.

Look at this set of data. What is its mode?

455, 450, 655, 455, 345, 655, 789, 453, 455, 655, 875

The values 455 and 655 each occur three times. Each of the other values appears only once.

This set has two modes, 455 and 655.

The **mean** of a set of data is the average of the values. To find the mean, add all the values and then divide the sum by the number of values in the set.

Look at this set of data. What is its mean?

140.5, 111.6, 85.8, 59.2, 105.4

The mean of these 5 values is their sum divided by 5.

$$\begin{array}{r} 140.5 \\ 111.6 \\ 85.8 \\ 59.2 \\ + 105.4 \\ \hline 502.5 \end{array}$$

$$502.5 \div 5 = 100.5$$

The mean of this set of data is 100.5.

The list below shows the number of months each of several employees worked for a company.

12, 17, 21, 2, 19, 16

Is the mean of this set of data greater than the median?

- Find the mean, or the average, of this set of data.

$$\frac{(21 + 19 + 17 + 16 + 12 + 2)}{6} = \frac{87}{6}$$

$$87 \div 6 = 14.5$$

The mean is 14.5 months.

- Find the median of this set of data.

2, 12, 16, 17, 19, 21

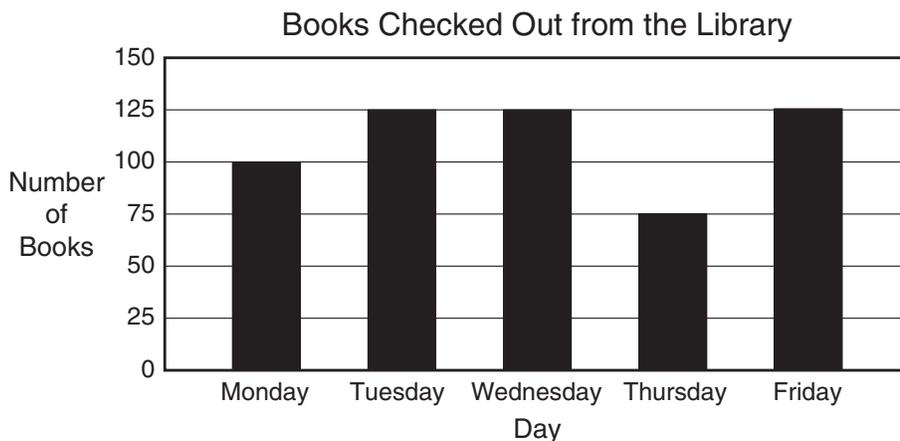
$$(16 + 17) \div 2 = 16.5$$

The median is 16.5 months.

No, the mean of this set of data is not greater than the median. It is less.

Try It

Patti works in the school library. She made this bar graph to show the numbers of books checked out during one school week.



What are the range, median, mean, and mode of this set of data?

- Find the range of this set of data.

The greatest number of books checked out was _____.

The least number of books checked out was _____.

The range of this set of data is _____.

- Find the median of this set of data.

List the number of books checked out each day in order from least to greatest.

The median of this set of data is _____.

- Find the mean of this set of data.

The sum of all the values in the set is _____.

There are _____ values.

The mean of this set of data is _____.

- Find the mode of this set of data.

The number that occurs most often is _____.

The mode of this set of data is _____.

The greatest number of books checked out was 125. The least number was 75. The range is 50. From least to greatest, the values are 75, 100, 125, 125, and 125. The median is 125. The sum of all the values in the set is 550. There are 5 values. The mean is 110. The number that occurs most often is 125. The mode is 125.

How Do You Know Which Measure of Data Is Appropriate to Use in a Given Situation?

Each measure of data (range, mean, median, and mode) gives a different detail about the data. Often one of these measures is more appropriate to use than another. When choosing a measure of data to use, look at the question you are trying to answer. Then think about what each measure would tell you about the data. Finally, choose the measure that best answers the question being asked.

The time it takes Gill to drive to work varies from day to day. He is trying to get to work on time more often. The table below shows his driving times in minutes for one workweek. Which measure of data best helps him analyze how much his driving times vary?

Day	Time (minutes)
Monday	25
Tuesday	28
Wednesday	22
Thursday	24
Friday	29

Different measures of data tell you different things.

- The range of this set of data is $29 - 22 = 7$.

This information tells how widely Gill's driving times vary. The difference between the shortest and longest times it took him to drive to work is 7 minutes. This information helps Gill because it tells him that he needs to allow for the 7 minutes' variation in his travel time and leave early enough to be sure to get to work on time.

- This set of data has no mode because each value occurs only once. This measure is not particularly useful.
- The mean of this set of data is the average of the times it takes him to drive to work.

$$\frac{(25 + 28 + 22 + 24 + 29)}{5} = 25.6$$

Gill's average driving time is 25.6 minutes. This information does not tell how widely his times vary. This might be a good measure of the data if Gill is trying to determine his average daily driving time.

- The median of this set of data is 25.

~~22~~ ~~24~~ 25 ~~28~~ ~~29~~

This information does not tell how widely his times vary. This measure may be useful if Gill wants to know about how much time per day he spends driving to work.

The range of this set of data best helps Gill analyze how much his driving times vary.

Try It

Ron's older brother does push-ups every morning. He did the following numbers of push-ups each day for the past 10 days.

105, 110, 115, 115, 110, 115, 105, 110, 115, 100

Which measure of data tells the most frequently occurring number of push-ups he did per day?

The mean of the data tells _____

The median of the data tells _____

The mode of the data tells _____

The range of the data tells _____

The _____ is the measure of data that tells the most frequently occurring number of push-ups Ron's brother did per day.

The mean of the data tells **the average of the values**. The median of the data tells **the middle value**. The mode of the data tells **the value that occurs most often**. The range of the data tells **the difference between the least number of push-ups and the greatest number of push-ups**. The **mode** is the measure of data that tells the most frequently occurring number of push-ups Ron's brother did per day.

Now practice what you've learned.

Question 39

For his lunch Lee can choose from three types of sandwiches: chicken, ham, or peanut butter. He can choose from two drinks: milk or juice. Which list shows all the possible combinations of sandwiches and drinks Lee can choose for lunch?

- A Chicken and milk; chicken and juice; chicken and ham; ham and milk; ham and juice; peanut butter and milk
- B Chicken and milk; ham and milk; peanut butter and milk
- C Chicken and ham; peanut butter and milk; ham and juice
- D Chicken and milk; chicken and juice; ham and milk; ham and juice; peanut butter and milk; peanut butter and juice



Answer Key: page 242

Question 40

Peg has four tiles of different colors: 2 white, 1 black, and 1 red. She randomly chooses two tiles at the same time. Which answer shows all the possible color combinations of the two tiles?

A

white	white
white	black
black	red
red	black

C

white	white
white	black
white	red
black	black
black	red
black	white
red	red
red	white
red	black

B

white	white
white	black
white	red
black	red

D

white	black
white	red
black	white
black	red
red	white
red	black



Answer Key: page 242

Question 41

A survey was done to count the number of fans attending different sporting events. The results of the survey are shown in the table below.

Event	Number in Attendance
Soccer match	50
Track meet	7
Swim meet	25
Baseball game	10
Football game	8

Which type of graph would best represent the data shown in the table?

- A Venn diagram
- B Line graph
- C Circle graph
- D Bar graph



Answer Key: page 242

Question 42

Which set of data has a mean of 10 and a range of 8?

- A 4, 10, 8, 12, 12
- B 6, 14, 10, 9, 13
- C 7, 11, 12, 12, 8
- D 9, 9, 7, 10, 15



Answer Key: page 242

Question 43

John has scores of 88, 73, 90, 85, and 93 on five math quizzes. What score must John earn on the next math quiz to have a mean quiz score of exactly 88?

- A 88
- B 95
- C 99
- D 100



Answer Key: page 242

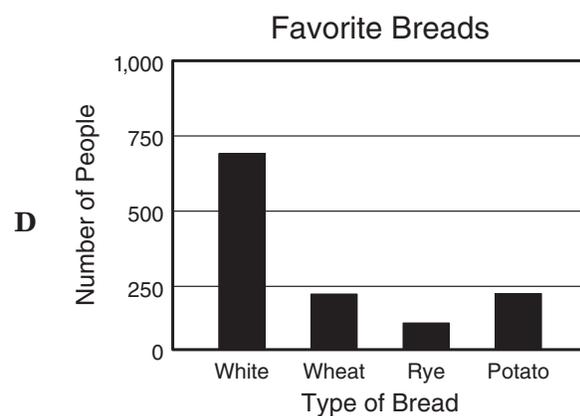
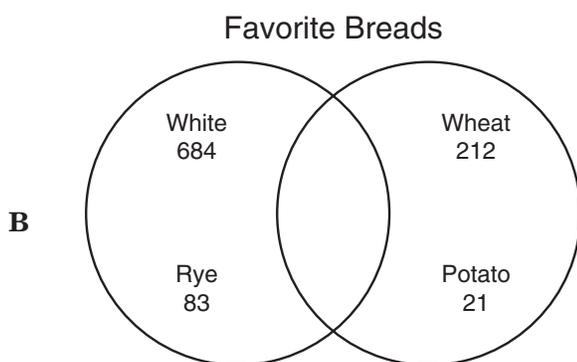
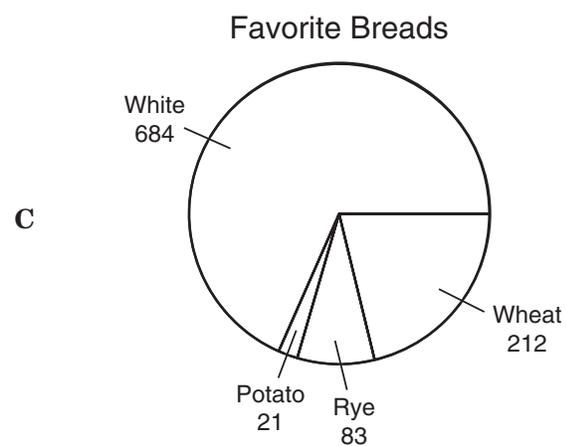
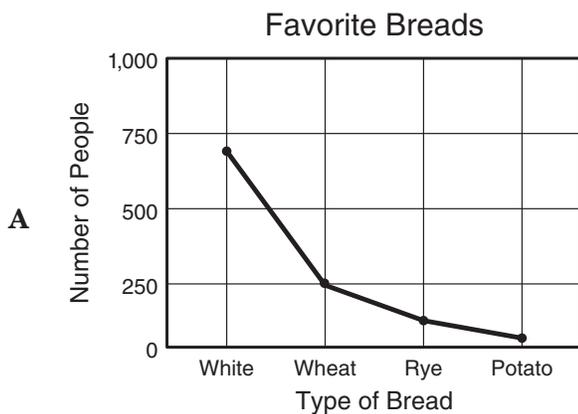
Question 44

A survey asked a group of 1,000 people what type of bread they like best. The table below shows their preferences.

Favorite Breads

Type of Bread	Number of People
White	684
Wheat	212
Rye	83
Potato	21

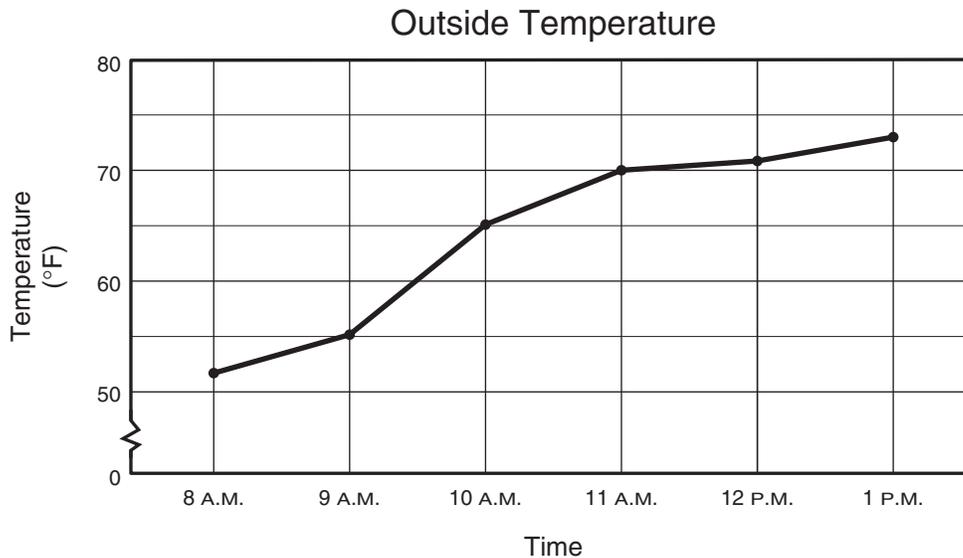
Which graph best represents the data in this table?



 Answer Key: page 242

Question 45

The graph below shows the outside temperature at various times of day.



Which of the following statements is NOT supported by the line graph?

- A The range of temperatures shown is about 21 degrees.
- B The temperature increased most between 10 A.M. and 11 A.M.
- C The temperature at 11 A.M. was 70°F.
- D The highest temperature shown is 73°F.

 Answer Key: page 242

Question 46

The table shows how many grams of a given substance can be dissolved in 100 milliliters of water at different temperatures.

Temperature (°C)	Amount of Substance Dissolved (grams)
20	10
30	15
75	37
100	51
150	75

Based on the table, which conclusion seems most reasonable?

- A As the temperature increases, the amount of substance dissolved decreases.
- B As the temperature decreases, the amount of substance dissolved increases.
- C As the temperature increases, the amount of substance dissolved increases.
- D As the temperature changes, there is no effect on the amount of substance dissolved.



Answer Key: page 243

Question 47

Eight students took a quiz. Their scores were 75, 83, 91, 75, 100, 55, 40, and 65. Which measure of data would change if a ninth student took the quiz and scored 68?

- A Range
- B Median
- C Mode
- D Mean



Answer Key: page 243

Question 48

Organizers of a conference know the number of people who attended their conference each of the past 7 years: 585, 725, 688, 700, 590, 630, and 700. Which measure of data would NOT help them determine approximately how many people to expect at their conference this year?

- A Range
- B Median
- C Mode
- D Mean



Answer Key: page 243

Objective 6

The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

For this objective you should be able to

- apply mathematics to everyday experiences and activities;
- communicate about mathematics; and
- use logical reasoning.

How Can You Use Mathematics to Solve Everyday Problems?

Many situations in everyday life involve mathematics. Suppose you want to compute the number of hours you need to work to save enough money to buy something. Or suppose you want to estimate the number of feet of ribbon needed in order to decorate for a party. Solutions to problems like these require the use of mathematics.

Solving problems involves more than just numerical computation; logical reasoning and careful planning also play important roles. Here are some steps to follow when solving problems:

- Understand the problem. Organize the information you are given and identify exactly what you must find. You may need information that is not given in the problem, such as a formula. You may be given information that is not needed in order to solve the problem.
- Make a plan. After you have organized the information, decide how to use this information to find an answer. Think about the math concepts that apply to the situation. Identify the order in which you will find new information and the formulas or equations you will use to find it.
- Carry out the plan. After you have chosen a problem-solving strategy, use the strategy to work toward a solution to the problem. Go step-by-step through your plan, writing down important information at each step.
- Check to see whether your answer is reasonable. Check to see whether your answer makes sense. Does it answer the question asked? Is it stated in the correct units? Is it reasonable? You can estimate the solution and then compare the estimate to your answer. They should be approximately equal.

On Friday, Marissa bought a new tape player for \$78. On Saturday, the tape player went on sale for \$59. What percent could Marissa have saved if she had waited until Saturday to purchase the tape player?

Understand the problem.

- What information do you already have?
The original price, \$78
The sale price, \$59
- What do you want to know?
The percent of the original price that was taken off

Make a plan.

- To find the amount taken off, subtract the sale price from the original price.
- To find the percent of the original price that was taken off, divide the amount taken off by the original price.
- Express the quotient as a percent.

Carry out the plan.

- $\$78 - \$59 = \$19$ taken off
- Express the discount as a fraction of the original price.

$$\frac{\text{Amount taken off}}{\text{Original price}} = \frac{\$19}{\$78}$$

- $19 \div 78 \approx 0.24$
 $0.24 = 24\%$

The sale price was 24% off the original price.

Check your answer to see whether it is reasonable.

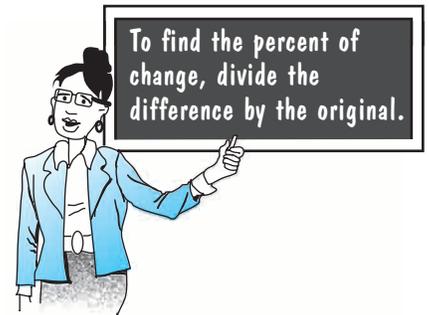
One way to check for reasonableness is to use estimation. Compare your estimate to the answer you obtained.

- The original price was \$78. This rounds to \$80.
- The sale price was \$59. This rounds to \$60.
- $\$80 - \$60 = \$20$. About \$20 was taken off the original price.

$$\frac{\text{Amount taken off}}{\text{Original price}} = \frac{20}{80} = \frac{1}{4} = 25\%$$

- About 25% was taken off of the original price.

The estimate of 25% is close to the answer of 24%. Therefore, 24% is a reasonable answer.



Celia is planning a budget for her back-to-school shopping. She is saving \$25 per week. So far she has saved \$200. She plans to spend about \$500 on back-to-school items. She is planning to purchase items that range in price from \$2 to \$150. Will Celia have enough money for her back-to-school shopping?

- What do you know?

Celia saves \$25 per week. She has already saved \$200. She plans to spend \$500 on back-to-school items.

- What do you want to know?

Will Celia have enough money for her back-to-school shopping?

The problem does not give any information about when Celia will go shopping. The number of weeks she has left to save the rest of the \$500 is missing from the problem. Additional information is needed in order to solve this problem, so you cannot answer the question.

Try It

Mark wants to put a radio in a rectangular box with a volume of 540 cubic inches. The rectangular box has a length of 10 inches and a width of 9 inches. Mark's radio is a rectangular prism measuring 9 inches by 8 inches by 9 inches. Will Mark's radio fit into the box?

You know two dimensions of the box, the _____ and _____.

You need to find the _____ of the box in order to know if the radio will fit into the box.

To find the height of the box, h , write an equation using the _____ of the box. Substitute the values you know into the equation and solve for the _____.

$$V_{\text{box}} = \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} \cdot h$$

$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}} h$$

$$\underline{\hspace{2cm}} = h$$

The height of the box is _____ inches. Mark's radio _____ fit into the box because the height of the radio is _____ than the _____ of the box.

You know the **length** and **width** of the box. You need to find the **height** of the box. To find the height, h , write an equation using the **volume** of the box. Substitute the values you know into the equation and solve for the **height**.

$$V_{\text{box}} = l \cdot w \cdot h$$

$$540 = 10 \cdot 9 \cdot h$$

$$540 = 90h$$

$$6 = h$$

The height of the box is **6** inches. Mark's radio **will not** fit into the box because the height of the radio is **greater** than the **height** of the box.

What Is a Problem-Solving Strategy?

A **problem-solving strategy** is a plan for solving a problem. Different strategies work better for different types of problems. Sometimes you can use more than one strategy to solve a problem. As you practice solving problems, you will discover which strategies you prefer and which work best in various situations.

Some problem-solving strategies include

- drawing a picture;
- looking for a pattern;
- guessing and checking;
- acting it out;
- making a table;
- working a simpler problem; and
- working backwards.

One problem-solving strategy is to work backwards. Begin with what you are told in the problem and then work backwards to find the solution.

Jenny is 5 times as old as Will. Will is 4 years younger than Louis. Louis is half as old as John. John is 12 years old. How old is Jenny?

Start with the information that you know and work backwards to find Jenny's age.

John is 12 years old.

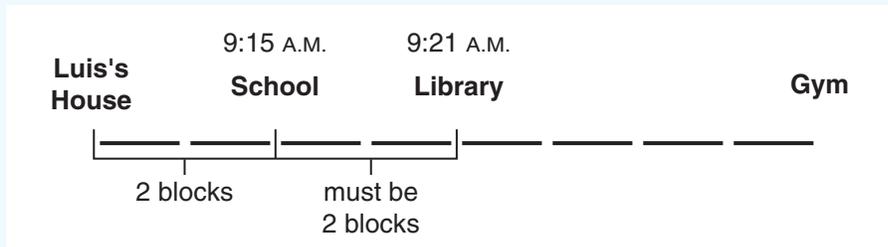
Louis is half as old as John. Since $12 \cdot \frac{1}{2} = 6$, Louis is 6 years old.

Will is 4 years younger than Louis. Since $6 - 4 = 2$, Will is 2 years old.

Jenny is 5 times as old as Will. Since $5 \cdot 2 = 10$, Jenny is 10 years old.

Another way to solve a problem is to draw a picture. Drawing a picture can help you organize the information you need in order to solve the problem.

Each Saturday Luis walks the same route to the gym. At 9:15 A.M. he passes the school, which is 2 blocks from his house. At 9:21 A.M. he reaches the library. At this point Luis is 4 blocks from the gym, or halfway from his house to the gym. If Luis walks at the same rate all the way to the gym, what time will he arrive?



- Find the distance from the school to the library.

At 9:21 A.M. Luis has 4 more blocks to go, and he is halfway to the gym. The distance from his house to the library must also be 4 blocks. Therefore, the distance from the school to the library must be 2 blocks.

- Find the rate at which Luis walks.

At 9:15 A.M. Luis passes the school, and at 9:21 A.M. he reaches the library.

$$9:21 \text{ A.M.} - 9:15 \text{ A.M.} = 6 \text{ minutes}$$

It takes Luis 6 minutes to walk 2 blocks, or 3 minutes to walk 1 block.

- Use this rate to find the time he will arrive at the gym.

Luis is 4 blocks from the gym. If it takes him 3 minutes to walk 1 block, it will take him 12 minutes to walk 4 blocks. Twelve minutes after 9:21 A.M. is 9:33 A.M.

Luis will arrive at the gym at 9:33 A.M.

Sometimes you need to combine strategies to solve a problem. Often when you make a table from the data in a problem, you can then look for a pattern to solve the problem.

You know that $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, and so on. If you expand the pattern further, what digit is in the ones place of 2^{13} when 2^{13} is written as a whole number?

One way to solve this problem is to calculate 2^{13} , but that is a very large number! Another way is to calculate some of the powers of 2 and see whether there is a pattern for the digits in the ones place.

Powers of 2

Power	Process	Value
2^1	2	2
2^2	$2 \cdot 2$	4
2^3	$2 \cdot 2 \cdot 2$	8
2^4	$2 \cdot 2 \cdot 2 \cdot 2$	16
2^5	$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$	32
2^6	$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$	64
2^7	$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$	128
2^8	$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$	256

- Look for a pattern in the digits in the ones place of the powers of 2.
- Notice the pattern of the digits in the ones place.

2, 4, 8, 6, 2, 4, 8, 6

- It is not necessary to calculate the exact values of 2^9 , 2^{10} , 2^{11} , 2^{12} , and 2^{13} in order to find the digit in the ones place of 2^{13} . You can continue the pattern found in the table of 2, 4, 8, 6.

2^9 would have a 2 in the ones place.

2^{10} would have a 4 in the ones place.

2^{11} would have an 8 in the ones place.

2^{12} would have a 6 in the ones place.

2^{13} would have a 2 in the ones place.

The digit in the ones place of 2^{13} is 2.

Try It

Line CD and line EF intersect at point M . The measure of $\angle FMD = 60^\circ$. What is the measure of $\angle DME$?

Because this is a geometry problem, a good problem-solving strategy is to first _____.

$\angle FMD$ and $\angle DME$ are _____ angles.

$$m\angle FMD + m\angle DME = \underline{\hspace{2cm}}$$

Let x equal $m\angle DME$.

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$x = \underline{\hspace{2cm}}$$

The measure of $\angle DME$ is _____.

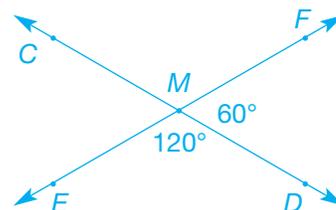
A good problem-solving strategy for this problem is to first **draw a picture**. $\angle FMD$ and $\angle DME$ are **supplementary** angles.

$$m\angle FMD + m\angle DME = 180^\circ$$

$$60 + x = 180^\circ$$

$$x = 120^\circ$$

The measure of $\angle DME$ is 120° .

**How Do You Change Words into Math Language and Symbols?**

It is important to be able to rewrite a problem using mathematical language and symbols. The words used in the problem will give you clues about what operations to use.

Rani is selling peanut and popcorn products for a school fundraiser. Each peanut product costs \$5, and each popcorn product costs \$7. There is an additional 5% tax and \$2 shipping fee on each order. Write an expression to find the total cost of an order that includes 3 peanut products and 4 popcorn products.

Each peanut product costs \$5. The total for 3 peanut products is represented by $3 \cdot 5$.

Each popcorn product costs \$7. The total for 4 popcorn products is represented by $4 \cdot 7$.

Add the two totals together to find the total cost of the peanut and popcorn products.

$$3 \cdot 5 + 4 \cdot 7$$

Multiply the sum by 5%, or 0.05, to find how much tax to add.

$$0.05(3 \cdot 5 + 4 \cdot 7)$$

Add the cost of the products, the tax, and the \$2 shipping fee together.

$$(3 \cdot 5 + 4 \cdot 7) + 0.05(3 \cdot 5 + 4 \cdot 7) + 2$$

This expression can be used to find the total cost of an order containing 3 peanut products and 4 popcorn products.

Sometimes real-life situations can best be described using mathematical language and symbols. First represent the quantities involved and then use an equation or formula that accurately reflects the relationships represented in the problem.

A circular circus tent measures 500 feet around its circumference. The tent has an aisle directly through the middle. Write an equation to find the length of the aisle.

The length of the aisle is the diameter of the circle formed by the tent.

The Mathematics Chart lists the formula for the circumference of a circle as follows: $C = \pi d$.

Use the formula to write an equation that can be used to find the length of the diameter. Substitute 500 for C and solve for d .

$$500 = \pi d$$

$$\frac{500}{\pi} = \frac{\pi d}{\pi}$$

$$\frac{500}{\pi} = d$$

The equation $d = \frac{500}{\pi}$ can be used to find the length of the aisle.

Try It

During a school recycling drive, Jeff's science class collected 40 pounds of aluminum cans. Ashley's science class collected twice as many pounds of cans as Jeff's class collected. Ben's science class collected 5 more pounds of cans than Ashley's class collected. Write an expression that can be used to find the total number of pounds of aluminum cans collected by all three classes.

Jeff's class collected _____ pounds of cans.

Ashley's class collected _____ as many pounds of cans as Jeff's class. The expression _____ \cdot _____ represents the number of pounds of cans collected by Ashley's class.

Ben's class collected _____ more pounds of cans than Ashley's class. The expression _____ \cdot _____ + _____ represents the number of pounds of cans collected by Ben's class.

Combine the expressions for each class to create an expression that gives the total number of pounds of aluminum cans collected by all three classes.

The expression

_____ + (_____ \cdot _____) + (_____ \cdot _____ + _____)

can be used to find the total number of pounds of aluminum cans collected by all three classes.

Jeff's class collected 40 pounds of cans. Ashley's class collected **twice** as many pounds of cans as Jeff's class. The expression $2 \cdot 40$ represents the number of pounds of cans collected by Ashley's class. Ben's class collected **5** more pounds of cans than Ashley's class. The expression $2 \cdot 40 + 5$ represents the number of pounds of cans collected by Ben's class. The expression $40 + (2 \cdot 40) + (2 \cdot 40 + 5)$ can be used to find the total number of pounds of cans collected.

How Can You Use Logical Reasoning as a Problem-Solving Tool?

Logical reasoning is thinking of something in a way that makes sense. Thinking about mathematics problems involves logical reasoning.

You can use logical reasoning to find patterns in a set of data. You can then use those patterns to draw conclusions about the data that can be used in order to solve problems.

Finding patterns involves identifying characteristics that numbers or objects have in common. Look for the pattern in different ways.

A sequence of geometric objects may have some property in common. For example, they may all be quadrilaterals or all have right angles.

Mark is training for a one-mile race. During the first month of his training program, his average time was 9 minutes 18 seconds. During the second month his average time was 7 minutes 18 seconds. During the third month his average time was 6 minutes 18 seconds. During the fourth month his average time was 5 minutes 48 seconds. If the pattern continues, what will his average time be during his sixth month of training?

Between the first and second months, Mark improved his time by 2 minutes. Between the second and third months, Mark improved his time by 1 minute. Between the third and fourth months, Mark improved his time by 30 seconds.

The pattern started with a 2-minute improvement in the second month. Half of 2 minutes is 1 minute. The third month showed a 1-minute improvement. Half of 1 minute is 30 seconds. The fourth month showed a 30-second improvement.

If the pattern continues, the fifth month should show a 15-second improvement to an average time of 5 minutes 33 seconds. The sixth month should show a 7.5-second improvement to an average time of 5 minutes 25.5 seconds.

Nathan's TV Store keeps track of its sales each week. The table below summarizes the store's sales for the past 4 weeks.

Week	Sales (nearest \$)
1	\$3,250
2	\$3,088
3	\$2,934
4	\$2,787

If this pattern continues, about how many dollars in sales can Nathan's TV Store expect in week 6?

- Look for a pattern in the table. The sales are decreasing. Are they decreasing by a constant number of dollars?

Week	Sales (nearest \$)	Difference from Previous Week
1	\$3,250	—
2	\$3,088	-\$162
3	\$2,934	-\$154
4	\$2,787	-\$147

No, the sales are not decreasing by a constant amount.

- Are sales decreasing by a constant rate?

$$\frac{\text{Difference from previous week}}{\text{Previous week's sales}}$$

$$\frac{162}{3,250} \approx 0.05 \quad \frac{154}{3,088} \approx 0.05 \quad \frac{147}{2,934} \approx 0.05$$

Yes, each week sales are decreasing at a rate of about 0.05, or 5%.

- Use this rate of decrease to predict the sales for week 5.

$$0.05 \cdot 2,787 = 139.35$$

The sales should decrease by about \$139 in week 5. Week 5 sales should be about $\$2,787 - \$139 = \$2,648$.

- Use the predicted sales for week 5 to predict the sales for week 6.

$$0.05 \cdot 2,648 = 132.40$$

The sales should decrease by about \$132 in week 6. Week 6 sales should be about $\$2,648 - \$132 = \$2,516$.

If this pattern continues, Nathan's TV Store can expect about \$2,516 in sales in week 6.

Now practice what you've learned.

Question 49

Which of these statements is best supported by the data in the table?

Name	Salary
Anna	\$12,000
Scott	\$26,000
Elise	\$27,000
Tomás	\$12,000
Jerome	\$75,000
Tasha	\$106,000

- A Jerome's salary is three times Scott's salary.
- B Tasha's salary is more than the other five salaries combined.
- C If Elise's salary increases by 5%, the mean of the salaries will change to \$43,225.
- D The mode of the salaries is 50% of the median of the salaries.



Answer Key: page 243

Question 50

Which of these statements is best supported by the data in the table?

Students Attending a Conference

State	Number of Boys	Number of Girls
Arkansas	16	18
Texas	29	33
Florida	11	7
Alabama	27	15
Louisiana	9	10
New Mexico	12	12
Oklahoma	11	10

- A About 20 percent of the students who attended the conference were from Louisiana.
- B The ratio of boys to girls attending the conference was 21:23.
- C For each state the number of girls who attended the conference was higher than the number of boys who attended.
- D The greatest percent of students at the conference were from Texas.



Answer Key: page 243

Question 51

A circle has a diameter of 30 centimeters. Which could be the first step in finding the area of the circle?

- A Find the circumference of the circle
- B Find the square of the diameter
- C Multiply the diameter by 2
- D Divide the diameter by 2



Answer Key: page 243

Question 52

Mario purchases 5 equally priced videotapes and a \$20 DVD. He spends a total of \$45. Which of the following equations can be used to determine v , the cost in dollars of each videotape?

- A $5v - 20 = 45$
- B $45 \div 5v = 20$
- C $5v + 20 = 45$
- D $5v \cdot 20 = 45$



Answer Key: page 243

Question 53

Tonya needs to be at a party at 7:00 P.M. Before leaving, she wants to exercise for $\frac{3}{4}$ hour and clean her room for 25 minutes. It will take her 50 minutes to get ready for the party and 15 minutes to walk there. Which of the following would be the best strategy to use to find the latest time Tonya should start doing these tasks in order to be at the party at 7:00 P.M.?

- A Work backwards using the information given
- B Measure the distance to the party in miles
- C Calculate the rate at which Tonya walks
- D Multiply the rate Tonya walks by the distance



Answer Key: page 244

Question 54

Mr. Jackson is planting three 25-by-25-foot flower beds with petunias and begonias. He spaces the flowers so that each petunia is in a 6-by-6-inch square and each begonia is in a 1-by-1-foot square. The petunias need fertilizer spread at a rate of 50 pounds per 500 square feet. The begonias need fertilizer spread at a rate of 50 pounds per 1,000 square feet. Fertilizer is sold in 50-pound bags. What additional information does Mr. Jackson need in order to determine how much fertilizer to purchase?

- A The price of 1 bag of fertilizer
- B The number of petunias and begonias he will plant
- C The total number of square yards in all three flower beds
- D No additional information is necessary.



Answer Key: page 244

Question 55

One of the angles of a parallelogram measures 63° . What are the measures of the other three angles of the parallelogram?

- A 63° , 63° , and 63° , because all the angles of a parallelogram are always congruent
- B 63° , 27° , and 27° , because consecutive angles of a parallelogram are complementary and the sum of the measures of the angles of a parallelogram is 180°
- C 63° , 117° , and 117° , because consecutive angles of a parallelogram are supplementary and the sum of the measures of the angles of a parallelogram is 360°
- D Cannot be determined



Answer Key: page 244

Objective 1

Question 1 (page 133)

- A** Incorrect. The fraction $\frac{5}{8}$ is equivalent to $\frac{10}{16}$. This is smaller than $\frac{11}{16}$, so the wrench would be too small for the bolt.
- B** Incorrect. The fraction $\frac{7}{16}$ is smaller than $\frac{11}{16}$, so the wrench would be too small for the bolt.
- C** Correct. Rewrite $\frac{3}{4}$ using 16 as the denominator: $\frac{3}{4} \cdot \frac{4}{4} = \frac{12}{16}$. Compare $\frac{11}{16}$ to $\frac{12}{16}$. Since $11 < 12$, then $\frac{11}{16} < \frac{12}{16}$. Since the $\frac{11}{16}$ -inch wrench was too small, a $\frac{3}{4}$ -inch wrench (which is equivalent to $\frac{12}{16}$) might be large enough.
- D** Incorrect. The fraction $\frac{1}{2}$ is equivalent to $\frac{8}{16}$. This is smaller than $\frac{11}{16}$, so the wrench would be too small for the bolt.

Question 2 (page 133)

- A** Correct. The part of the class that has traveled outside their home state is $\frac{15}{25}$. Choice A, $\frac{10}{15}$, is not equivalent to this value, so it does not represent the part of the class that has traveled outside their home state.

Question 3 (page 133)

- D** Correct. The model shows 8 dots by 8 dots. There are a total of 64 dots: $8 \cdot 8 = 8^2 = 64$. The square root of 64 is 8, because $8 \cdot 8 = 64$. Therefore, the model can be used to find $\sqrt{64}$.

Question 4 (page 133)

- B** Correct. You need to separate $4\frac{1}{3}$ pounds into equal $\frac{3}{8}$ -pound servings. Use division to separate a whole into equal parts. The expression $4\frac{1}{3} \div \frac{3}{8}$ shows the number of $\frac{3}{8}$ -pound hamburger patties

that can be made from $4\frac{1}{3}$ pounds of ground beef.

Question 5 (page 134)

- A** Correct. Tammy owns $\frac{1}{3}$ of the business. Subtract to find the remaining part of the business.

$$1 - \frac{1}{3} = \frac{2}{3}$$

María and her three brothers equally share the remaining $\frac{2}{3}$ of the business.

Use division to separate $\frac{2}{3}$ into 4 equal parts.

$$\frac{2}{3} \div 4$$

Multiply by $\frac{1}{4}$, the reciprocal of $\frac{4}{1}$. Remember that

4 is the same as $\frac{4}{1}$.

$$\frac{2}{3} \cdot \frac{1}{4} =$$

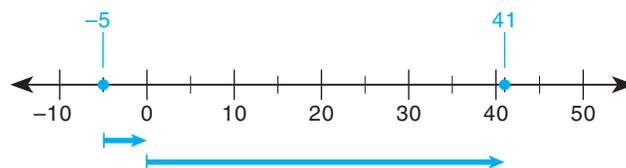
$$\frac{2}{12} = \frac{1}{6}$$

María owns $\frac{1}{6}$ of the business.

Question 6 (page 134)

- B** Correct. One way to find the change in temperature is to first see what the total change in temperature was and then decide whether it was a positive change (an increase in temperature) or a negative change (a decrease in temperature).

The temperature went from -5°F to 41°F . That change can be modeled on a number line.



$$5 + 41 = 46$$

The temperature increased by 46°F . The integer $+46$ represents this change.

Question 7 (page 134)

- D** Correct. To find the cost of 1 pound of cheese, divide the cost of 2 pounds of cheese by 2.

The expression $\$7.50 \div 2$ represents the cost of 1 pound of cheese, which is the unit cost.

To find the cost of 4.5 pounds of cheese, multiply 4.5 by the unit cost.

The expression $\$7.50 \div 2 \cdot 4.5$ represents the cost of 4.5 pounds of cheese.

Question 8 (page 134)

- C Correct.** The order of operations requires that any operations in parentheses be performed first. There are no parentheses in this expression, so the next step is to simplify any exponents. Since 3^3 is in exponential form, it should be performed first.

Question 9 (page 135)

- D Correct.** You need to know the unit rate for both walkers.

Peter walked 4 miles in 50 minutes. Divide 4 miles by 50 minutes to find how many miles he walked per minute.

$$4 \div 50 = 0.08$$

Peter's walking rate was 0.08 mile per minute.

Jan walked 3 miles in 30 minutes. Divide 3 miles by 30 minutes to find how many miles she walked per minute.

$$3 \div 30 = 0.1$$

Jan's walking rate was 0.1 mile per minute.

Subtract to find the difference in their walking rates.

$$0.1 - 0.08 = 0.02$$

Peter's walking rate was 0.02 mile per minute slower than Jan's.

Question 10 (page 135)

- B Correct.** To find how many boxes of cereal the Thompson family eats in 1 week, multiply the amount eaten per day by 7 days.

$$\frac{3}{8} \cdot 7 = \frac{3}{8} \cdot \frac{7}{1} = \frac{21}{8}$$

The fraction $\frac{21}{8}$ is equal to $2\frac{5}{8}$, or 2.625.

Since the Thompson family cannot buy 2.625 boxes of cereal, they would need to buy 3 boxes to have enough cereal for 1 week.

Objective 2

Question 11 (page 155)

- D Correct.** Use either the proportion method or the decimal method to find the final cost of the meal.

Proportion Method

Remember that percent means per 100.

Set up a proportion using $\frac{20}{100}$ for 20%.

$$\frac{20}{100} = \frac{x}{48.30}$$

Solve the proportion by using cross products.

$$\frac{20}{100} = \frac{x}{48.30}$$

$$966 = 100x$$

$$\frac{966}{100} = \frac{100x}{100}$$

$$9.66 = x$$

The discount on the meal was \$9.66.

To find the final cost of the meal, subtract the discount from the cost of the meal.

$$\$48.30 - \$9.66 = \$38.64$$

Decimal Method

To find the discount, find 20% of the cost of the meal.

First express the percent as a decimal.

$$20\% = 0.20$$

Then multiply the cost of the meal by 0.20.

$$\$48.30 \cdot 0.20 = \$9.66$$

The discount on the meal was \$9.66.

To find the final cost of the meal, subtract the discount from the cost of the meal.

$$\$48.30 - \$9.66 = \$38.64$$

The final cost of the meal was \$38.64 after the coupon was used.

Question 12 (page 155)

- B Correct.** Of the students surveyed, 35 out of 125 have their own e-mail account. To express $\frac{35}{125}$ as a decimal, divide 35 by 125.

$$35 \div 125 = 0.28$$

$$0.28 = 28\%$$

Of the students surveyed, 28% have their own e-mail account.

Question 13 (page 155)

B Correct. The problem uses two different units of measure. Convert all measurements to pints. The Mathematics Chart shows the number of quarts in a gallon and the number of pints in a quart.

- 1 gallon = 4 quarts; 1 quart = 2 pints
- 1 gallon = (4 quarts) • (2 pints per quart)
- 1 gallon = 8 pints
- 2 gallons = 16 pints

Write two ratios that compare price to volume. Let x equal the cost of 2 gallons of soy sauce.

The ratio for the 2-pint bottle of soy sauce is $\frac{\$1.79}{2 \text{ pints}}$.

The ratio for the 2 gallons (16 pints) of soy sauce is $\frac{x}{16 \text{ pints}}$.

Write a proportion by setting the two ratios equal to each other. Solve the proportion using cross products.

$$\begin{aligned} \frac{1.79}{2} &= \frac{x}{16} \\ 2x &= 28.64 \\ x &= 14.32 \end{aligned}$$

The cost of 2 gallons of soy sauce is \$14.32.

Question 14 (page 156)

A Correct. The triangle in the scale model and the triangle formed by the ramp are similar figures. The ratios of their corresponding sides are equal.

The height of the ramp (4 feet) corresponds to 3 inches in the model.

The length of the ramp (x feet) corresponds to 8 inches in the model.

Write a proportion by setting the ratios of the corresponding sides equal to each other and then solve the proportion.

$$\begin{aligned} \frac{4}{3} &= \frac{x}{8} \\ 3x &= 32 && \text{Use cross products.} \\ x &= \frac{32}{3} && \text{Divide both sides of the equation by 3.} \\ x &= 10\frac{2}{3} && \text{Divide 32 by 3: } 32 \div 3 = 10 \text{ R}2. \\ &&& \text{The number 10 is the whole-number part; 2 is the fractional part of the mixed number.} \end{aligned}$$

The ramp will be $10\frac{2}{3}$ feet long.

Question 15 (page 156)

D Correct. In similar figures, the ratios of corresponding sides are equal.

\overline{XY} corresponds to \overline{PQ} and \overline{YZ} corresponds to \overline{QR} .

$$\frac{XY}{PQ} = \frac{YZ}{QR}$$

The proportion $\frac{5}{12.5} = \frac{9}{x}$ can be used to find the length of \overline{QR} .

Question 16 (page 157)

C Correct. The Mathematics Chart shows that 1 quart = 2 pints.

The x -coordinates and corresponding y -coordinates of the ordered pairs in the correct graph should show the same relationship.

The graph shows points at (1, 2), (2, 4), (3, 6), (4, 8), (5, 10), and (6, 12). The x -coordinates and corresponding y -coordinates are in the ratio 1:2.

Only this graph has x -coordinates and corresponding y -coordinates in this ratio.

Question 17 (page 158)

A Correct. The x -axis of the graph is the number of seed packets. The y -axis of the graph is the number of seeds. The graph shows points at (2, 30), (3, 45), (5, 75), (6, 90), and (8, 120). The point (2, 30), for example, shows that 2 packets contain 30 seeds. This table shows the number of packets and the number of seeds in this same relationship.

Question 18 (page 159)

C Correct. To see if a rule applies to a sequence of numbers, apply the rule to each number's position in the sequence.

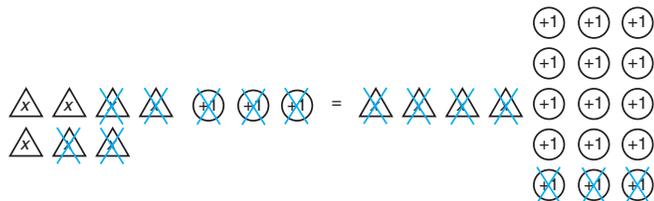
Sequence: 1, 3, 7, 13, 21, . . .

Position	$(n + 1)^2 - 3n$	Value of Term
1	$(1 + 1)^2 - 3(1)$	1
2	$(2 + 1)^2 - 3(2)$	3
3	$(3 + 1)^2 - 3(3)$	7
4	$(4 + 1)^2 - 3(4)$	13
5	$(5 + 1)^2 - 3(5)$	21

The rule works for each term in the sequence 1, 3, 7, 13, 21, . . .

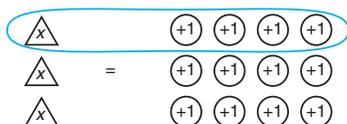
Question 19 (page 159)

C Correct. Remove like quantities from each side.



$$3x = 12$$

Divide both sides of the equation by 3.



$$x = 4$$

Therefore, $x = 4$ is the solution to the equation.

Question 20 (page 159)

D Correct. To find the average score for 5 games, add the 5 scores and divide by 5. Let the unknown fifth score be represented by x . Represent the average score, 148, as the sum of the five scores divided by 5.

$$(128 + 145 + 139 + 157 + x) \div 5 = 148$$

Objective 3

Question 21 (page 185)

The correct answer is 74.5. Two angles are complementary if the sum of their measures is 90° . To find the complement of a 15.5° angle, subtract 15.5° from 90° .

$$90^\circ - 15.5^\circ = 74.5^\circ$$

The complement of $\angle Y$ has a measure of 74.5° .

		7	4	.	5	
0	0	0	0		0	0
1	1	1	1		1	1
2	2	2	2		2	2
3	3	3	3		3	3
4	4	4	●		4	4
5	5	5	5		●	5
6	6	6	6		6	6
7	7	●	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9

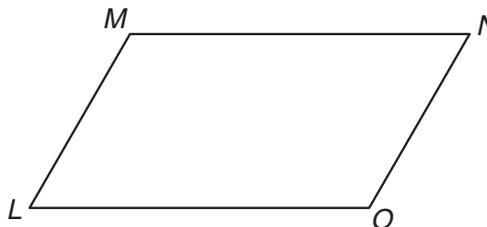
Question 22 (page 185)

C Correct. Corresponding parts are in the same relative position.

Since \overline{MN} is the hypotenuse, the side opposite the right angle of triangle MNR , the corresponding side of triangle MBA must be \overline{MB} , the side opposite the right angle of triangle MBA . \overline{MB} is the side opposite the right angle, so \overline{MB} corresponds to \overline{MN} .

Question 23 (page 185)

- A Incorrect.** A rectangle is a special parallelogram in which all angles are congruent. This is not true of all parallelograms.
- B Incorrect.** A rhombus is a special parallelogram in which all sides are congruent. This is not true of all parallelograms.
- C Incorrect.** A rectangle is a special parallelogram in which adjacent sides are perpendicular to each other. This is not true of all parallelograms.
- D Correct.** Parallelograms are quadrilaterals in which opposite sides are parallel.



In parallelogram $LMNO$, side LM is parallel to side ON , and side MN is parallel to side LO . A parallelogram always has opposite sides that are parallel.

Question 24 (page 185)

- B Correct.** A pyramid has only one base. The base of an octagonal pyramid is an octagon. A pyramid also has triangular faces. Since an octagon has 8 sides, the pyramid must have 8 triangular faces.

Question 25 (page 186)

The correct answer is 110. Consecutive angles in a parallelogram are supplementary. The sum of their measures is 180° .

To find the supplement of a 70° angle, subtract 70° from 180° .

$$180^\circ - 70^\circ = 110^\circ$$

$$m\angle F = 110^\circ$$

	1	1	0	.		
0	0	0	●		0	0
1	●	●	1		1	1
2	2	2	2		2	2
3	3	3	3		3	3
4	4	4	4		4	4
5	5	5	5		5	5
6	6	6	6		6	6
7	7	7	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9

Question 26 (page 186)

- C Correct.** Corresponding sides of similar triangles are proportional. Corresponding parts are in the same relative position. Since MN is the hypotenuse, the side opposite the right angle of triangle MNR , the corresponding side of triangle MBA must be MB , the side opposite the right angle. MA corresponds to MR , and BA to NR . Only the proportion $\frac{6}{3} = \frac{10}{x}$ compares corresponding sides.

Question 27 (page 187)

- B Correct.** The coordinates of point R are $(-2, 3)$. The x -coordinate of point R is -2 . The x -coordinate of the new point is 4 units to the right of -2 . The number 2 is 4 units to the right of -2 . The x -coordinate of the new point is 2. The y -coordinate of point R is 3. The y -coordinate of the new point is 5 units down from 3. The number -2 is 5 units down from 3. The y -coordinate of the new point is -2 . The coordinates of the new point are $(2, -2)$.

Question 28 (page 187)

- D Correct.** The coordinates of point F are $(7, 8)$. Moving 1 unit to the right makes the new x -coordinate $7 + 1 = 8$. Moving down 7 units makes the new y -coordinate $8 - 7 = 1$. The new coordinates of point F will be $(8, 1)$.

Question 29 (page 188)

- B Correct.** The top view is a square. The front and side views are triangles. This choice is the only one with 1 square as the base and 4 triangles as faces.

Question 30 (page 188)

- A Correct.** The net shows 6 rectangular faces and 2 hexagonal bases. Prisms have 2 bases; pyramids have only 1 base. The solid must be a prism. The bases are hexagons. The solid is a hexagonal prism.

Objective 4

Question 31 (page 196)

- C Correct.** The area of the rectangular window is equal to its length times its width.

$$A = lw = 4.5 \cdot 3 = 13.5 \text{ ft}^2$$

The area of the circular window is equal to π times the square of its radius. Use 3.14 as an estimate of the value of π . The radius of the circle is half the diameter, or 2 feet.

$$A = \pi r^2 = \pi \cdot 2^2 \approx 3.14 \cdot 4 \approx 12.56 \text{ ft}^2$$

The difference between the area of the rectangle and the area of the circle is $13.5 - 12.56 \approx 0.94 \text{ ft}^2$.

The circular window will have an area of about 0.94 square feet less than the rectangular window.

Question 32 (page 196)

- B Correct.** The formula for the perimeter of a rectangle is $P = 2l + 2w$. The perimeter, P , is 50 feet. The width, w , is 7 feet. Let l equal the length of the rectangle in feet.

$$P = 2l + 2w$$

$$50 = 2l + 2(7) \quad \text{Substitute 50 for } P \text{ and } 7 \text{ for } w.$$

$$50 = 2l + 14 \quad \text{Multiply: } 2(7) = 14.$$

$$36 = 2l \quad \text{Subtract 14 from both sides of the equation.}$$

$$18 = l \quad \text{Divide both sides of the equation by 2.}$$

The formula for the area of a rectangle is $A = lw$. The length, l , is 18 feet. The width, w , is 7 feet.

$$A = lw$$

$$A = 18 \cdot 7$$

$$A = 126 \text{ ft}^2$$

The area of the deck is 126 square feet.

Question 33 (page 196)

B Correct. Square yards is a unit of area. The dimensions of the room are given in feet. Convert the dimensions to yards. Since there are 3 feet in 1 yard, divide by 3 to find the number of yards.

$$22 \div 3 = 7\frac{1}{3}$$

$$18 \div 3 = 6$$

Next find the area using the formula for the area of a rectangle.

$$A = lw$$

$$A = 6 \cdot 7\frac{1}{3}$$

$$A = 44 \text{ yd}^2$$

Mr. Hall will need to buy 44 square yards of carpet.

Question 34 (page 196)

C Correct. The formula for the volume of a cube is $V = s^3$. Each of the boxes has a volume of $V = s^3 = 4^3 = 4 \cdot 4 \cdot 4 = 64$. It takes 81 boxes to fill each crate, so the volume of a crate is $81 \cdot 64 = 5,184 \text{ in.}^3$

The volume of each crate is 5,184 cubic inches.

Question 35 (page 196)

C Correct. The formula for the circumference of a circle is $C = 2\pi r$. Use 3.14 as an approximation for π . Let r equal the radius of the circle.

$$C = 2\pi r$$

$$18 \approx 2 \cdot 3.14 \cdot r$$

$$18 \approx 6.28r$$

$$3 \approx r$$

The formula for the area of a circle is $A = \pi r^2$.

$$A \approx 3(3)^2 \approx 27$$

The area of the table is approximately 27 square feet.

Question 36 (page 197)

D Correct. To find the total number of ounces of ground beef needed, multiply $5\frac{1}{4}$ by 32.

$$5\frac{1}{4} \cdot 32 = 168 \text{ ounces}$$

To find the number of pounds in 168 ounces, divide 168 by 16.

$$168 \div 16 = 10.5 \text{ pounds}$$

In order to make 32 hamburger patties, Mr. Borders will need to buy 11 pounds of ground beef.

Question 37 (page 197)

A Correct. Multiply $2\frac{1}{3}$ by 4 to find the number of cups of grain Victor will feed the 4 horses.

$$2\frac{1}{3} \cdot 4 = \frac{7}{3} \cdot \frac{4}{1}$$

$$= \frac{(7 \cdot 4)}{(3 \cdot 1)}$$

$$= \frac{28}{3}$$

$$= 9\frac{1}{3} \quad 28 \div 3 = 9 \text{ R}1$$

Victor will feed the horses $9\frac{1}{3}$ cups of grain. The bag originally contained 128 cups of grain. Subtract to find the difference: $128 - 9\frac{1}{3}$.

$$\begin{array}{r} 127\frac{3}{3} \\ - 9\frac{1}{3} \\ \hline 118\frac{2}{3} \end{array}$$

Rewrite 128 as $127\frac{3}{3}$ so that you can subtract $\frac{1}{3}$ from it.

After Victor feeds the horses, there will be $118\frac{2}{3}$ cups of grain left in the bag.

Question 38 (page 197)

A Correct. The formula for the volume of a rectangular prism is $V = lwh$.

$$V = lwh$$

$$V = 7 \cdot 2 \cdot 6\frac{1}{2}$$

$$V = 14 \cdot 6\frac{1}{2}$$

$$V = 91 \text{ in.}^3$$

The volume of the rectangular prism is 91 cubic inches. The cylinder should have the same volume as the rectangular prism. The formula for the volume of a cylinder is $V = \pi r^2 h$. Substitute 3.14 for π and 91 for V .

$$V = \pi r^2 h$$

$$91 \approx 3.14 \cdot 4^2 \cdot h$$

$$91 \approx 3.14 \cdot 16 \cdot h$$

$$91 \approx 50.24 \cdot h$$

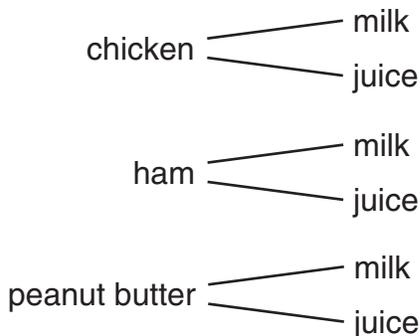
$$1.8 \approx h$$

The height of the cylinder would be approximately 1.8 inches.

Objective 5

Question 39 (page 217)

- A Incorrect. This choice lists chicken and ham. Lee can choose only one sandwich.
- B Incorrect. This choice lists only lunches that have milk as the drink choice. Juice is also a drink choice.
- C Incorrect. This choice lists chicken and ham. Lee can choose only one sandwich.
- D **Correct.** Lee has three sandwich choices. For each of the three sandwich choices, Lee has two drink choices. Use a tree diagram to model all the possible combinations.



These are the 6 possible combinations for Lee's lunch.

Question 40 (page 217)

- A Incorrect. This list repeats a combination. Red and black is the same as black and red. Also, the list does not include the combination white and red.
- B **Correct.** There are two white tiles, so white may be chosen for both tiles. There are only 1 black tile and 1 red tile. Black and red can occur only once. Only this choice lists all the possible combinations.
- C Incorrect. This list includes the combination black and black and the combination red and red. Because there are only 1 black tile and 1 red tile, these combinations are both impossible.
- D Incorrect. This list repeats combinations such as red and black and black and red. Also, the list does not include the combination white and white.

Question 41 (page 218)

- D **Correct.** The bar graph would best represent the data. Because a bar graph uses bars of different lengths to compare data, it would show a comparison between each event and the number of fans attending.

Question 42 (page 218)

- A Incorrect. The data has a range of 8 and a mean of 9.2.
- B Incorrect. The data has a range of 8 and a mean of 10.4.
- C Incorrect. The data has a range of 5 and a mean of 10.
- D **Correct.** The greatest value is 15. The least value is 7. The range is $15 - 7 = 8$. The mean is $(9 + 9 + 7 + 10 + 15) \div 5 = 50 \div 5 = 10$.

Question 43 (page 218)

- C **Correct.** Add to find the total points John has after taking 5 quizzes.

$$88 + 73 + 90 + 85 + 93 = 429$$

To have a mean score of 88 after taking 6 quizzes, John's total points on 6 quizzes should equal $6 \cdot 88 = 528$ points.

John needs a total of 528 points. Right now he has 429.

John must earn $528 - 429 = 99$ points. John needs 99 points on his next quiz in order to have a mean score of 88.

Question 44 (page 219)

- A Incorrect. A line graph is used to show trends, or changes in data over a period of time. It is not a good choice to show preferences for a type of bread.
- B Incorrect. A Venn diagram is used to show how many pieces of data have a certain property in common. It is not a good choice to show preferences for a type of bread.
- C **Correct.** A circle graph is used to compare a set of data, such as preferences for a type of bread. This circle graph accurately represents the percent of people who like each type of bread.
- D Incorrect. A bar graph is used to compare data, such as preferences for a type of bread. However, this bar graph incorrectly shows potato bread chosen by approximately 212 people, not 21 people.

Question 45 (page 220)

- B **Correct.** The temperature increased 10°F between 9 A.M. and 10 A.M. The temperature increased 5°F between 10 A.M. and 11 A.M. The statement that the temperature increased most between 10 A.M. and 11 A.M. is not supported by the graph.

Question 46 (page 221)

- C Correct.** Each temperature is about two times the number of grams of substance dissolved at that temperature. As the temperature increases from 20°C to 150°C , the amount of substance that can be dissolved increases from 10 to 75 grams.

Question 47 (page 221)

- A Incorrect.** The range would still be the difference between the greatest and least scores, which is $100 - 40 = 60$.
- B Incorrect.** The median, the middle score, would still be 75.
- C Incorrect.** The mode, the most frequently occurring score, would still be 75.
- D Correct.** The original mean was 73. If a grade of 68 were figured in, the mean would be 72.4.

Question 48 (page 221)

- A Correct.** The range only tells the organizers the difference between the greatest and least numbers of people who attended. The range for the attendance is $725 - 585 = 140$. The range value, 140, does not help them determine the approximate number of people to expect this year.
- B Incorrect.** The median is the middle number in the data. It provides a good indication of how many people may be at the next conference.
- C Incorrect.** The mode is the most frequently occurring number. It provides a good indication of how many people may be at the next conference.
- D Incorrect.** The mean of a set of data is the average of the values. It provides a good indication of how many people may be at the next conference.

Objective 6**Question 49 (page 233)**

- A Incorrect.** Scott's salary, \$26,000, multiplied by three is \$78,000.
- B Incorrect.** Tasha's salary is \$106,000. The sum of the other five salaries is \$152,000.
- C Correct.** Five percent of Elise's salary is \$1,350. Her new salary would be \$28,350. The mean would increase to \$43,225.
- D Incorrect.** The mode of the salaries is \$12,000. The median of the salaries is \$26,500. The mode, \$12,000, is 50% of \$24,000.

Question 50 (page 233)

- A Incorrect.** A total of 115 boys and 105 girls, or 220 students, attended the conference. From Louisiana 9 boys and 10 girls, or 19 students, attended. The fraction $\frac{19}{220}$ represents the portion of the students from Louisiana. To find the equivalent percent of $\frac{19}{220}$, divide the numerator by the denominator: $19 \div 220 \approx 0.086$. Thus, only about 8.6 percent of the students who attended the conference were from Louisiana.
- B Incorrect.** In all, 115 boys and 105 girls attended the conference. The ratio of boys to girls was 115:105, which is equivalent to 23:21, not 21:23.
- C Incorrect.** Florida, Alabama, and Oklahoma had more boys than girls attending the conference. New Mexico had the same number of girls and boys attending.
- D Correct.** From Texas 29 boys and 33 girls, or 62 students, attended. Texas had the greatest number of students attending the conference. If the number of students attending from Texas was the greatest, then the percent attending from Texas would also be the greatest.

Question 51 (page 234)

- D Correct.** The formula for the area of a circle is $A = \pi r^2$. To find the area of a circle if the diameter is given, first divide the diameter by 2 to find r , the radius. Then square the radius and multiply the product by π .

Question 52 (page 234)

- C Correct.** Let v represent the cost of 1 videotape. If each videotape is the same price, then 5 videotapes cost $5v$. The cost of the DVD is \$20. Add to find the total amount Mario spends. The expression $5v + 20$ represents the total amount he spends. The problem states that Mario spends a total of \$45. Write an equation setting the expression and total equal to each other. The equation $5v + 20 = 45$ can be used to find v , the cost in dollars of each videotape.

Question 53 (page 234)

A Correct. Tonya knows the number of minutes each of her activities will take. She also knows when she needs to be at the party. If Tonya subtracts the number of minutes she will spend doing each of the tasks from 7:00 P.M., she will find the latest time she should start doing her tasks. She should work backwards using the information given.

Question 54 (page 235)

B Correct. Mr. Jackson needs to know how much area will be covered by each type of flower. To determine this, he needs to know how many of each type of flower he will plant.

Question 55 (page 235)

C Correct. A parallelogram is formed by the intersection of two pairs of parallel lines. Consecutive angles in a parallelogram are supplementary, which means that the measures of the two angles add up to 180° . The sum of the measures of the four angles is always 360° .

WRITING

INTRODUCTION

What Are Objectives?

Successful writers use many skills to communicate their ideas and experiences to readers. The TAKS writing test groups these skills under six objectives, or goals for learning. These broad statements describe what seventh-grade students are expected to know and do when writing. Specific skills are outlined under each statement.

What Kinds of Tasks Are Required on the Test?

On the TAKS writing test, students are given an opportunity to demonstrate their writing skills. For Objectives 1 and 2, students write a composition in response to a prompt (selected topic). For Objectives 3, 4, 5, and 6, students read five or six passages that resemble student writing and answer multiple-choice questions about revising and editing these passages.

How Is This Study Guide Organized?

This study guide provides information and practice for the objectives that will be tested on the TAKS writing test. Each of the six objectives is explained, and examples are given. Both guided and independent practice activities follow.

Objectives 1 and 2 require writing a composition in response to a prompt. In this guide students are given instruction in the writing process. Then four sample compositions are shown. Notes in the margins of each composition help students identify elements of effective and ineffective writing.

Next students are given an opportunity to write their own compositions in response to a prompt. Instructions guide students through the planning, writing, revising, and editing stages of the writing process.

Objectives 3, 4, 5, and 6 focus on the revising and editing process. These objectives deal with issues such as recognizing complete, clear sentences; using verb tenses correctly; and including necessary punctuation marks. This guide gives instruction in each skill and then offers examples and practice exercises.

At the end of the instructional section, a sample revising and editing passage is provided, with attention called to specific sentences within the passage. Students are guided through making improvements to the identified sentences. Finally, two more revising and editing passages are offered. These passages look similar to the passages that students are asked to revise and edit on the TAKS test. As on the TAKS test, each passage is followed by multiple-choice questions. The answer key on pages 338–340 explains the correct answers and helps students understand why the incorrect answers should be ruled out.

Your TAKS Progress Chart

Student's Name

WRITE A PAPER

	Prepare to Write	
1	<ul style="list-style-type: none">● Read pages 248–249 to learn what good writers do.● Examine the sample papers on pages 249–255. Read the margin notes carefully so that you will understand what the writers have done well and what they need to work on.● Study pages 256–262 to learn how a student uses the writing process to develop a paper.	✓
2	Write a Paper <ul style="list-style-type: none">● Follow the directions on pages 263–272. You will brainstorm, organize, and select ideas; compose a rough draft; revise and edit the draft; and write a final paper.	✓
PRACTICE THE SKILLS		
3	Organization <ul style="list-style-type: none">● Read pages 274–281 to learn about organizing ideas.● Practice writing supporting sentences, deleting extraneous ones, and using appropriate transitions.	✓
4	Sentence Structure <ul style="list-style-type: none">● Read pages 282–295 to learn about writing good sentences.● Practice writing complete sentences and correcting fragments, run-ons, and awkward or redundant sentences.	✓
5	Grammar and Usage <ul style="list-style-type: none">● Read pages 296–308 to review correct grammar and usage.● Practice using verbs, pronouns, adjectives, and adverbs correctly.	✓
6	Mechanics <ul style="list-style-type: none">● Read pages 309–322 to review basic skills in punctuation, capitalization, and spelling.● Practice using periods, exclamation points, question marks, commas, apostrophes, quotation marks, and capital letters.● Review some important spelling rules.	✓

Objective 1

The student will, within a given context, produce an effective composition for a specific purpose.

What is a given context?

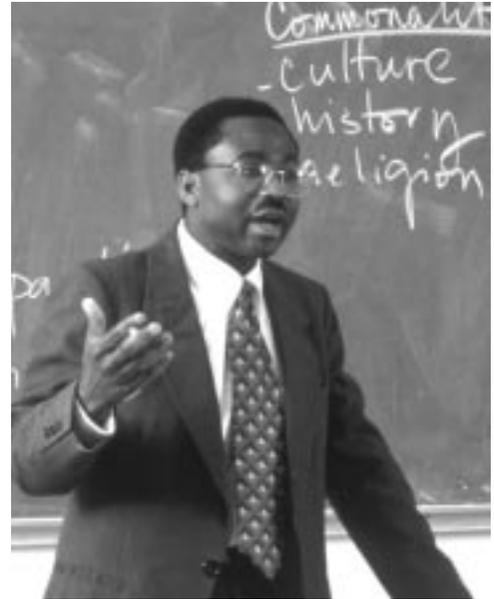
A given context is a topic that is provided. On the TAKS test a writing prompt will be given to all students. This prompt tells students what the composition should be about.

What is an effective composition?

An effective composition is a piece of writing that clearly communicates the writer's ideas to a reader. Before you write, you must decide the best way to get your message across to the reader.

What is a specific purpose?

A specific purpose is what you want to accomplish in your writing. Although every student will be writing about the same topic, you select your own purpose. Will you write to inform, to persuade, to compare, to reflect, or to entertain? Or will you decide to use a combination of these strategies?



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Objective 2

The student will produce a piece of writing that demonstrates a command of the conventions of spelling, capitalization, punctuation, grammar, usage, and sentence structure.

What are these conventions?

The conventions of spelling, capitalization, punctuation, grammar, usage, and sentence structure are the rules people need to follow when they write in standard English.

How does a student show a command of these conventions?

When a student is able to follow most of the rules, he or she shows a command of the conventions. For example, seventh-grade students should be able to use conjunctions to connect ideas, use prepositional phrases to develop ideas, use adjectives and adverbs to create vivid descriptions, and punctuate and capitalize most sentences correctly. Some errors are to be expected, but if the errors make it difficult for readers to understand the writer's message, the writer has not shown a command of these conventions.

Writing a Composition

The written composition on the TAKS test is always based on a writing topic called a **prompt**. The student is expected to

- respond directly to the prompt
- organize ideas so that a logical progression of thought is evident both within and across paragraphs
- remain focused on the topic throughout the composition
- develop ideas thoroughly and specifically
- write a complete composition—one that has a beginning, a middle, and an end
- express an individual voice

A student's written composition will be scored to show how well he or she has mastered the skills listed in Objectives 1 and 2. A score point of 1 (the lowest), 2, 3, or 4 (the highest) is possible.



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There are times each day when you will need to write. No matter what you are writing, you will want your writing to be clear and complete so that readers can understand it.

Before you begin writing, decide what type of writing you will do. Try to complete a statement like one of the following:

- I am writing to share my thoughts about an experience.
- I am writing to propose a solution to a problem.
- I am writing to explain something.
- I am writing to persuade someone.
- I am writing to describe something.
- I am writing to compare and contrast two or more things.
- I am writing to tell a story.

Follow these steps to be sure that people will be able to understand your writing:

- Before you write, think about what you want to say. Use a web, chart, graph, list, or other organizer to brainstorm the ideas that you want to include.
- Look at the ideas you have brainstormed and put them in an order that makes sense.
- Write a rough draft of your ideas.
- Reread what you have written. Look for logical order and move sentences around if needed. Change words or sentences to make your writing clear. Add additional details where they are needed.
- Read your paper again. Be sure all your sentences are complete. Look for and correct any errors in usage and mechanics.

Sample Papers

In this part of the writing study guide, you will find some sample papers. Each paper has been given a score. Notes in the margins explain why the paper received the score point it did. Study these papers so that you can understand what the writers did well and what they need to work on.

The sample papers that follow were written by seventh-grade students in response to the prompt below.

Write a composition about someone who has made a difference in your life.

The information in the box below will help you remember what you should think about when you write your composition.

REMEMBER—YOU SHOULD

- write about someone who has made a difference in your life
- make your writing interesting to the reader
- make sure that each sentence you write helps the reader understand your composition
- make sure that your ideas are clear and easy for the reader to follow
- write about your ideas in detail so that the reader really understands what you are saying
- check your work for correct spelling, capitalization, punctuation, grammar, and sentences

These papers show what seventh-grade writing looks like at each of the score points. A paper that scores a 1 is “not effective,” a 2 paper is “somewhat effective,” a 3 paper is “generally effective,” and a 4 paper is “highly effective.”

As you read each sample paper, pay close attention to the way the writer develops ideas about someone who has made a difference in his or her life. Margin notes point out what’s good about the paper and where the writing needs more work. Some mistakes the student made in spelling, capitalization, punctuation, grammar, and sentence structure are also included.

Score Point 1

Kevin’s Paper

My friend Anthony is someone who has made a difference in my life. If it wasn't for him I would be outrageous. So I'm glad I have a friend like him. He is the best friend I have ever had. He has made me were I'm not as wild as I would be if he wasn't my friend.

It slows you down when you have to figure out which words Kevin really meant.

Kevin has already told you this in the second sentence.

Basic words aren't spelled correctly.

Basic words aren't spelled correctly.

Kevin needs more specific examples to tell about his ideas.

Anthony had put me on the write trail and that's all that madders. He tells me like not to get into fights with people and don't do drugs or acohol. This stuff will hurt you if it is used. Also do good in school. So I'm very glad that he is my friend.

Kevin may think that it's obvious why Anthony is a great friend and how Anthony put him “on the right trail,” but good writing needs to be clear and specific. Kevin needs to tell the reader more!

Score Point 2

Tamara's Paper

Tamara tells you what she wants to write about; her mom will be the focus of the paper.

Have you ever had someone in your life that has made a big difference? My mom can wipe away my tears when I am down. My mom taught me what is right and wrong.

In the third grade my mom had found a new love. He would open the door for her and everything. He just happened to live two hours away. When they got married I had to move to a new school with new people, and teachers. Now I have friends that are so kind. I love all my teachers, they do so much for me. That was a major difference.

Tamara gets back on track here, but she could explain this more clearly.

When I am feeling down and really need someone to talk to my mom is always there. I know if I fall she is the one who would pick me up. I talk to her about my friends, my teachers, and even about the boys I have a crush on.

My mom taught me how to love. She gave me advice on how to treat friends and to love them. She also told me to love all of my family. Be kind and always be there for them when they need you. That's why she is the one who has made a difference in my life.

Suddenly Tamara switches to moving, new teachers, etc. She has lost the focus on Mom.

Good detail.

What advice?

What does "be there" really mean?

Overall, Tamara's paper is only somewhat effective. She needs to make sure that everything she writes is connected to the focus of her paper, and she needs to explain her ideas in more detail so that the reader can really understand what she's saying.

Score Point 3

Matt's Paper

Good introduction. Matt tells you the focus of his paper and gets you interested right away.

Someone who has made a difference in my life is Martin Luther King Jr. When I was younger if I got mad at someone else and they weren't my same color, I would say something racial. My mom would always tell me that it wasn't right but I would never listen to her.

Until one day when I was in the 5th grade. We had to do a report on someone who made a difference in the U.S.A. and I did mine on Dr. Martin Luther King Jr. In order for me to do the report I had to read books about his life. After just reading one chapter of the book it made me realize that what I had been saying to people for years was really wrong.

Matt could have told you a little more about what was in that chapter.

Nice transition. It's a good way to move from the ideas in paragraph 2 to the ideas in paragraph 3.

Then I started to think about what if people called me names that I didn't want to be called. Back in the 1950s white people had a lot more than black people did. And a lot of black people were scared to come out and tell them how they felt. But Martin Luther King Jr. was one of the few people who spoke his mind about how he felt. He thought it was wrong for people to judge other people just by the color of their skin. A lot of white people didn't like what he was doing and they tried

You can hear Matt's voice when he writes about history in a simple way.

many things to make him stop. But he never did. He never gave up. And the best thing about it is that he never not once used violence. He was just a talking man.

This conclusion is O.K., but the ideas here remain general. They could be more developed.

→ After doing that report I thought long and hard about it. And I think that he was a pretty cool guy. Even today I'm still trying to learn more about him.

Overall, Matt wrote a generally effective composition. Matt stayed focused on how Dr. King's ideas and actions made an impression on him and caused a change in his behavior. This personal connection is one of the ways that you "hear" Matt's voice. Throughout the paper Matt moved forward logically from one idea to the next. There are a few mistakes in mechanics, but they do not prevent you from understanding Matt's ideas. However, Matt could have developed his ideas in more depth.

Score Point 4

Bianca's Paper

Nice introduction. Bianca connects with the reader right away.

Have you ever met someone who has made a huge difference in your life? Someone who you saw and promised yourself you would someday be like him/her? I have. In fact this wonderful person is my father. Let me explain how he made a difference.

Bianca gives you specific examples about how her dad helps her with school.

Everyone gets mad at their parents. Everyone wishes they could change that small detail that's so annoying. I don't; if I could change something about my dad it would be nothing. When I have a low grade at school, he doesn't ground me or scold me. Instead he sits down with me and asks me to tell him what's wrong, why I've made that low grade. Once I had a 72 on my science average, he helped me understand about kilometers, grams, meters and all of the metric measurements. Now my grade is an 87.9!

From Bianca's school experiences to her dad's—the ideas follow logically.

My dad never finished school. He had to drop out in tenth grade to help my uncles work on the ranch. They worked from when the sun rose at 5 a.m. till the sun went down at 8 p.m. Such hard work paid off, cause my Papa bought land for each one of his 12 kids. Even though Dad didn't go to school, Nanna taught him everything he needs to know. Dad always tells me that the day I graduate will be as if he were graduating with me.

You get a good picture of Bianca's dad and why she admires him.

The story about the trip adds depth and voice.

2 months ago, I heard about a trip to Washington D.C. I was eager to go from the day I heard about it. I went home that day to beg my parents for permission. They were discussing about bills. I felt selfish to ask for permission to go on this \$1,500 trip. My dad asked me how school went that day. I told him about the trip. And he said "We'll see." About a week later my dad had figured out a way for me to go. He would work 1 1/2 hours longer every day for 3 weeks. Then my uncle would pay him the money he owed him. I said "No Dad, you don't have to do that." He said "Nonsense Bianca, you deserve to go."

Use of dialogue makes the characters seem more real.

I love my dad for his kind and gentle heart, for always encouraging me when I need him most. I want to be exactly the way he is because I feel that that way, someday when I have kids they'll love me as much as I love him.

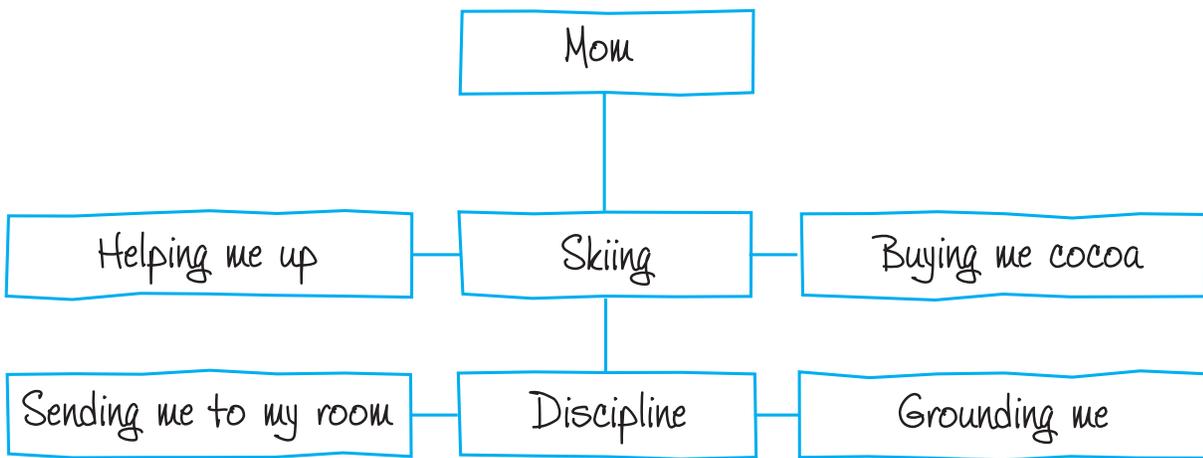
Bianca's conclusion adds new thoughts; she doesn't just repeat what she's already said.

Bianca's composition isn't perfect; for example, there's a run-on sentence in the second paragraph, and there are a few misspelled words—can you find them? However, the paper as a whole is very effective; Bianca's sentences flow smoothly, she develops her ideas well, and you are interested in what she has to say because you can "hear" her voice.

Activity 1—Prewriting—What Will I Say?

Roberto has decided to write about someone who has made a difference in his life. Roberto knows it is a good idea to think about what he wants to say before he begins to write.

Although there are many different ways to plan a composition, Roberto has decided to use a graphic organizer to help him organize his thoughts.



Activity 2—Composing

With the prewriting done, it's time to get those ideas on paper. Look at Roberto's first draft below. He was not concerned about writing a perfect paper on the first try. He put his ideas down without trying to correct spelling, capitalization, punctuation, or grammar. He will fix those things later.

Have you ever thought about someone who has made a tremendous impact on your life. Well there is someone in my life and that person is my mom, which has stayed by my side through tough times and disciplined me when I needed it. There are a couple of reasons that she has made an impact on my life.

The first is, she has helped me when I needed it most. For instance, when we went skiing she stayed by my side and helped me do better by helping me up when I fell down and by buying me some cocoa when I got cold.

The next thing is, discipline. My mom has sent me to my room so many time I can't even count them, but yet I thank her for doing so because it will help me make better decisions later on down the road. One time she found me playing video games on a weekday, and I'm not suppose to, and she grounded me. I tried to reason with her, but that night I rememberd that I hadn't finished my homework and I would have made a 0 on it if I wouldn't have listened to my mom.

I hope the composition reminded you of that special person that has made all the differce in your life and I hope you find the courage to thank him.

Notice how Roberto has used the ideas from his prewriting in his first draft.

Activity 3—Revising

Look carefully at how Roberto revised his first draft. Think about the changes he made. Read the notes in the margins to see why he made the changes.

Adding this makes it easier to understand why Roberto needed help.

This is a smoother transition from “skiing” to “discipline.”

This adds depth and helps explain the idea of “making better decisions.”

This is a much better ending because it’s specific to Roberto’s paper. It also ties the whole composition together so that it sounds finished.

Have you ever thought about someone who has made a tremendous impact on your life. Well there is someone in my life and that person is my mom, which has stayed by my side through tough times and disciplined me when I needed it. There are a couple of reasons that she has made an impact on my life.

The first is, she has helped me when I needed it most. ~~I am not a very good skier, but when our family took a ski vacation last year, I was determined to try hard to learn to ski better.~~ For instance, ~~when we went skiing she stayed by my side and helped me do better by helping me up when I fell down, and by buying me some cocoa when I got cold.~~ ^{During the first few days on the slopes my mom helped me do better by helping me up when I fell down, and by buying me some cocoa when I got cold.}

~~Another thing my mother does for me is discipline me.~~

~~The next thing is, discipline.~~ My mom has sent me to my room so many time I can’t even count them, but yet I thank her for doing so because it will help me make better decisions later on down the road. ~~One time she found me playing video games on a weekday, and I’m not suppose to, and she grounded and sent me to my room. As I was sitting there without any video games to distract me, we I tried to reason with her, but that night I rememberd that I hadn’t finished my homework, and I would have made a 0 on it if I wouldn’t have listened to my mom.~~ ^{She is trying to teach me right from wrong and that doing wrong will have bad consequences.}

~~I tried to reason with her, but that night I rememberd that I hadn’t finished my homework, and I would have made a 0 on it if I wouldn’t have listened to my mom.~~ ^{As I was sitting there without any video games to distract me,}

~~I tried to reason with her, but that night I rememberd that I hadn’t finished my homework, and I would have made a 0 on it if I wouldn’t have listened to my mom.~~ ^{I tried to reason with her, but that night I rememberd that I hadn’t finished my homework, and I would have made a 0 on it if I wouldn’t have listened to my mom.}

~~I’m lucky because my mom knows when to help me and when to make me take responsibility for myself. I know I will be a better person because of her.~~

~~I hope the composition reminded you of that special person that has made all the difference in your life and I hope you find the courage to thank him.~~

~~my homework assignment if I had kept playing those video games. I hated to admit it, but~~

~~my mom was right!~~

This is more specific than writing “when we went skiing.”

More details help you get a better picture of the events.

Now it’s easier to understand why Roberto would suddenly remember his homework.

The video game story is clearer and more complete now.

Activity 4—Editing

All writers make mistakes in spelling, capitalization, punctuation, grammar, and sentence structure when they write and revise. That’s why editing is an important part of writing. Editing is the process of finding and correcting those errors.

Why is it important to correct errors? They make it difficult for you as a writer to present your ideas clearly and effectively. Errors can also cause confusion, making it difficult for your reader to understand what you are trying to say.

Take a closer look at Roberto’s edited composition below.

Misspelled word.

Needs a question mark rather than a period.

“Those” is better because it refers directly to the reasons already stated.

“My mom” is clearer; “the first is” isn’t necessary.

This sentence has two conjunctions; “yet” isn’t necessary.

Have you ever thought about someone who has made a ~~tremendouse~~ ^{tremendous} impact on your life. Well there is someone in my life ^{like that} and that person is my mom, ~~which~~ ^{she} has stayed by my side through tough times and disciplined me when I needed it.

~~There~~ ^{Those} are a couple of reasons that she has made an impact on my life.

~~The first is,~~ ^{My mom} she has helped me when I needed it most. For instance, I am not a very good skier, but when our family took a ski vacation last year, I was determined to try hard to learn to ski better. During the first few days on the slopes my mom stayed by my side and helped me do better by helping me up when I fell down. It was extremely cold there in the mountains. My mom helped me by buying me some cocoa when I got cold.

Another thing my mother does for me is discipline me. My mom has sent me to my room so many ~~time~~ ^{times} I can’t even count them, but ~~yet~~ I thank her for doing so because it will help me make better decisions later on down the road. She is trying to teach me right from wrong and that doing wrong will have bad consequences. One time she found me playing video games on a weekday, and I’m not ~~supose~~ ^{supposed} to. I tried to

Refers to the idea in the first sentence, the person who makes an impact.

Better to make this into two sentences and eliminate the incorrect pronoun “which.”

This should be “times” (plural), not “time.”

Misspelled word.

reason with her, but she grounded me and sent me to my room.

As I was sitting there without any video games to distract me, I ~~remembered~~ ^{remembered} that I hadn't finished my homework. I would have made a 0 on my homework assignment if I had kept playing those video games. I hated to admit it, but my mom was right!

I'm lucky because my mom knows when to help me and when to make me take responsibility for myself. I know I will be a better person because of her.

Misspelled
word.

Activity 5—Writing a Final Draft

Roberto has finished his paper. Read his composition and compare it to his first draft.

Have you ever thought about someone who has made a tremendous impact on your life? Well there is someone in my life like that and that person is my mom. She has stayed by my side through tough times and disciplined me when I needed it. Those are a couple of reasons that she has made an impact on my life.

My mom has helped me when I needed it most. For instance, I am not a very good skier, but when our family took a ski vacation last year, I was determined to try hard to learn to ski better. During the first few days on the slopes my mom stayed by my side and helped me do better by helping me up when I fell down. It was extremely cold there in the mountains. My mom helped me by buying me some cocoa when I got cold.

Another thing my mother does for me is discipline me. My mom has sent me to my room so many times I can't even count them, but I thank her for doing so because it will help me make better decisions later on down the road. She is trying to teach me right from wrong and that doing wrong will have bad consequences. One time she found me playing video games on a weekday, and I'm not supposed to. I tried to reason with her, but she grounded me and sent me to my room. As I was sitting there without any video games to distract me, I remembered that I hadn't finished my homework. I would have made a 0 on my homework assignment if I had kept playing those video games. I hated to admit it, but my mom was right!

I'm lucky because my mom knows when to help me and when to make me take responsibility for myself. I know I will be a better person because of her.

What score do you think Roberto would receive if he had written this composition on a TAKS test? To help you decide his score, look below at the short explanation of each score point.

- Score Point 1: An ineffective composition (a failing paper)
- Score Point 2: A somewhat effective composition (a passing paper)
- Score Point 3: A generally effective composition (a good paper)
- Score Point 4: A highly effective composition (a very good paper)

Roberto's composition would receive a 3 on TAKS because

- ✓ it is focused on someone who has made a difference in Roberto's life; everything Roberto writes is about this same idea.
- ✓ most of the sentences Roberto writes follow an order that makes sense to the reader.
- ✓ Roberto gives some details and specifics to make his ideas generally clear to the reader.
- ✓ Roberto's composition is generally interesting and sounds "real." The reader can tell that these are Roberto's own thoughts and that he has expressed them in his own way. The reader can "hear" Roberto's voice off and on throughout the paper.
- ✓ Roberto has tried to use correct spelling, punctuation, capitalization, grammar, and sentences to make his writing easy for the reader to understand.

To get a score of 4, Roberto would not need to add any more ideas about the person who has made a difference in his life. Instead, he would need to think harder so that he can provide more depth to support the ideas he already has. If Roberto did this, his voice in the paper would be stronger, too.

It's Your Turn!

Now that you've read about what good writers do and looked at samples of other students' writing, it's your turn to write. Look at the prompt below. It is similar to the kind of prompt you will see on the TAKS writing test.

Write a composition about an experience that has changed you in some way.

The information in the box below will help you remember what you should think about when you write your composition.

REMEMBER—YOU SHOULD

- write about an experience that has changed you
- make your writing interesting to the reader
- make sure that each sentence you write helps the reader understand your composition
- make sure that your ideas are clear and easy for the reader to follow
- write about your ideas in detail so that the reader really understands what you are saying
- check your work for correct spelling, capitalization, punctuation, grammar, and sentences



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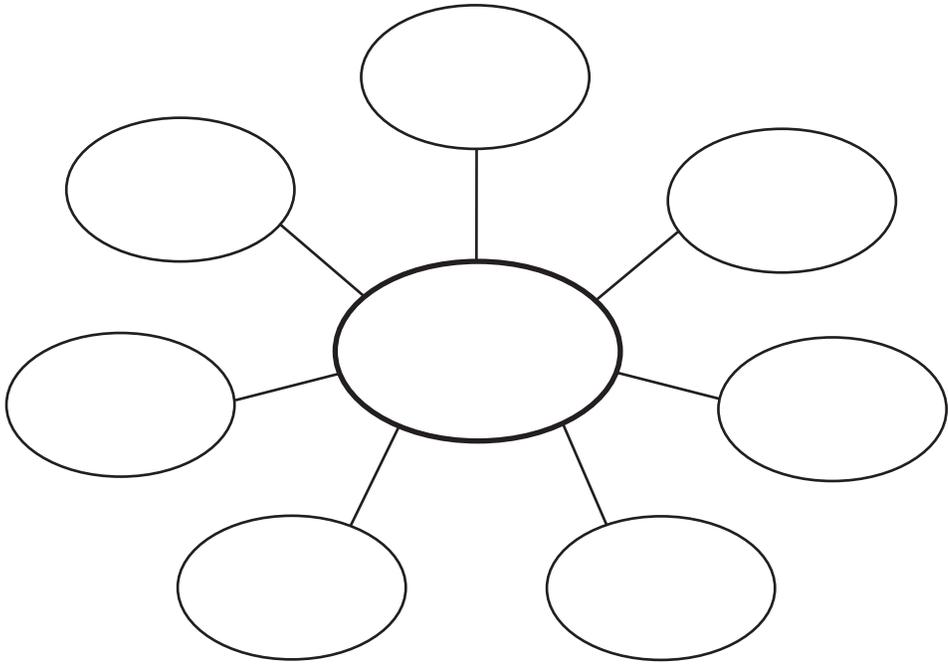
STOP! Before you begin to write, **THINK.**

- How will I address this topic?
- Do I want to reflect on an experience I had when I was younger?
- Do I want to write a story about an experience I have had at school?
- Do I want to convince others that an experience I have had is something they should experience, too?
- Do I have another idea for a way to approach this topic?

Look at the graphic organizers on the next page. Use one to help you brainstorm some ideas for your composition or make one of your own in the blank space provided on page 266. You may want to

- use the web to record your feelings about an experience that has changed you
- use the web to list the events in a story about an experience you once had
- use the chart to list the reasons you think a particular experience changed you
- use the chart to list points you want to make about something other people should experience

You may have an idea of your own. All that is important is that you take the time to think about some ideas you have on this topic before you begin to write your first draft.



You can add more ovals if you need to.

Empty rectangular box for writing.



Empty rectangular box for writing.



Empty rectangular box for writing.



Empty rectangular box for writing.

Use this page to create a different type of graphic organizer if you prefer.

Look over the ideas you brainstormed in the graphic organizers. Number the ideas you would like to write about in the order you want to present them. After putting your ideas in order, decide whether there is anything else you want to include in your paper. When you finish planning and organizing your ideas, you are ready to start your first draft.

Revising Your Paper

Reread your composition and ask yourself the following questions:

- Have I accomplished the purpose I selected for my composition?
- Does my writing “fit” my audience?
- Do the ideas or events in my composition follow a logical order?
- Have I given adequate support for my ideas?
- Have I used language clearly and effectively so that readers can understand what I am saying?
- Do I need to correct any fragments, run-ons, or awkward sentences?

As you think about the questions above, use a colored pencil or pen to show the revisions you would like to make to your composition.

Editing Your Paper

All writers must edit their papers for errors in spelling, capitalization, punctuation, and usage. When you edit, look for these kinds of mistakes:

Spelling

- Did I follow spelling rules for words that fit common patterns?
- Did I check a dictionary for unfamiliar words?

Capitalization

- Did I capitalize all the proper nouns and proper adjectives?
- Did I capitalize the first word in each sentence and direct quotation?

Punctuation

- Did I use appropriate end punctuation in each sentence?
- Did I use commas, colons, and semicolons correctly?
- Did I use apostrophes correctly in possessives and contractions?
- Did I use quotation marks correctly?

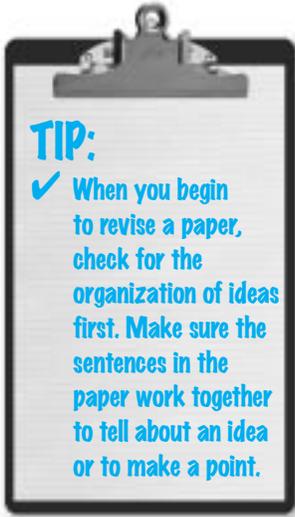
Usage

- Did I use adjectives and adverbs appropriately?
- Does each verb agree with its subject?
- Did I shift verb tense only when necessary?
- Did I use pronouns correctly?
- Did I use words that sound similar, such as *are* and *our*, correctly?
- Did I use homonyms correctly?
- Did I remove any double negatives?
- Did I delete any sentences that unnecessarily repeat information?

As you ask yourself these questions, use a colored pencil or pen to make edits on your first draft.

Objective 3

The student will recognize appropriate organization of ideas in written text.



You are probably used to revising and editing most of your papers when you are finished writing. Sometimes you may also be asked to help another writer revise and edit his or her work.

As you read a paper, ask yourself what the paper is about. Can you identify a point or points the writer is trying to make? For example, the paper may

- explain how a car's engine works
- describe a favorite movie
- convince people that one CD player is better than another
- compare and contrast two sports
- tell a story about a visit to the Grand Canyon

A paper with a clear idea or point is much more effective than a paper that has no main focus.

Developing a Paper

Read the paper in the box and ask yourself these questions:

- What is this paper about?
- What point or points is the writer trying to make?

When I was younger, I loved going to theme parks. They were magical worlds filled with amazing characters, exotic food, and fabulous rides. But my recent visits to theme parks have been disappointing. The colorful scenery has faded, and the smell of stale popcorn seems to fill the air. The lines are the worst part. It sometimes feels like I spend the entire day waiting in lines. Until last week I had pretty much given up on theme parks.

Everything changed when I went to Wonder World, the new theme park that opened just outside town. The first thing I noticed when I came through the gate was that the park was very clean. As I walked around, I noticed something else: a wide variety of food selections. There was Chinese food on one corner, a Mexican buffet in a nearby pavilion, and pizza for sale at the picnic site. I was impressed, but I hadn't seen any of the attractions yet. I was eager to find something to ride.

When I walked through the entrance for the Jungle River Adventure Ride, I expected a line—and I was right. The line was long, but it moved quickly. As I waited, entertainers worked their way through the crowd. Some juggled, some performed card tricks, and others played music. All of them made me laugh. When I found myself getting on the boat for the ride, I was almost reluctant to leave the line.

Wonder World has given me a good reason to return to theme parks. It's the most entertaining park I've ever visited. I will definitely return, and I plan on bringing all my friends!



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In these paragraphs the writer tells why he enjoyed Wonder World more than other theme parks. Here is the point he is trying to make:

Wonder World is much better than other theme parks.

Here are some of the details the writer uses to support his point:

- Wonder World is very clean.
- There are lots of food choices at Wonder World.
- The lines are long, but they move quickly.
- Entertainers keep people occupied when the lines are long.

Using Supporting Sentences

Writers use supporting sentences to develop the ideas in a paper. A well-written paper includes many supporting sentences.

Important Note

Supporting sentences tell more about an idea by defining it, explaining it, or providing examples of it.

Read this sentence:

There are nine planets in our solar system.

If you were writing a paper about this idea, what kind of supporting sentences would you need? You would need sentences that tell more about this idea.

Put a check next to the sentence that tells more about the nine planets in our solar system.

- Each planet spins around a star we call the sun.
- Many different solar systems make up the universe.
- Stars can be red, yellow, blue, or white, depending on their temperature.

Did you select the first idea? You are correct. It's interesting that the universe is made of many different solar systems, but that doesn't give information about the nine planets in our solar system. It's also interesting that stars come in many different colors, but that doesn't tell anything about the planets in our solar system, either. The first sentence explains how the planets in our solar system move. It tells more about the idea in the box, so it is a supporting sentence.

Try It

Read the sentence below and think about the kind of ideas that would support it.

School cafeterias should have snack machines.

What kind of sentences would you need to write if you wanted to support this idea? What would your sentences need to be about?



Answer Key: page 336

Deleting Extraneous Sentences

Sometimes writers include sentences that do not belong in the composition. These sentences are called extraneous. Extraneous sentences may relate to the topic of an essay, but they do not help explain any important ideas.

Important Note

Extraneous sentences give unimportant or unrelated information and should not be included.

Read this paragraph:

Saul wanted to build a table for his mother's birthday. He found a design that showed him how to put the table together. His mother's birthday is April 24. Then Saul bought planks of poplar and cherry wood. Saul's shop teacher let him use the tools at school to build his birthday surprise.

Circle the extraneous sentence in this paragraph.

The paragraph is about the table Saul wanted to make for his mother's birthday. The date of his mother's birthday is not directly related to this idea. In this paragraph that detail is extraneous.

Using Transitions

As writers develop their papers, they use transition words and phrases to help readers move from one idea to the next. When you write, you will sometimes want to begin your sentences with transitions such as these:

For example,	On the other hand,
In addition,	Therefore,
However,	In other words,

Read the two sentences below. Circle the transition word or phrase from the list above that would logically take a reader from the first sentence to the second sentence.

The Apaches are often thought of as great horsemen. This Native American tribe did not even have horses until the Spaniards arrived in the 1500s.

Did you select the word *however*? That's the best choice. You don't want to use the phrase *in addition* because that means you're giving another reason. *Therefore* suggests a cause and effect. *In other words* means that you're repeating the previous statement in a different way. By choosing *however*, you tell the reader that the next sentence offers information in contrast to the idea in the first sentence. *However* can be used to alert the reader that the second sentence may contradict the sentence before it or bring up an opposing idea.

Important Note

Supporting sentences give more information about an idea. Transition words and phrases can be used to connect supporting sentences to one another and to the rest of the paragraph.

Developing a Strong Paragraph

Think about what you have learned about main ideas, supporting sentences, extraneous sentences, and transition words and phrases. Then read the sentence in the box. Imagine that a student wants to write a paper about this idea:

Every student should have access to a computer.

Put a check next to each of the sentences that can be used to support the idea in the box.

- Students can use computers to improve their stories and reports.
- A computer's thesaurus can help students select words that are more interesting.
- Information from thousands of books can be found on a computer.
- It is quicker and easier to research a topic when a computer is available.
- Buying a computer can be very expensive.
- Selecting the right computer can take a little time.

The first four ideas tell why every student should have access to a computer. The last two ideas do not. They talk about buying and selecting a computer but not about why a student should have access to one. The last two ideas wouldn't belong in a paragraph with the others.

What if you wanted to use the first four ideas in a paragraph? Here is one way you could use transitions to put these sentences together. A closing sentence has also been added to the paragraph.

Every student should have access to a computer. **First of all**, students can use computers to improve their stories and reports. **For example**, a computer's thesaurus can help students select words that are more interesting. **Furthermore**, information from thousands of books can be found on a computer. **As a result**, it is quicker and easier to research a topic when a computer is available. When students have computers, they are able to work more efficiently.

In this paragraph the writer uses a transition at the beginning of most of the sentences. **This is certainly not necessary in every paragraph. Just use a transition when it will help your readers connect one idea to another.**



Try It

Now is a good time to practice writing a paragraph or group of paragraphs on your own. Look at the picture below and think of a story or paragraph you might write about it.



©Lawrence Manning/CORBIS

First decide what you want your paragraph(s) to be about. You may select from one of these ideas, or you may have an idea of your own.

Jacob and his friends have started a band.

My brother's band played in a citywide contest last year.

Playing in a band in front of a large crowd can be a little frightening.

Write your idea here:

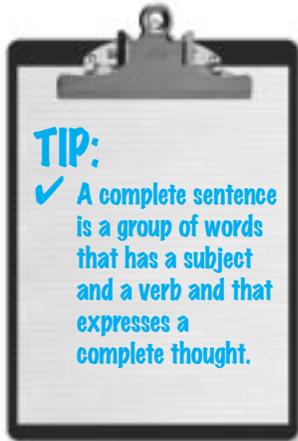
What sentences could you include in your paragraph? Remember the sentences should directly relate to the idea you wrote. Be sure not to include extraneous sentences that relate to the topic but don't really give information about the idea.

Look carefully at your supporting sentences and ask yourself these questions:

- Do my supporting sentences tell more about the idea I decided to write about?
- Have I deleted any extraneous ideas?
- Have I left out any important information?

Objective 4

The student will recognize correct and effective sentence construction in written text.



Complete Sentences

A complete sentence

- has a subject (who or what the sentence is about)
- has a verb (what the subject does, has, or is)
- expresses a complete thought

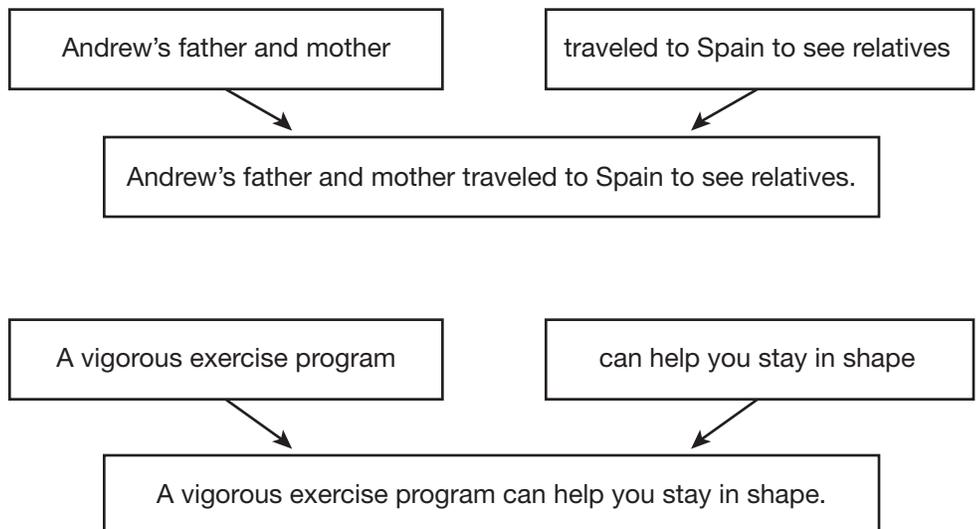
Important Note

People do not always speak in complete sentences. When you talk, you can add meaning to your words with hand gestures and facial expressions. Even the sound of your voice can make the same words mean different things. When you write, you have only words to communicate meaning. That's why it's important to write in complete sentences. Sentences that are incomplete can be confusing because readers can't tell where one thought ends and the next one begins.

The following sentences are examples of complete sentences. Notice that each sentence has a subject and a verb. The subjects are underlined once. The verbs are underlined twice.

- The dog chases the ducks in the water.
- The cereal in the pantry is getting old and stale.
- Orlando and Rafi skated down the street.

Look how the following subjects and verbs have been put together to form complete sentences:



Sentence Fragments

A **fragment** is a group of words that does not express a complete thought. Sometimes a fragment is missing a subject or a verb. Other times a fragment has both a subject and a verb, but it is still not a complete thought. Look at these fragments:

- Broke down on Fifth Avenue.
- Two or three hundred flag-waving fans.
- A cat scratching at the back door.
- Although we arrived on time.

Since a sentence fragment is an incomplete thought, each of the fragments in the box must be missing something. Look again at the first fragment in the box. What broke down on Fifth Avenue? The sentence doesn't say. To correct this sentence, you need to add a subject.

My car broke down on Fifth Avenue.

What about the second fragment? It has a subject. But what did the two or three hundred flag-waving fans do? This sentence needs a verb.

Two or three hundred flag-waving fans **cheered for the home team.**

The third fragment is a little different. We know the subject is *a cat*. We also know what the cat is doing; it is *scratching at the back door*. But the verb is not complete. A verb that ends in *-ing* needs a helping (auxiliary) verb. Here's one way you could correct the third fragment:

A cat **is** scratching at the back door.

Helping verb Complete verb

The fourth fragment has a subject and a verb, but it is still not a complete thought. Here is one way to correct this fragment:

Although we arrived on time, **we couldn't find seats in the theater.**

A writer can make a fragment look like a complete sentence by beginning it with a capital letter and ending it with a period, a question mark, or an exclamation point. But if a group of words does not have a subject and a verb and does not express a complete thought, it is not a complete sentence.

Try It

Look at these fragments. They look like complete sentences, but they are not. Think about what each fragment is missing. Then think about what you could add to each fragment to make it a complete sentence. Write your complete sentences on the lines below.

Mailed a very heavy package to Austin.

The cars in the back of the parking lot.

And decided not to try out for the play.

Because I planned to surprise her with a party.

The last place I wanted to be.



Answer Key: page 336

Run-On Sentences

You have just learned that a sentence fragment does not state a complete thought because it is missing something. A **run-on sentence** is not missing anything. In fact, it has too much of something. A run-on sentence is actually two or more sentences that have been put together as if they are one.

Look at the sentence below.

Eduardo and his sister were playing a game she went into the kitchen to get something to drink.

This is a run-on sentence. It is two sentences put together. Both sentences have subjects and complete verbs and state complete thoughts, but there is no punctuation or capitalization between them.

Some people think they can correct a run-on by putting a comma between the two sentences like this:

Eduardo and his sister were playing a game, she went into the kitchen to get something to drink.

This is still a run-on. Putting a comma between the two sentences does not correct a run-on sentence. The run-on sentence can be corrected in many ways. Here are two examples:

- It can be rewritten as two sentences.

Eduardo and his sister were playing a game. She went into the kitchen to get something to drink.

- A connecting word can be used to combine the two sentences.

Eduardo and his sister were playing a game **when** she went into the kitchen to get something to drink.



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Take a look at another run-on sentence:

Eduardo's sister opened the cupboard, she wanted to find a clean glass.

This run-on can be corrected in either of the ways described above, or it can be corrected by leaving some words out. You could correct this run-on by removing the comma and the words *she wanted*:

Eduardo's sister opened the cupboard to find a clean glass.

Try It

Read the sentences below and put a check on the line next to each run-on sentence. Look for places where two complete sentences have been written as one.

- 1. My father works in a factory he makes televisions.
- 2. Lois won the kite-flying contest in the park on Saturday.
- 3. My friend Caleb has four brothers, they are all older than he is.
- 4. Ursula has a cold she cannot play basketball with us today.
- 5. Students should report to the cafeteria each morning before school.
- 6. You may see a cat licking its fur it does this to get clean.
- 7. Alex hopes to play quarterback on the seventh-grade football team in the fall.
- 8. Patricia called her father, she told him she would be home soon.
- 9. Because I love math, I hope to be an engineer someday.
- 10. I smiled at the new girl, I wanted her to know she had a friend.

Awkward Sentences

Sentence fragments and run-ons are hard to understand because they leave a reader asking questions. Sometimes sentences that state complete thoughts can cause problems, too. Words and phrases might be written in a way that makes the meaning of a sentence unclear. This kind of sentence is called an **awkward sentence**.

In the science fair everyone wants to participate in my class, and it's in the winter.

The sentence in the box is a complete sentence. It has a subject and a verb, and it expresses a complete thought. Even though it's complete, it is difficult to understand. You may have to read the words over and over to figure out what the writer is trying to communicate. You may have questions like these:

- Does everyone want to participate in the class or in the science fair?
- What is in the winter? Is it the class or the fair?

This sentence is hard to understand because it's awkward. The sentence can be rewritten like this:

Everyone in my class wants to participate in the winter science fair.

Try It

Look at the awkward sentences below. Think about what the writer is trying to say. Rewrite each sentence on the appropriate line so that its meaning is clear.

My brother Jacob for the school newspaper at his school writes stories.

For mowing yards Thomas earned last summer \$185, and it was in his neighborhood.

I prepared a speech that I should serve as class president, and it was to convince my classmates.



Answer Key: page 336

Misplaced Modifiers

A **modifier** is a word or group of words that tells more about a subject or a verb. Sometimes a sentence is confusing because a modifier is in the wrong place.

Look at this sentence:

Simone picked a flower in the backyard that was pretty.

This sentence is confusing because the modifier (*pretty*) is not close to the word it modifies (*flower*). The way this sentence is written, it is the backyard that is pretty, not the flower. If *pretty* were put closer to *flower*, the sentence's meaning would be clear.

Simone picked a pretty flower in the backyard.

Look at another example:

Rich and delicious, I baked a birthday cake for my mother.

Which word(s) should the phrase *rich and delicious* modify? How can you rewrite the sentence to put the modifier close to its object?

If you put *rich and delicious* before *birthday cake*, you made a good choice.

Try It

Now rewrite the sentences below by placing the modifiers where they should be.

The fox chased the rabbit across the empty field that had amazing speed.

The model airplane on the kitchen table that I was building fell to the floor and broke.



Answer Key: page 336

Repetition—Too Much of the Same Thing

Sometimes a sentence is confusing because it repeats information. Look at this sentence:

In the enormous jungles of Africa, wild animals roam freely in the jungles.

This sentence repeats unnecessary information. The reader needs to be told only once that the animals are in the jungles. The sentence can be corrected in two different ways:

- In the enormous jungles of Africa, wild animals roam freely.
- In Africa wild animals roam freely in the enormous jungles.

When a sentence repeats information unnecessarily, it is called **redundant**. Even a sentence that does not repeat a word exactly can be redundant, as in the examples below:

- “Come over here!” Tom **shouted**, **yelling** loudly.
- Sandra loves candy because it is **delicious** and **tastes good**.
- The superhero was **invisible** and **could not be seen**.

In each of these sentences, the writer says the same thing twice, just using different words. Aren't shouting and yelling the same thing? If something is delicious, doesn't that mean that it tastes good? When you say a superhero is invisible, doesn't that already tell a reader that the superhero can't be seen?

Important Note

When you write, try to avoid **redundancy**, or giving the same information more than once.

Try It

Read the sentences below and look for information that has been given twice. Draw a line through words that can be deleted from each sentence. Rewrite each sentence on the line below it.

Yesterday Sam and Tyler ate lunch at the Burger Barn yesterday.

My family went to the beach for a vacation on our vacation.

The horse with the white stripe on his head won the race and was the winner.

Ignacio was tired and exhausted after the district swim meet.



Answer Key: page 336

Important Note

When you write, you may say the same thing twice without even realizing it. That's why you should always review what you have written to make sure that you haven't repeated yourself unnecessarily.

Combining Sentences

Sometimes writers use complete sentences, but the sentences are short and choppy. They are hard to read because they are not connected. Read the sentences in the box below.

Octavio wrote a paper about dolphins. He drew a diagram of a dolphin's body. He built a model of a dolphin's habitat.

Who or what is each of these sentences about?

Because all the sentences are about Octavio, it would probably sound better to combine them to form one sentence. Look at the sentence in the box below.

Octavio wrote a paper about dolphins, drew a diagram of a dolphin's body, and built a model of a dolphin's habitat.

The new sentence contains a single subject and a compound (meaning “more than one”) verb. The subject is *Octavio*. The compound verb tells three things the subject did: *wrote*, *drew*, and *built*. Now let's look at some sentences that have different subjects but the same verb.

Jamal sings in the school choir. Hector sings in the school choir. Janice sings in the school choir.

What is the same in all three sentences?

Because all the subjects sing in the school choir, the three sentences should probably be combined to form one sentence. You can do this by creating a compound subject:

Jamal, Hector, and Janice sing in the school choir.

Sometimes several sentences can be combined even if they aren't exactly the same. Look at these sentences:

Ryan works at Baker's Doughnuts, which is the doughnut shop in the mall. Kaneisha just got a job at the same doughnut shop. Candace sells doughnuts at the shop in the mall, too.

Even though these sentences use different words, they all tell about the same thing, so they can be combined. Here's one way to put the sentences together:

Ryan, Kaneisha, and Candace work at Baker's Doughnuts, the doughnut shop in the mall.

Important Note

When you combine sentences in your writing, you need to make sure that the ideas in your new sentence are **parallel**. This means that ideas that are alike should be written in the same way. For instance, you might write, "I like to swim, but I don't like to bowl." The writer's thoughts on swimming and bowling are written in the same way. If the ideas in a sentence are not parallel, the meaning of the sentence is often unclear.

Read this sentence:

Tyrone bathed the dog, washed the car, and the lawn mowing.

The student who wrote the sentence about Tyrone tried to combine three ideas into one sentence. But the sentence sounds odd because the writer did not express the ideas in a parallel way. We know that Tyrone *bathed* the dog and *washed* the car, but we don't have an action verb that tells us what he did to the lawn. How could you rewrite the sentence so that the ideas are parallel?

Tyrone **bathed** the dog, **washed** the car, and **mowed** the lawn.

Now the sentence is parallel. The verbs (*bathed*, *washed*, *mowed*) are in the same form, and the objects of the verbs (*the dog*, *the car*, *the lawn*) are expressed similarly.

Sentences may be combined for many different reasons. Look at the examples below.

A Subject Is Repeated

Short and Choppy: Maya blew up balloons. Maya hung streamers. Maya played loud music.

Combined but a Run-On: Maya blew up balloons, she hung streamers, and played loud music.

Combined Effectively: Maya blew up balloons, hung streamers, and played loud music.

A Verb Is Repeated

Short and Redundant: Amy ran for class president. Jason and Joe ran for class president.

Combined but Redundant: Amy and Jason and Joe ran for class president.

Combined Effectively: Amy, Jason, and Joe ran for class president.

The Ideas Contrast

Short and Redundant: The sun rises in the east. The sun sets in the west.

Combined but Not Parallel: The sun rises in the east, but the west is where the sun sets.

Combined Effectively: The sun rises in the east but sets in the west.

Something Makes Another Thing Happen

Wordy: Chris fell off his bike. This happened because the wheel hit a rock.

Combined but Awkward: Chris fell off his bike that hit a rock because it happened.

Combined Effectively: Chris fell off his bike because the wheel hit a rock.

Something Happens Before Something Else

Short and Choppy: You must wash your hands. You must dry your hands. Then you can hold the baby.

Combined but Not Accurate: You must wash your hands and dry your hands and hold the baby.

Combined Effectively: You must wash and dry your hands before you can hold the baby.

Try It

Read each pair of sentences and combine them on the lines provided. Try to combine the sentences in different ways. Make sure your new sentences are parallel.

Martin loves to watch the stars at night. Martin loves to listen to the crickets at night.

After soccer practice I have to run laps. I also have to do push-ups after practice.

My mother enjoys reading. My father enjoys reading. I enjoy reading.

Angelina prefers carrots to mushrooms. Carrots are crunchier than mushrooms.

Dora will choose a puppy at the Humane Society. First she has to fill out the application.

I'm going to San Antonio next week. I will not have time to visit the Alamo.



Answer Key: page 336

Important Note

Sometimes a short sentence can be an effective sentence. However, you do not want your papers to be full of short sentences because they will make your writing sound choppy. To avoid choppy writing, reread your sentences aloud when you are finished writing a paper. If it sounds like you are stopping and starting too much, look for places where you can combine ideas.

Objective 5

The student will recognize standard usage and appropriate word choice in written text.



There are many rules to follow when you write in standard English. You follow some of the rules without even thinking about them. There are other rules, however, that you need to learn and practice.

Subject-Verb Agreement

Subject-verb agreement means using a singular verb with a singular subject and a plural verb with a plural subject.

Look at the sentences below.



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Singular subject and verb

This officer works at the police station.



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Plural subject and verb

These officers work at the police station, too.

In the chart below notice how the verbs change form when the subject changes from singular to plural. If you are writing about one airplane, you write *it flies*. But when you write about more than one airplane, you write *they fly*.

Singular Subject and Verb	Plural Subject and Verb
The <u>airplane</u> <u>flies</u> .	The <u>airplanes</u> <u>fly</u> .
One <u>tiger</u> <u>pounces</u> .	Two <u>tigers</u> <u>pounce</u> .
The <u>team</u> <u>plays</u> baseball.	The <u>teams</u> <u>play</u> baseball.
<u>Ted</u> <u>is</u> running to work.	<u>Ted and Jo</u> <u>are</u> running to work.
<u>Sandra</u> , who has three jobs, <u>is</u> always busy.	<u>Sandra and Lisa</u> , who met at work, <u>are</u> good friends.
<u>One</u> of the boys <u>is</u> on the track team.	<u>Some</u> of the boys <u>are</u> on the track team.

Try It

Which verb form goes with each subject in the sentences below? Fill in the blanks.

The mosquitoes in my yard _____ my feet when I walk in the grass.
(bite, bites)

Juan's brothers _____ to visit their grandparents.
(is going, are going)

Fred _____ decisions quickly.
(make, makes)



Answer Key: page 336

Verb Tense

Verbs can be written in different forms called tenses. A verb's **tense** tells when an action happens. There are three main tenses: present, past, and future.

- *Present tense* Angel **cleans** her room.
- *Past tense* Angel **cleaned** her room last night.
- *Future tense* Angel **will clean** her room tomorrow.

Past-tense verbs are usually formed by adding *-ed*.

talk + *-ed* = talked dance + *-ed* = danced hug + *-ed* = hugged

Some past tense verbs do not end in *-ed*. These verbs are called **irregular verbs**.

Present Tense	Incorrect Past Tense	Correct Past Tense
drive	drived	drove
write	writed	wrote
grow	growed	grew

Shifting Tenses

Some writers change from one tense to another when there's no reason to change. This is called **shifting tense**. Look at the paragraph in the box.

I'm walking down the street when a dog appears out of nowhere and starts barking at me. I turn and tell it to go home, but it did not listen to me. Instead it will follow me all the way to my house.

Did you notice that the paragraph starts off in the present: *I'm walking, a dog appears*?

Then it shifts to the past tense in the middle of a sentence: *it did not listen*.

At the end of the paragraph, the writer switches to future tense: *it will follow*.

These tense shifts confuse and distract the reader. When you are writing, it is important to stay in the same tense—unless there is a very good reason to shift.

In the sentence below, the tense changes from past to present for a good reason.

Last night I **danced** for hours, so I **am** very tired today.

Pronoun Reference

Important Note

A **pronoun** is a word that is used in place of a noun. Some examples of pronouns are *I*, *she*, *him*, *we*, *myself*, and *your*.

A pronoun must agree with its **antecedent**, or the noun it refers to. If the noun is singular, the pronoun must be singular. For example, the pronoun *it* can be used to replace the noun *box*. If the noun is feminine, then the pronoun must be feminine. For example, the pronoun *she* can be used to replace the noun phrases *my mom* or *your sister*.

Look at the sentence below.

I talked to the **police officer**, and **she** reminded me not to skateboard in the street.

The pronoun *she* replaces *the police officer* in the sentence.

Sometimes people use the wrong pronoun to refer to a noun or noun phrase. This can make a sentence confusing because readers can't tell what the pronoun refers to.

After we talked, the police **officers** said **she** needed to report back to the station.

What is confusing about this sentence? There are two police officers who need to go back to the station, so the pronoun should refer to both of the officers. The sentence should read as follows:

After we talked, the police **officers** said **they** needed to report back to the station.



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Clear Pronoun Reference

Sometimes a writer uses a pronoun, but the reader can't tell what the pronoun refers to. Look at these sentences.

My friend Jamal rode his bike to Redwood Middle School. It was new.

What was new? Was it the bike or Redwood Middle School? It's hard to tell because the pronoun *It* does not have a clear reference. There are different ways to correct the sentences. If you know it is the bike that is new, you can rewrite the sentences in either of the ways below.

- My friend Jamal rode his bike to Redwood Middle School. The bike was new.
- My friend Jamal rode his new bike to Redwood Middle School.

Pronoun Case

Pronouns have different forms called **cases**. For example, when you talk about your father or brother, you may use any one of these words: **he**, **him**, **his**, or **himself**. How do you know which case of pronoun to use when you write? The case you use depends on how the pronoun is used in the sentence. Look at the sentences below.



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Daniel finished **his** project early. **He** was really proud of **himself**, and Mrs. Bennet was proud of **him**, too.

In these sentences the pronouns are used in different ways. That's why different cases are used.

Look at the following sentences. What is wrong with each sentence?

- Melinda does her homework with myself.
- Us like to work on science and math.

Both sentences have a pronoun in the wrong case. The sentences should read as follows:

- Melinda does her homework with **me**.
- **We** like to work on science and math.

Try It

Read the following sentences and decide which pronoun should go in each blank.

Aunt Lil invited me to spend the summer with _____.
(she, her, hers, herself)

We are going to spend the summer having as much fun as
_____ can.
(we, us, our, ourselves)

Jo and Mia will share the computer their parents bought for
_____.
(theirs, them, they, themselves)



Answer Key: page 336

Important Note

When you have a name and a pronoun together in a sentence, it can be difficult to decide which pronoun case to use. Here's a hint that will help you: take the name and the conjunction out of the sentence and ask yourself which case of the pronoun you would use.

Look at the following sentence.

My mother packed lunches for Rico and I.

This sentence sounds very formal, and some people would say it is correct. However, look at the hint above and think about the sentence again. If you take out the words *Rico and*, what would the sentence say? *My mother packed lunches for I.* Now it is clear that the sentence is incorrect. That's because the pronoun is not in the correct case. The correct sentence reads as follows:

My mother packed lunches for Rico and **me**.

Try It

Use the hint to help you decide which case of the pronoun belongs in each blank below.

Derrick, Jake, and _____ need to work on our class project tonight. (I, me)

Don't forget to tell the librarian about my friend and _____.
(I, me)

_____ and our neighbors want to plant new trees in the park.
(We, Us)



Answer Key: page 336

Using Adjectives and Adverbs Correctly

Important Note

Adjectives and adverbs are descriptive words that make your writing more interesting. These words give more information about the ideas in your sentences.

An adjective can help a reader picture what you are writing about. Look at the underlined adjectives in the sentences below. Which noun or pronoun in the sentence is each adjective describing?

- The mover lifted the large, heavy boxes. (Who or what was large and heavy?)
- The freezing guests sat by the fire and drank coffee. (Who was freezing?)
- Before long the weather turned humid. (What turned humid?)

Imagine you are describing the perfect car. What words would you use to describe the car? The words you use are adjectives.

The adverb in each of the sentences below is underlined. In what way is each adverb describing the verb *ran*?

Joshua and Hakim ran <u>quickly</u> .	This adverb tells <i>how</i> the friends ran.
Joshua and Hakim ran <u>yesterday</u> .	This adverb tells <i>when</i> the friends ran.
Joshua and Hakim ran <u>upstairs</u> .	This adverb tells <i>where</i> the friends ran.

Try It

Find and circle the adverb in each sentence below.

You will be able to see the full moon tomorrow.

The big deer scrambled awkwardly up the steep hill.

Companies look everywhere for oil and natural gas.

The detectives searched the house thoroughly.



Answer Key: page 336





Knowing When to Use an Adjective and When to Use an Adverb

You need to recognize adjectives and adverbs so that you can use the right word at the right time. Look at the sentences below. Ask yourself what the word in parentheses modifies. Then underline the correct form of the word.

I walked (quiet/quietly) through the halls.

The word needs to tell how I walked. That means it needs to be an adverb, so the correct choice is *quietly*.

Marsha grinned (happy/happily) at her sister.

The word needs to tell how Marsha grinned. That means it needs to be an adverb, so the correct choice is *happily*.

Tyrone wanted the (large/largely) drink.

The word needs to tell the size of the drink. That means it needs to be an adjective, so the correct choice is *large*.

Here is a situation that can be tricky. When you use a verb based on one of your senses (such as *feel*, *look*, *appear*, *sound*, *smell*, or *taste*) or any form of the verb *to be* (such as *am*, *are*, *is*, *was*, or *were*), you will often use an adjective following the verb.

Look at these examples.

Sara felt **hungry** at lunchtime. (not **hungrily**)

The band sounds **good**. (not **well**)

Honey tastes **sweet**. (not **sweetly**)

I'm sorry that I was **angry**. (not **angrily**)

Here are some more challenging examples:

I feel **bad** about missing your baseball game. (not **badly**)

Callie's voice sounds **good** when she sings. (not **well**)

Comparing Using Adjectives and Adverbs

Adjectives

When you compare two nouns, you use either *-er* (*wider*) or *more* (*more destructive*). This is called the **comparative** form of the adjective.

When you compare more than two nouns, you use either *-est* (*widest*) or *most* (*most destructive*). This is called the **superlative** form of the adjective.



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The middle car is **faster** than the car on the right, but the car on the left is the **fastest** of all.

Adverbs

Adverbs can compare verbs and other adverbs in the same way that adjectives compare nouns, using the comparative and superlative forms. For example, if you compare two actions, you add *-er* to the adverb (*earlier*) or use the word *more* with the adverb (*more cheerfully*). If you compare more than two actions, you add *-est* to the adverb (*earliest*) or use the word *most* with the adverb (*most cheerfully*).

The driver in the middle car will race **more aggressively** than the driver in the car on the right. The driver in the car on the left will race the **most aggressively** of all three.

Try It

Look at the sentences below and decide which word belongs in each blank.

Summer days are _____ than winter days.
(hot, hotter, hottest)

Ramón practices the _____ of all the players on his team.
(hard, harder, hardest)



Answer Key: page 336





Using Homonyms

Using the wrong homonym when you write can confuse people. Look at the sentence under the picture. Can you tell what is wrong?



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Crystal and Akmar do not know when **their** going to see each other again.

Their shows ownership. *They're* means *they are*. In this sentence the writer means *they are*, so the word *their* should be *they're*.

Here are some other homonyms. Think about the meaning of each word.

you're, your	it's, its	to, too, two	stare, stair
right, write	break, brake	pair, pear	road, rode
know, no	read, red	passed, past	buy, by
patience, patients	peace, piece	meat, meet	whose, who's

Try It

Write a paragraph using some of the homonyms from the list or other homonyms you know. Use a dictionary to be sure you've used each homonym correctly.

Avoiding Double Negatives

Using double negatives will also confuse people who read your papers. Look at this sentence.

Spencer **didn't** know whether he **wouldn't** like to go to the game.

What does the writer mean? Does Spencer want to go to the game or not? This sentence is confusing because it has two negatives. The words *didn't* and *wouldn't* are both negative. You shouldn't use two negatives to express the same idea.

Here are some other negative words. Avoid using more than one of these words to express the same idea in the same sentence.

not	no	hardly
can't	don't	doesn't
barely	nobody	nothing

Saying It Twice

You learned a little about redundancy in the last section. One area where you have to watch for redundancy is in pronoun use. Look at the sentence below.



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The police officer he is teaching a class on self-defense.

In this sentence the noun phrase *The police officer* and the pronoun *he* refer to the same person. The writer doesn't need both. There are two different ways to rewrite this sentence:

The police officer is teaching a class on self-defense.

He is teaching a class on self-defense.

Try It

Look for a word or words that you can delete in each sentence below. Then cross out the unnecessary word or words.

My cousin and I we worked on the car all night.

It was hard to believe that a picture Rahib had taken it was in that magazine.

Two of my sisters, Melinda and Jackie, they took a picture of the statue.



Answer Key: page 337

Important Note

There are basic rules of standard English that you must remember when you are writing. As you check over your work, think about the rules you have learned regarding subject-verb agreement, verb tense, pronoun case, homonyms, and double negatives. Correct any mistakes you have made so that your writing will be easier for people to understand.

Objective 6

The student will proofread for correct punctuation, capitalization, and spelling in written text.

When you speak, the people you are speaking to are usually nearby. They can ask you to stop if you say something they don't understand. Then you can repeat yourself or reword your thoughts until the meaning you are trying to convey is clear. The people who read your writing are not always nearby. They may not be able to ask you to clarify your words. To help people understand your writing, you must use correct punctuation, capitalization, and spelling.

- **Punctuation** gives your reader information such as when a sentence ends, when there is a pause, when someone is talking, and when someone owns something.
- **Capitalization** tells your reader when a sentence starts. It also identifies the names of particular people, places, and things.
- **Spelling** helps your reader focus on the ideas you are trying to communicate. When you spell a word incorrectly, readers have to spend time figuring out the word instead of thinking about the meaning of the sentence.

Important Note

Standard English has many rules for punctuation, capitalization, and spelling. It would be impossible to list all of them in this guide. The next few pages describe some of the rules that seventh-grade students should know. Your parents and teachers may tell you about other rules.

Punctuation

Imagine reading a book with no periods, commas, question marks, or quotation marks. Words would run into words. You would not know where to stop reading and where to start again. It would probably take you a long time to figure out what the writer was trying to say.

Punctuation helps you understand what you are reading. It gives you directions for reading a group of sentences. Look at this short story.

Sheila thought she was hearing things. “What did you just say?” she asked her friend.

Eliza tried to calm down enough to talk. “Our band has been invited to play at the summer festival,” she repeated slowly.

Sheila couldn’t believe her ears. “That’s awesome news!” she replied. The band the girls had formed last year had finally received a break; the summer festival was a major event.

Sheila smiled as she remembered what her mother had always told her: believe in yourself and good things will happen. Sheila’s mother had been right. The band members had worked hard and believed in their abilities. Now they were going to be given a chance to perform at the biggest event of the summer!

Did you notice all the punctuation in the story? What are the names of each of the punctuation marks? Do you know what each mark tells you to do?

You can see that punctuation is very important. Let's review the way you use certain marks of punctuation.

End Punctuation

Every sentence must end with some form of punctuation. Different types of sentences end with different punctuation marks.

- Use a period at the end of a statement. (*I'm going to play soccer in September.*)
- Use a question mark at the end of a question. (*Would you like to play on my team?*)
- Use an exclamation point at the end of an exclamatory statement. (*What an exciting game!*)

Try It

For each sentence below insert the correct end punctuation on the line provided.

What do you like to do when you are outdoors___ Do you enjoy running or working in the garden___ Maybe you prefer sports, such as baseball, soccer, or football___ As for me, I love to go outside to read___ First I lay a soft blanket under a shade tree___ As soon as I'm comfortable, I bury myself in the pages of an exciting novel___ What a relaxing way to spend an afternoon___



Answer Key: page 337

Important Note

Sometimes it can be hard to decide whether a sentence needs a period or an exclamation point. If you are unsure, say the sentence to yourself. Is it a sentence you would say loudly or with great feeling? If so, it may need an exclamation point. However, it's important not to use too many exclamation points in a piece of writing. If you do, the exclamation points will lose their effectiveness.

Quotation Marks

When you write, you need to use quotation marks to show when someone is speaking. These marks should be placed around the exact words that a person says. Look at the sentences below. Pay careful attention to where the quotation marks have been placed.

The firefighter said, “What do you know about staying safe in a fire?”

“You should feel a door to see whether it’s hot before you open it,” Kylie replied.

“People have to stay low to the ground,” Candace added, “because there is more oxygen near the floor.”

“Call 911 as soon as you’re in a safe place!” someone shouted from the back of the room.

“That’s excellent,” the firefighter responded. “You seem to know a lot about fire safety.”

Did you notice that quotation marks were placed around the words that each speaker said? Did you notice the other punctuation that was used in these sentences? Do you know when to use commas, periods, exclamation points, and question marks with quotation marks?

Using Other Punctuation with Quotation Marks

When you name the speaker and then show the words that he or she said, use a comma before opening the quotation marks.

The firefighter said, “Fires can spread very quickly.”

When the quotation comes before the speaker has been named, use a comma before closing the quotation marks.

“That’s why you need to move fast,” the teacher noted.

If the speaker is asking a question or saying something in an excited way, do not use a comma before closing the quotation marks. Use a question mark or an exclamation point.

“Does anyone here hope to be a firefighter someday?” the firefighter asked.

“Absolutely!” James shouted excitedly.

Try It

Add the correct punctuation to the sentences below.

“How does a person become a firefighter__” Theresa asked.

The firefighter responded__ “You must apply and be accepted by the city__”

“After that, you have to attend an intensive training program__” the teacher added.

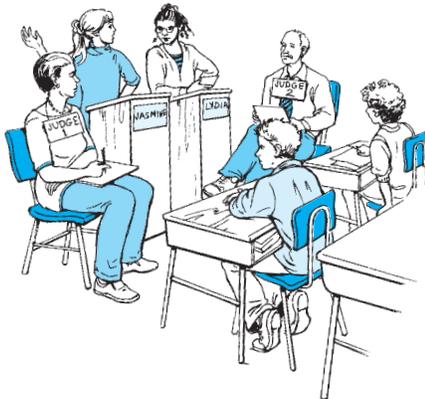
“Wow__” Alisha said excitedly. “Where can I learn more about this__”



Answer Key: page 337

Try It

Now study the picture below. Think about what the characters might be saying in this picture. Use quotation marks to write some dialogue that corresponds to this scene. Some of the dialogue has been started for you. Continue this dialogue or cross it out and write your own.



Lydia concluded, “That’s why we need to put a soda machine in our school.”

Jasmine responded, “_____”

Commas, Semicolons, and Colons

Commas, semicolons, and colons are used for different reasons, but each of these punctuation marks tells you to pause.

Commas can be used to

- separate words or phrases in a series (*tires, mufflers, and pipes*)
- separate a city from its state (*Dallas, Texas*)
- separate a city and state from the rest of the sentence (*I lived in Dallas, Texas, for two years.*)
- separate a date from its year (*June 6, 2001*)
- separate a date and its year from the rest of the sentence (*The dance held on June 6, 2001, was fun.*)
- separate parts of a compound sentence (*John opened his present carefully, but Brian tore his apart.*)
- separate some clauses and phrases from the rest of the sentence (*The can, which was rusted around its edges, was heavy.*)
- separate an introductory subordinate clause from the rest of the sentence (*Because it was Dad's birthday, I mowed the yard without being reminded.*)
- separate an introductory participial phrase from the rest of the sentence (*Sensing danger, the mouse retreated to his nest.*)
- set off a noun of direct address (*"Ollie, clean up your room."*)
- set off a direct quotation (*"Come inside when you're finished," my mother said.*)
- follow a salutation in a personal letter (*Dear Uncle Melvin,*)

Semicolons can be used to

- separate parts of a compound sentence when no conjunction is used (*I opened the door slowly; the house was dark.*)
- separate items in a series that already contains commas (*Dallas, Texas; Houston, Texas; and San Antonio, Texas*)

Colons tell the reader to pay close attention to something that follows. They can be used to

- set off an explanation or example that follows an independent clause (*There are three primary colors: red, blue, and yellow.*)
- separate numbers in descriptions of time (*3:45 P.M.*)
- follow a salutation in a business letter (*Dear President Hutchinson:*)

Try It

Pretend you are a copyeditor for a newsmagazine. The advertisement below has been submitted for publication in your magazine. You need to correct this advertisement before it can be used.

Study the advertisement carefully. How would commas, semicolons, and colons help make this ad easier for readers to understand? Insert these punctuation marks wherever you think they are needed.

**At 8 00 A.M.
on
September 17 2003
ART WORLD
will open its
newest location.**

In addition to stores in Paris France and London England **ART WORLD** will now offer a superstore in **Houston Texas**.

Artists will find the same **ART SUPPLIES** they have been ordering from Europe nothing will be different **EXCEPT** the prices. Since the supplies won't have to be shipped overseas you will **PAY LESS**.

Visit **ART WORLD** on Monday.
Here's the location **2312 Tower Drive**

**When European style comes to America
we hope you will be a part of it!**

**ART WORLD
SUPER STORE**

 Answer Key: page 337

Important Note

You know to use commas when you are listing items in a series (The cars were black, red, and yellow). Some people use a comma before the word *and*, but some people do not. Most grammar books say to use a comma before *and*. However, since this is a matter of style, it will not be tested on the TAKS test.

Using Apostrophes

Apostrophes are used

- to show possession (*Reva's plant, Sara's glasses, the girls' lockers*)
- to create contractions (*shouldn't, won't, they're*)

Showing Possession

You must use an apostrophe to show ownership. If the noun that owns something is singular, you add *-s* to the noun.

- The car that belongs to Lina is **Lina's** car.
- The garden that belongs to Paolo is **Paolo's** garden.
- The desk that belongs to the teacher is the **teacher's** desk.
- The sandwich that belongs to James is **James's** sandwich.

If the noun that owns something is plural, sometimes you add *-s*, and other times you add just an apostrophe. Look at these examples.

- The dog that belongs to the twins is the **twins'** dog.
- The football that belongs to the boys is the **boys'** football.
- The nest that belongs to the mice is the **mice's** nest.
- The club that belongs to the women is the **women's** club.

In the first two examples, the plurals were formed by adding *-s* (*twin + -s = twins, boy + -s = boys*). In plurals like these, you put an apostrophe after the *-s* to show ownership.

In the second two examples, the plurals were formed by creating a new word (*mouse* became *mice*; *woman* became *women*). In plurals like these, you add *-s* to show ownership.

Try It

Use a possessive form to rewrite each of the phrases below.

the trailer that belongs to the couple

the supplies that belong to Mr. Wentz

the books that belong to the students

the rattle that belongs to the snake

the telephone that belongs to the children



Answer Key: page 337

Contractions

Sometimes two words are combined, and some letters are left out. This is called a **contraction**. When you form a contraction, you must use an apostrophe. The apostrophe stands for the letters that are missing.

could + not = couldn't

he + is = he's

they + are = they're

we + are = we're

will + not = won't

can + not = can't

Try It

There are many other contractions in standard English. Look through some books and copy a few of the contractions you find. What two words make up each contraction? What letter or letters do the apostrophes represent?

Some contractions are frequently misused. The rules below will help you avoid the mistakes many people make.

- When you mean *who is*, use the contraction *who's*. (*Who's going to help with the carnival?*)
- When you mean *it is*, use the contraction *it's*. (*It's almost time for the bell to ring.*)
- When you mean *you are*, use the contraction *you're*. (*You're a very good artist.*)
- When you mean *there is*, use the contraction *there's*. (*There's a telephone on my desk.*)

Capitalization

In standard English the rules for capitalization are fairly simple.

- A sentence always starts with a capital letter. (*The boys missed the student council meeting because their bus was late.*)
- A proper noun must begin with a capital letter. (*The building stood on the corner of **Waterloo Street and Downing Avenue.***)
- A proper adjective must also begin with a capital letter. (*At the front of the building, there was a row of **Roman** columns.*)

Proper Nouns

Common nouns identify people, places, and things, while **proper nouns** name specific people, places, and things. Proper nouns must always be capitalized. For example, the word *bridge* is a common noun because it is the name of a thing, but the phrase *Golden Gate Bridge* is a proper noun because it names a specific bridge.

In the chart below notice the difference between common nouns and proper nouns.

Common Nouns	Proper Nouns
singer	Britney Spears
team	Texas Longhorns
principal	Walter Thompson
park	Harris Park
school	Hatfield High School
continent	Africa
galaxy	Milky Way
book	<i>The Adventures of Tom Sawyer</i>
movie	<i>Spider-Man</i>
street	Wylie Avenue

Look at the sentences in the box. Circle the proper nouns that need to be capitalized.

My friends, megan and david, went with their parents to dallas, texas. On the way the family stopped and had a picnic at lake waco. In dallas they went to a football game at texas stadium. The dallas cowboys played the new york giants.

Were you able to find the proper nouns in the sentences? Capitalization makes the nouns easier to identify. Here is how the sentences should have been written:

My friends, Megan and David, went with their parents to Dallas, Texas. On the way the family stopped and had a picnic at Lake Waco. In Dallas they went to a football game at Texas Stadium. The Dallas Cowboys played the New York Giants.

Proper Adjectives

Most students understand proper nouns, but proper adjectives may be a little less familiar. Look at this sentence.

The elephants at the zoo are from Africa.

The word *Africa* is a proper noun because it names a specific place. Look at the next sentence.

The elephants at the zoo are known as African elephants.

The word *African* is not a proper noun. It does not name a person, place, or thing. It is an adjective that has been formed from a proper noun. Adjectives like this are called **proper adjectives**. Proper adjectives are used in a different way than proper nouns are used, but they still need to be capitalized.

Try It

Find and underline the proper adjective in each sentence. Then cross out the proper adjectives and write them with correct capitalization.

Ryan asked for italian bread with his lasagna.

The spanish dancers were elegant and graceful.

Dee's favorite dish is new england clam chowder.

It was hard to learn the arabic letters, but I finally did it.



Answer Key: page 337

Spelling

There are many spelling rules that will help you spell words correctly. A few of the most common rules are listed below.

- When a word ends in a short vowel followed by one consonant, double the consonant before adding an ending that starts with a vowel.

compel + <i>-ing</i>	= compelling	spot + <i>-ed</i>	= spotted
flit + <i>-ed</i>	= flitted	fog + <i>-y</i>	= foggy
propel + <i>-er</i>	= propeller	big+ <i>-est</i>	= biggest
grip + <i>-ing</i>	= gripping	sad + <i>-est</i>	= saddest

- When a word ends in a silent *-e*, drop the *-e* before adding an ending that starts with a vowel.

inhale + <i>-ing</i>	= inhaling	assure + <i>-ance</i>	= assurance
spare + <i>-ed</i>	= spared	trudge + <i>-ed</i>	= trudged
cleanse + <i>-ing</i>	= cleansing	taste + <i>-ed</i>	= tasted
little + <i>-est</i>	= littlest	dare + <i>-ing</i>	= daring

- When a word ends in a *-y*, change the *-y* to *-i* before adding an ending that starts with a vowel.

crazy + <i>-est</i>	= craziest	imply + <i>-es</i>	= implies
multiply + <i>-ed</i>	= multiplied	happy + <i>-est</i>	= happiest
victory + <i>-ous</i>	= victorious	shaky + <i>-er</i>	= shakier
story + <i>-es</i>	= stories	drowsy + <i>-est</i>	= drowsiest

Objective 6

- When a word contains the letters *i* and *e*, remember this little rhyme:

I before *e*,
Except after *c*,
Or when sounding like “*a*,”
As in *neighbor* and *weigh*.

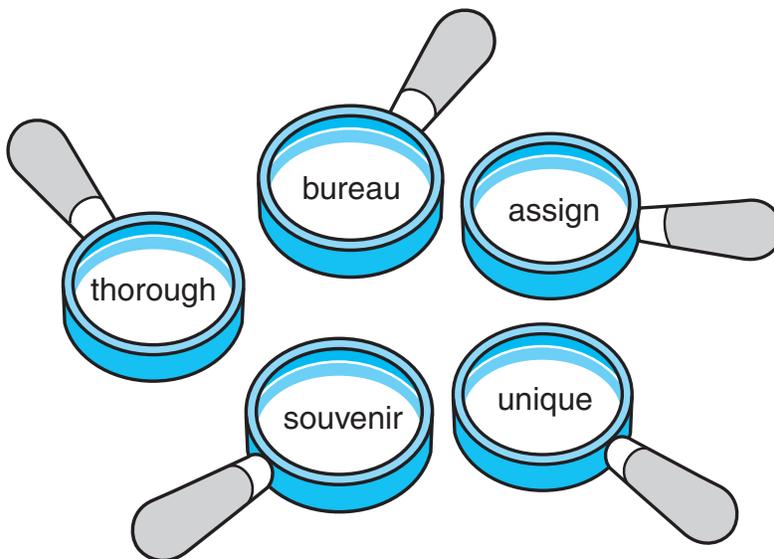
thief	<i>i</i> before <i>e</i>
deceive	<i>e</i> before <i>i</i> since the letter pair comes after <i>c</i>
weight	<i>e</i> before <i>i</i> since the letter pair sounds like “ <i>a</i> ”
ceiling	<i>e</i> before <i>i</i> since the letter pair comes after <i>c</i>
freight	<i>e</i> before <i>i</i> since the letter pair sounds like “ <i>a</i> ”
receipt	<i>e</i> before <i>i</i> since the letter pair comes after <i>c</i>
believe	<i>i</i> before <i>e</i>

Important Note

As with many spelling rules, there are some exceptions to the “*i* before *e*” rule. Here are a few examples: *species*, *society*, *efficient*, *their*, *weird*.

Sight Words

For many English words there are no spelling rules. You must simply learn to spell these words. These words are called **sight words**. Here are some examples:



Using the Skills

Revising and Editing a Paper

You have just reviewed some of the things you need to think about when you write. Now you are ready to help a fellow student revise and edit his paper.

The narrative on the next page was written by a seventh grader named Andrew. Read the paper carefully. As you read, ask yourself questions such as these:

- **How well has Andrew organized and supported his ideas?** Does he need to include additional details to give support to any of his main ideas? Does he need to add transition words or phrases to connect any of his details? Should he delete any extraneous sentences?
- **Has Andrew used clear and complete sentences?** Does the paper contain any fragments or run-ons that should be corrected? Has Andrew fixed any awkward or redundant sentences? Are there places where Andrew needs to combine ideas?
- **Has Andrew followed the rules of standard English?** Do his subjects and verbs agree? Are his verbs in the correct tense? Has he used homonyms and pronouns correctly? Has he avoided using double negatives?
- **Has Andrew made any punctuation, capitalization, or spelling mistakes?** Did he begin and end all sentences correctly? Did he remember to start each proper noun and proper adjective with a capital letter? Did he use commas, quotation marks, and apostrophes correctly? Did he follow common spelling rules?

As you read Andrew's paper, you may come to some words or sentences that you think he should change. When this happens, write notes in the margin. If you know what is wrong, mark how you would fix it. If you're unsure, just write a simple phrase such as "This sounds odd" or "I know this is wrong, but I'm not sure how to fix it." When you are finished, look at pages 325–328.

Andrew learned something important about his parents and decided to write a narrative about his experience. Read Andrew's narrative and think about the changes you would make to improve the story.

Green Hair

(1) I learned something important about my parents a few days ago. (2) There not as strict as I once thought. (3) Last Friday I spent the night at Tony's house. (4) My friends Terrence and Daiki also spent the night at Tony's house. (5) When we went into Tony's room, Daiki pulled some green hair dye out of his backpack. (6) He said he was going to put a streak in his hair, just like a guy in a movie we'd seen. (7) We see all the good movies together. (8) My friends and me followed Daiki into the bathroom to watch. (9) When he was finished, Daiki's hair looked so cool that Terrence decided to add a streak to his hair. (10) I didn't want to be left out, I put a streak in my hair, too.

(11) As I stared at myself in the mirror the next morning, I had two thoughts. (12) The first was that I didn't look half as cool as the guy in the movie. (13) The second thought was worse. (14) "My parents are going to ground me until I'm 55," I said to my reflection.

(15) Eventually I had to go home. (16) I tried to sneak in quietly, but Mom and Dad saw me before I could get to my room. (17) They were completely silent as they stared at me. (18) After a minute Mom hid her face and started shaking. (19) For a minute I thought she was crying. (20) Then I realized she was laughing. (21) "Am I in serious trouble," I asked.

(22) "Yes, Andrew," my father said sternly. (23) "Your punishment is that you have to wear a green streak in your hair for a while." (24) Both of my parents laughed this time. (25) On Monday I went to school with my green streak. (26) A few kids thought it was real cool, but everyone else just laughed. (27) I can't wait for my hair to grow out so I can cut it.

(28) Terrence and Daiki were both grounded for dyeing their hair, but my parents didn't ground me. (29) Not only are my parents less strict than I thought, they actually have a pretty good sense of humor.

How should Andrew revise his paper?

Sentence 2

Did you find something wrong with this sentence? Look at it carefully.

There not as strict as I once thought.

The first word in the sentence is a homonym. Has Andrew used the correct homonym? No, he has not. He is trying to say They are not as strict as I once thought. Which spelling shows the word Andrew is trying to use?

- *There*
- *Their*
- *They're*

Did you select the last spelling? That's correct. Andrew needs to change *There* to *They're*.

Sentences 3 and 4

Did you notice that Andrew repeated information in these two sentences? Look at the sentences again. Which words are repeated?

Last Friday I spent the night at Tony's house. My friends Terrence and Daiki also spent the night at Tony's house.

Since both sentences talk about spending the night at Tony's house, Andrew can combine these ideas into one sentence. What is the best way to combine sentences 3 and 4?

- *Last Friday I spent the night at Tony's house with Terrence and Daiki because they also spent the night at Tony's house.*
- *Last Friday I spent the night at Tony's house, my friends Terrence and Daiki did, too.*
- *Last Friday I spent the night at Tony's house with my friends Terrence and Daiki.*

The first answer choice is incorrect because it uses an inappropriate connecting word. There is no evidence that Andrew spent the night at Tony's house **because** Terrence and Daiki did. This answer choice also repeats information.

The second answer choice doesn't repeat information, but it contains a new problem. Did you identify this answer choice as a run-on sentence? When you combine sentences, the new sentence you create must be clear and complete.

Did you choose the third answer choice? This is the most effective way to combine sentences 3 and 4. This sentence is complete, its meaning is clear, and it does not repeat information unnecessarily.

Sentence 7

Did anything bother you about this sentence? Take a look at it again.

We see all the good movies together.

The sentence is complete, and its meaning is clear. No words or phrases are unnecessarily repeated. However, something still doesn't seem right.

This paper is about an experience a group of friends had one night. The details in the paper describe what the friends did and how their parents reacted. It may be true that the boys see many good movies together, but that doesn't really relate to the ideas in this paper. This is an extraneous sentence, and it should be deleted from Andrew's final draft.

Sentence 8

Did you find a mistake in sentence 8? If not, read the sentence again.

My friends and me followed Daiki into the bathroom to watch.

Does this sentence sound right? Did Andrew follow the rules of standard English? Look at the pronoun *me*. Is this the pronoun Andrew should have used?

Remember, there are four cases of this pronoun: *I*, *me*, *myself*, and *my/mine*. Andrew used the pronoun *me* in the subject of this sentence. Is that correct? No, it's not. The pronoun *I* should be used in the subject of a sentence. Just imagine that the words *My friends and* are not there. Which of the following sentences would be correct?

- *Me followed Daiki into the bathroom to watch.*
- *I followed Daiki into the bathroom to watch.*

Of course, you would use the pronoun *I*. That means that sentence 8 should read *My friends and I followed Daiki into the bathroom to watch.*

Sentence 10

Did you revise sentence 10 in some way? Here it is again:

I didn't want to be left out, I put a streak in my hair, too.

This sentence is a run-on sentence. It is two complete sentences connected with a comma. What is the best way to correct this run-on?

- *I didn't want to be left out. And put a streak in my hair, too.*
- *I didn't want to be left out. I put a streak in my hair, too.*
- *I didn't want to be left out, so I put a streak in my hair, too.*

The first choice isn't correct. The phrase *And put a streak in my hair, too* is a fragment. It has no subject.

The second choice is two complete sentences, but they sound choppy. Because the sentences are short and closely related, the ideas should probably be combined.

The third choice shows the best way to correct the run-on sentence. A connecting word is used to combine the two sentences. The word *so* shows the relationship between the ideas: one idea caused the other.

Sentence 17

Did anything in sentence 17 look odd to you? There is a misspelled word in this sentence. Look at the sentence again.

They were completly silent as they stared at me.

Do all the words in this sentence look right to you? What about the underlined word? Is it spelled correctly?

Think about the root word of the underlined word. What is it? The word *complete* is the root word. What rule have you learned about adding suffixes to words that end in a silent *-e*?

When a word ends in a silent *-e*, drop the *-e* before adding an ending that starts with a vowel.

Does the suffix *-ly* start with a vowel? No, it starts with an *l*. The letter *l* is a consonant. Therefore, there is no reason to drop the *-e* when adding this suffix. The word Andrew is trying to spell is *completely*.

Sentence 21

What error did Andrew make in this sentence?

“Am I in serious trouble,” I asked.

In this sentence Andrew is asking a question, but he hasn't used a question mark anywhere. Where should the question mark be inserted?

When you write a question in a direct quotation, a question mark is used before the closing quotation marks. Andrew should replace the comma with a question mark. The sentence should look like this:

“Am I in serious trouble?” I asked.

Sentence 26

Did you notice anything wrong with sentence 26? This is a common mistake, so look at the sentence again.

A few kids thought it was real cool, but everyone else just laughed.

The word *real* is modifying the adjective *cool*. When you modify an adjective, you need to use an adverb. *Real* is an adjective, not an adverb. To express this idea correctly, Andrew would need to write the sentence like this:

A few kids thought it was really cool, but everyone else just laughed.

How does TAKS test the skills you have been reviewing?

On the TAKS writing test, you will be asked to review some papers written by seventh-grade students. The papers will contain mistakes. You will need to study each paper and decide how it should be changed.

The papers on the following pages are like the ones you will see on a real TAKS test. As you read each paper, think about how you would change it.

Important Note

- Read the first paper and think about what you would change.
- When you finish reading, look at the first question and all the answer choices. Decide which answer choice is correct and mark it. Read the rest of the questions and mark an answer for each one.
- Look at pages 338–339 of the Answer Key. Each answer choice is explained. Read all the explanations so that you will understand why one choice is correct and the others are not.
- Read the second passage and answer the corresponding questions.
- Return to the Answer Key and look at pages 339–340. Compare your answers to the ones given there.

That sentence sounds awkward.
How should I rewrite it?



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Taneisha is in the seventh grade. She read about the seven wonders of the ancient world and wrote a report about one of them. As part of a peer-editing assignment, she has asked you to read her report and think about the suggestions you would make to help her correct and improve it. When you have finished reading, answer the questions that follow.

The Brightest Wonder

(1) When medieval scholars decided to try to identify the seven wonders of the ancient world, they looked at written records from ancient Greece. (2) The scholars came up with a list that included two stachues, two tombs, a temple, a garden, and a lighthouse.

(3) All were amazing works of art or architecture. (4) The Lighthouse of Pharos, the seventh wonder of the world, was different from the others. (5) It had a job to do.

(6) In 330 B.C. Alexander the Great founded the city of Alexandria Egypt, to serve as a seaport. (7) The seaports location made it a perfect center for trade, but there was one problem.

(8) Ships kept crashing into the sandbars at the edge of the harbor.

(9) Ptolemy Soter, one of Alexander's generals and the ruler of Egypt, ordered that a huge lighthouse be constructed to guide ships safely into port. (10) He chose Pharos Island as the location for the lighthouse. (11) The island sat at the edge of the harbor.

(12) The lighthouse amazed everyone who saw it. (13) It was a huge structure that looked more like a skyscraper than a lighthouse.

(14) According to historical records it was constructed in three sections: a square base nearly 200 feet tall, an octagonal section nearly 100 feet tall, and a round tower about 25 feet tall. (15) With its foundation the lighthouse stood as high as a 40-story building.

(16) At the top of the tower, workers builded a large fire in front of several mirrors. (17) The mirrors reflected the light from the fire.

(18) This reflected light was so bright that they could be seen from 40 miles away.

(19) It stood for 15 centuries before earthquakes finally brought it to the ground. (20) Even today its memory inspiring architects and dreamers around the world.

Question 1

What change, if any, should be made in sentence 2?

- A Change *came* to **come**
- B Change *that* to **it**
- C Change *stachues* to **statues**
- D Make no change



Answer Key: page 338

Question 2

What transition word or phrase should be added to the beginning of sentence 4?

- A As a result,
- B Then
- C For example,
- D However,



Answer Key: page 338

Question 3

What change, if any, should be made in sentence 6?

- A Change *Great* to **great**
- B Change *founded* to **founding**
- C Insert a comma after *Alexandria*
- D Make no change



Answer Key: page 338

Question 4

What change, if any, should be made in sentence 7?

- A Change *seaports* to **seaport's**
- B Change *it* to **them**
- C Change *perfect* to **perfict**
- D Make no change



Answer Key: page 338

Question 5

What is the BEST way to combine sentences 10 and 11?

- A He chose Pharos Island as the location for the lighthouse, it sat at the edge of the harbor.
- B He chose Pharos Island, which sat at the edge of the harbor, as the location for the lighthouse.
- C He chose Pharos Island as the location for the lighthouse and sat at the edge of the harbor.
- D He chose Pharos Island as the location for the lighthouse, and the lighthouse sat at the edge of the harbor.



Answer Key: page 338

Question 6

What change, if any, should be made in sentence 13?

- A Change *that* to **it**
- B Change *looked* to **looks**
- C Change *then* to **than**
- D Make no change



Answer Key: page 338

Question 7

What change, if any, should be made in sentence 16?

- A Change *builded* to **built**
- B Change *large* to **larger**
- C Change *several* to **several**
- D Make no change



Answer Key: page 339

Question 8

What change, if any, should be made in sentence 18?

- A Delete *was*
- B Change *bright* to **brighter**
- C Change *they* to **it**
- D Make no change



Answer Key: page 339

Question 9

The meaning of sentence 19 can be improved by changing *It* to —

- A They
- B The Lighthouse of Pharos
- C Its memory
- D Alexandria



Answer Key: page 339

Question 10

What is the BEST way to revise sentence 20?

- A Even today its memory inspires architects. And dreamers around the world.
- B Even today its memory inspires them. Architects and dreamers around the world.
- C Even today its memory inspires architects and dreamers around the world.
- D No revision is needed.



Answer Key: page 339

Brandon is in the seventh grade. His language arts teacher asked him to write a story about an unusual pet. Brandon wants you to help him revise and edit the story he wrote. Read Brandon's story and think about the corrections and improvements he should make. When you are finished reading, answer the questions that follow.

Raising a Dragon

(1) A dragon moved in with us this weekend. (2) Yes, it's true. (3) I have a pet dragon. (4) Dad and I went to a reptile show on Saturday at the Morristown civic center. (5) I noticed several bearded dragons resting together on a rock under a heat lamp. (6) As I watched these unusual lizards interact I became very interested in them. (7) The dominant male in the group let the others know to move out of the highest resting spot by bobbing his head up and down. (8) He looked so hilarious with his spiny body doing disjointed push-ups. (9) I asked Dad if I could buy one of the baby lizards and take it home as a pet. (10) I was thrilled when he said yes.

(11) Everyone in my family have enjoyed watching our new pet dragon scurry around in its tank chasing crickets. (12) We all laugh when the dragon raises a front leg in a slow circular wave that looks like a greeting. (13) The breeder said that when a baby motions like this, it could mean one of two things. (14) She added that males usually outgrow this behavior; females, however, display it throughout their lives.

(15) Right now my pet dragon is about six inches long, but I've read that if it is properly cared for, it will grow quickly. (16) Within a year my lizard could measure almost two feet in length. (17) I'm making sure that it gets a nutritious diet of crickets, fruits, and vegetables as well as the vitamin and mineral supplements it needs. (18) My pet has been a little picky about eating vegetables, and my pet prefers to be hand-fed. (19) Mom says I'm spoiling my dragon, but I'm really enjoying myself.

(20) I'm convinced that I have it, the most unusual pet in the neighborhood. (21) I can't wait to take my bearded dragon to science class and showing it to all my friends. (22) After all, how many students at my school can say they have their own pet dragon?

Question 11

What change, if any, should be made in sentence 4?

- A Change *I* to **me**
- B Insert a comma after *show*
- C Change *civic center* to **Civic Center**
- D Make no change



Answer Key: page 339

Question 12

What change, if any, should be made in sentence 6?

- A Insert a comma after *interact*
- B Change *became* to **become**
- C Change *interested* to **intrested**
- D Make no change



Answer Key: page 339

Question 13

How should sentence 8 be revised?

- A He looked so hilarious. With his spiny body doing disjointed push-ups.
- B He looked so hilarious, his spiny body was doing disjointed push-ups.
- C He looked so hilarious, and his spiny body was hilarious doing disjointed push-ups.
- D No revision is needed.



Answer Key: page 339

Question 14

What transition word or phrase could BEST be added to the beginning of sentence 9?

- A Furthermore,
- B However,
- C In comparison,
- D At the end of the day,



Answer Key: page 340

Question 15

What change, if any, should be made in sentence 11?

- A Change *have enjoyed* to **has enjoyed**
- B Change *its* to **it's**
- C Change *chasing* to **chaseing**
- D Make no change



Answer Key: page 340

Question 16

Which sentence could BEST be added after sentence 13 to support the ideas in this sentence?

- A The breeder, Mr. Johnson, raises and sells many unusual animals, including sugar gliders and sea monkeys.
- B It could be either a display of recognition or an act meant to calm a larger bearded dragon.
- C We buy the crickets at Brennan's Pet Store, which is down the street from our house.
- D Bearded dragons are the best pets to have because they are quiet but very interesting.



Answer Key: page 340

Question 17

What is the BEST way to rewrite the ideas in sentence 18?

- A My pet has been a little picky about eating vegetables. Preferring to be hand-fed.
- B My pet has been a little picky about eating vegetables, it prefers to be hand-fed.
- C My pet has been a little picky about eating vegetables that prefer to be hand-fed.
- D My pet has been a little picky about eating vegetables and prefers to be hand-fed.



Answer Key: page 340

Question 18

What change, if any, should be made in sentence 20?

- A Change *convinced* to *convinsed*
- B Delete *it* and the comma
- C Change *most unusual* to *unusualest*
- D Make no change



Answer Key: page 340

Question 19

What change should be made in sentence 21?

- A Insert a comma after *class*
- B Change *showing* to *show*
- C Change *it* to *them*
- D Change *friends* to *freinds*



Answer Key: page 340

Try It

Page 276

The sentences would need to describe some of the pros and cons of snack machines in school cafeterias.

Page 284

Possible Answers:

My grandmother mailed a very heavy package to Austin.

The cars in the back of the parking lot will be moved first.

Tai was busy and decided not to try out for the play.

I didn't get Kat a present because I planned to surprise her with a party.

The principal's office was the last place I wanted to be.

Page 286

Possible Answers:

My father works in a factory. He makes televisions.

My friend Caleb has four older brothers.

Ursula has a cold, so she cannot play basketball with us today.

You may see a cat licking its fur to get clean.

Patricia called her father and told him she would be home soon.

I smiled at the new girl because I wanted her to know she had a friend.

Page 288

Possible Answers:

My brother Jacob writes stories for his school newspaper.

Last summer Thomas earned \$185 for mowing yards in his neighborhood.

I prepared a speech to convince my classmates that I should serve as class president.

Page 289

Possible Answers:

With amazing speed, the fox chased the rabbit across the empty field.

The model airplane that I was building on the kitchen table fell to the floor and broke.

Page 291

Possible Answers:

Delete the second *yesterday*.

Delete the phrase *on our vacation*.

Delete the phrase *and was the winner*.

Delete the words *tired and*.

Page 295

Possible Answers:

Martin loves to watch the stars and listen to the crickets at night.

After soccer practice I have to run laps and do push-ups.

My mother, my father, and I enjoy reading.

Angelina prefers carrots to mushrooms because carrots are crunchier.

Dora will choose a puppy at the Humane Society after she fills out the application.

I'm going to San Antonio next week, but I will not have time to visit the Alamo.

Page 297

bite, are going, makes

Page 301

her, we, them

Page 302

I, me, We

Page 303

tomorrow, awkwardly, everywhere, thoroughly

Page 305

hotter, hardest

Page 308

Possible Answers:

Delete the word we.
Delete the second it.
Delete the word they.

Page 311

What do you like to do when you are outdoors? Do you enjoy running or working in the garden? Maybe you prefer sports, such as baseball, soccer, or football. As for me, I love to go outside to read. First I lay a soft blanket under a shade tree. As soon as I'm comfortable, I bury myself in the pages of an exciting novel. What a relaxing way to spend an afternoon!

Page 313

"How does a person become a firefighter?" Theresa asked.

The firefighter responded, "You must apply and be accepted by the city."

"After that, you have to attend an intensive training program," the teacher added.

"Wow!" Alicia said excitedly.
"Where can I learn more about this?"

Page 315

At 8:00 A.M. on September 17, 2003, ART WORLD will open its newest location.

In addition to stores in Paris, France, and London, England, ART WORLD will now offer a superstore in Houston, Texas.

Artists will find the same ART SUPPLIES they have been ordering from Europe; nothing will be different EXCEPT the prices. Since the supplies won't have to be shipped overseas, you will PAY LESS.

Visit ART WORLD on Monday. Here's the location: 2312 Tower Drive.

When European style comes to America, we hope you will be a part of it!

Page 317

the couple's trailer, Mr. Wentz's supplies, the students' books, the snake's rattle, the children's telephone

Page 320

Italian, Spanish, New England, Arabic

The Brightest Wonder

Question 1 (page 331)

Spelling

- A Incorrect. This sentence should be in the past tense, so *came* is the correct verb.
- B Incorrect. Changing *that* to *it* would create a run-on sentence.
- C **Correct.** The word *stachues* is spelled incorrectly. In this word the /ch/ sound is spelled with a *t*, so *statues* is the correct spelling.
- D Incorrect. There is a spelling mistake in this sentence.

Question 2 (page 331)

Transition

- A Incorrect. *As a result* shows a cause-and-effect relationship. The Lighthouse of Pharos wasn't different **because** it was amazing. All the wonders were amazing.
- B Incorrect. *Then* suggests a sequence of events. This paragraph is not about a sequence of events.
- C Incorrect. *For example* would mean that the information in sentence 4 gives an example of a statement made in sentence 3.
- D **Correct.** *However* suggests a contrast in the paragraph. This is the best transition because that is the point the author is trying to make. All the wonders were amazing works of art or architecture, but this one was different because it was the only one with a job to do.

Question 3 (page 331)

Comma

- A Incorrect. Alexander the Great was a specific person. His full name must be capitalized.
- B Incorrect. Changing *founded* to *founding* would create a sentence fragment.
- C **Correct.** A comma must be used to separate a city and state or a city and country.
- D Incorrect. There is a punctuation mistake in this sentence.

Question 4 (page 331)

Apostrophe

- A **Correct.** This word shows possession. The location belongs to the seaport, so *seaport* needs an -'s.
- B Incorrect. The pronoun *it* refers to the noun *seaport*. This noun is singular, so the pronoun needs to be singular. *Them* is a plural pronoun.
- C Incorrect. The word *perfect* is spelled correctly in the report.
- D Incorrect. There is a punctuation mistake in this sentence.

Question 5 (page 331)

Sentence Combining

- A Incorrect. This answer choice is a run-on because it is two complete sentences put together with only a comma.
- B **Correct.** This answer choice uses an adjective clause to combine the two sentences in a clear and effective way.
- C Incorrect. This answer choice says that Alexander the Great sat at the edge of the harbor, but it was actually the island that sat at the edge of the harbor.
- D Incorrect. This answer choice is redundant because it says *the lighthouse* twice. It is also inaccurate because it says that the lighthouse sat at the edge of the harbor, but it was actually the island that sat at the edge of the harbor.

Question 6 (page 331)

Word Usage

- A Incorrect. Changing *that* to *it* would create a run-on sentence.
- B Incorrect. This sentence needs the past tense verb *looked*.
- C **Correct.** The word *then* is a time-order word. The word *than* is used in comparisons. The writer is using the word as part of a comparison, so *than* is the word that should be used.
- D Incorrect. A word is used incorrectly in this sentence.

Question 7 (page 332)**Verb Form**

- A **Correct.** The past tense of *build* is *built*, not *builded*.
- B **Incorrect.** The word *larger* is incorrect because two things are not being compared.
- C **Incorrect.** The word *several* is spelled correctly in the report.
- D **Incorrect.** A verb in the sentence is formed incorrectly.

Question 8 (page 332)**Pronoun-Antecedent Agreement**

- A **Incorrect.** Deleting *was* would create a sentence fragment.
- B **Incorrect.** The word *brighter* is incorrect because two things are not being compared.
- C **Correct.** The pronoun *they* is used to refer to plural nouns. In this sentence the pronoun is supposed to be replacing the phrase *this reflected light*. This phrase is singular, so the correct pronoun to use is *it*.
- D **Incorrect.** This sentence contains a mistake in pronoun-antecedent agreement.

Question 9 (page 332)**Indefinite Reference/Clarity**

- A **Incorrect.** To switch one pronoun for another wouldn't clarify the meaning of the sentence.
- B **Correct.** The Lighthouse of Pharos is what stood for 15 centuries.
- C **Incorrect.** A memory cannot stand for 15 centuries.
- D **Incorrect.** The city of Alexandria is not what the passage is about. It wouldn't make sense to end the passage with a paragraph about how long Alexandria stood.

Question 10 (page 332)**Sentence Fragment**

- A **Incorrect.** This answer choice contains a fragment. (*And dreamers around the world.*)
- B **Incorrect.** This answer choice contains a fragment. (*Architects and dreamers around the world.*)
- C **Correct.** This answer choice is a clear and complete sentence.
- D **Incorrect.** The sentence in the passage is a fragment because *inspiring* needs a helping verb.

Raising a Dragon**Question 11 (page 334)****Capitalization**

- A **Incorrect.** The pronoun is part of a compound subject, so *I* is the correct case to use.
- B **Incorrect.** There is no reason to put a comma before the prepositional phrase *on Saturday*.
- C **Correct.** *Morristown Civic Center* is the name of a specific place, so it needs to be capitalized.
- D **Incorrect.** This sentence contains a capitalization mistake.

Question 12 (page 334)**Comma with a Subordinate Clause**

- A **Correct.** The clause *As I watched these unusual lizards interact* is a subordinate clause. An introductory subordinate clause must be followed by a comma.
- B **Incorrect.** This sentence is in the past tense, so *became* is the correct form of the verb.
- C **Incorrect.** The word *interested* is spelled correctly in the story.
- D **Incorrect.** This sentence contains a punctuation mistake.

Question 13 (page 334)**No Revision Is Needed**

- A **Incorrect.** This answer choice contains a fragment. (*With his spiny body doing disjointed push-ups.*)
- B **Incorrect.** This answer choice is a run-on because it is two complete sentences with only a comma between them.
- C **Incorrect.** This answer choice is awkward and repeats words unnecessarily.
- D **Correct.** The sentence in the passage does not need to be revised.

Question 14 (page 334)

Transition

- A Incorrect. The word *furthermore* suggests that this is one in a series of things the writer did.
- B Incorrect. The word *however* suggests that this sentence is in contrast to the one before it.
- C Incorrect. There is nothing being compared in this sentence.
- D **Correct.** The phrase *at the end of the day* suggests a time that the events in the sentence happened. This transition makes the most sense.

Question 15 (page 334)

Subject-Verb Agreement

- A **Correct.** The subject in this sentence is *everyone*, and this pronoun is always singular because it refers to every person individually. This singular noun agrees with the singular verb *has enjoyed* rather than *have enjoyed*, which is plural.
- B Incorrect. *It's* stands for *it is*. The homonym in this sentence does not stand for *it is*. In this sentence the word should be *its* because it is being used to show ownership of the tank.
- C Incorrect. The root word of *chasing* is *chase*. When a word ends in a silent *-e*, you must drop the *-e* before adding *-ing*.
- D Incorrect. There is a subject-verb agreement mistake in this sentence.

Question 16 (page 334)

Supporting Detail

- A Incorrect. The passage is about bearded dragons. It doesn't matter what else Mr. Johnson sells in his store.
- B **Correct.** This sentence tells more about the detail in sentence 13. It explains the two things that the motion could mean.
- C Incorrect. This detail is completely unrelated to the information in sentence 13.
- D Incorrect. This is an interesting opinion, but it does not support sentence 13.

Question 17 (page 335)

Redundancy

- A Incorrect. This answer choice contains a fragment. (*Preferring to be hand-fed.*)
- B Incorrect. This answer choice is a run-on sentence. It is two complete sentences connected by only a comma.
- C Incorrect. This answer choice says that the vegetables prefer to be hand-fed.
- D **Correct.** This answer choice eliminates the redundancy and is a clear and complete sentence.

Question 18 (page 335)

Double Indicator

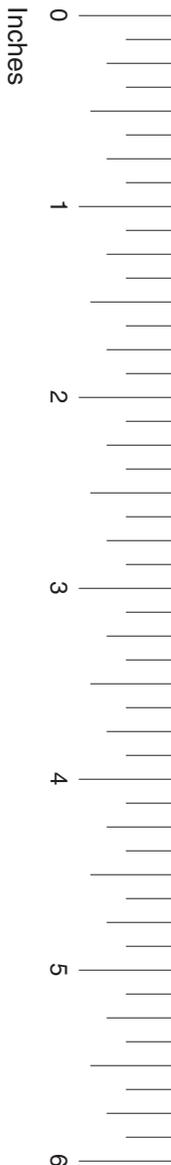
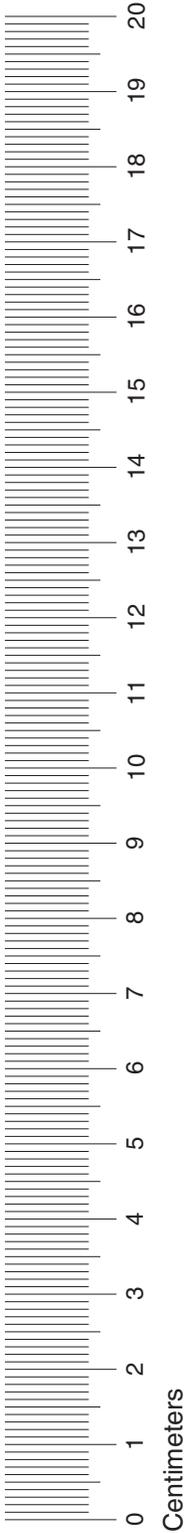
- A Incorrect. The word *convinced* is spelled correctly in the story.
- B **Correct.** The pronoun *it* and the noun phrase *the most unusual pet in the neighborhood* refer to the same thing. There is no need to use both.
- C Incorrect. The superlative form of *unusual* is *most unusual*, not *unusualest*.
- D Incorrect. There is an unnecessary pronoun in this sentence.

Question 19 (page 335)

Parallelism

- A Incorrect. There is no need to insert a comma after *class*. The writer is not listing items in a series, and this is not a compound sentence.
- B **Correct.** The verbs in this sentence are not parallel. The writer will *take* and *show* the dragon, not *take* and *showing* it.
- C Incorrect. The pronoun *it* refers to the dragon. Since there is only one dragon, it would not be correct to say *them*.
- D Incorrect. The word *friends* is spelled correctly in the story. This word follows the "i before e" spelling rule.

Grade 7 Mathematics Chart



LENGTH

Metric

1 kilometer = 1000 meters
1 meter = 100 centimeters
1 centimeter = 10 millimeters

Customary

1 mile = 1760 yards
1 mile = 5280 feet
1 yard = 3 feet
1 foot = 12 inches

CAPACITY AND VOLUME

Metric

1 liter = 1000 milliliters

Customary

1 gallon = 4 quarts
1 gallon = 128 ounces
1 quart = 2 pints
1 pint = 2 cups
1 cup = 8 ounces

MASS AND WEIGHT

Metric

1 kilogram = 1000 grams
1 gram = 1000 milligrams

Customary

1 ton = 2000 pounds
1 pound = 16 ounces

TIME

1 year = 365 days
1 year = 12 months
1 year = 52 weeks
1 week = 7 days
1 day = 24 hours
1 hour = 60 minutes
1 minute = 60 seconds

Continued on the next side

Grade 7 Mathematics Chart

Perimeter	square	$P = 4s$
	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
Circumference	circle	$C = 2\pi r$ or $C = \pi d$
Area	square	$A = s^2$
	rectangle	$A = lw$ or $A = bh$
	triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
Volume	cube	$V = s^3$
	rectangular prism	$V = lwh$ or $V = Bh^*$
	cylinder	$V = \pi r^2h$ or $V = Bh^*$
<i>*B represents the area of the Base of a solid figure.</i>		
Pi	π	$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$

