

GRADE

4



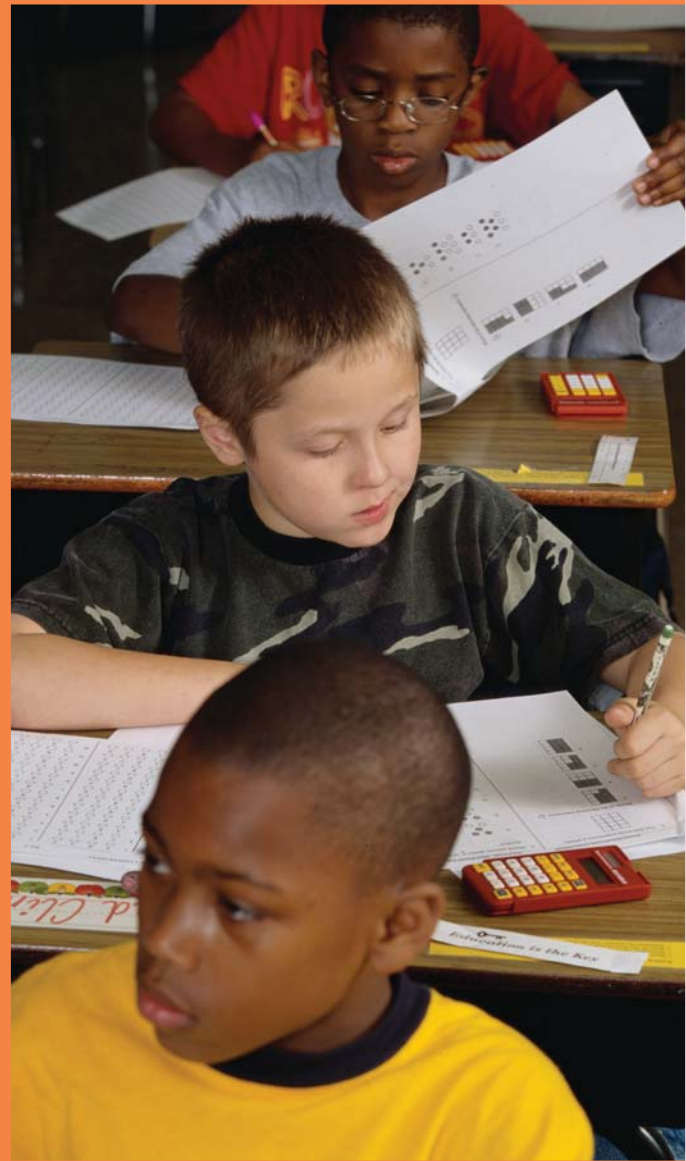
Revised 2008

STUDY GUIDE


Texas Assessment of Knowledge and Skills

Mathematics

A Student and Family Guide



Revised Based on TEKS Refinements



TAKS STUDY GUIDE

Texas Assessment of Knowledge and Skills

Grade 4

Mathematics

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, including TAKS (Accommodated) and Linguistically Accommodated Testing (LAT), 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, 8, 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 TAKS. Every guide includes explanations, practice questions, detailed answer keys, and student activities. At the end of this study guide 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 graduation requirements for high school 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/student.assessment.

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,



Gloria Zyskowski
Deputy Associate Commissioner for Student Assessment
Texas Education Agency

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Mathematics

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MATHEMATICS

INTRODUCTION

What Is This Book?

This is a study guide to help your child strengthen the skills tested on the Grade 4 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 fourth grade, your child will be better prepared to succeed on the Grade 4 TAKS and during the next school year.

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 This Book Organized?

This study guide is divided into the six objectives tested on TAKS. A statement at the beginning of each objective lists the mathematics skills your child needs to acquire. The study guide covers a large amount of material, which your child should not complete all at once. It may be best to help your child 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.

On page 8 you will find a Progress Chart. Use this chart and the stickers provided at the back of this guide to keep a record of the objectives your child has successfully completed.

How Can I Use This Book with My Child?

First look at your child's Confidential Student Report. This is the report the school gave you that shows your child's TAKS scores. This report will tell you which TAKS subject-area test(s) your child passed and which one(s) he or she did not pass. Use your child's report to determine which skills need improvement. Once you know which skills need to be improved, you can guide your child through the instructions and examples that support those skills. You may also choose to have your child work through all the sections.

How Can I Help My Child Work on the Study Guide?

- When possible, review each section of the guide before working with your child. This will give you a chance to plan how long the study session should be.
- Sit with your child and work through the study guide with him or her.
- Pace your child through the questions in the study guide. Work in short sessions. If your child becomes frustrated, stop and start again later.
- There are several words in this study guide that are important for your child to understand. These words are boldfaced in the text and are defined when they are introduced. Help your child locate the boldfaced words and discuss the definitions.

What Are the Helpful Features of This Study Guide?

- Examples are contained inside shaded boxes.
- Each objective has “Try It” problems based on the examples in the review sections.
- A Grade 4 Mathematics Chart is included on page 9 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 the student 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 a student to practice skills that have just been covered in the instruction. Each “Try It” problem features lines for student responses. The answers to the “Try It” problems are found immediately following each problem.

While your child is completing a “Try It” problem, have him or her cover up the answer portion with a sheet of paper. Then have your child 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 4 TAKS test. There are two types of questions in the mathematics study guide.

- **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. Your child should read each answer choice carefully before choosing the best answer.
- **Griddable Questions:** Some practice questions use a four-column answer grid like those used on the Grade 4 TAKS test.

How Do You Use an Answer Grid?

The answer grid contains four columns, the last of which is a fixed decimal point. The answers to all the griddable questions will be whole numbers.

Suppose the answer to a problem is 108. First write the number in the blank spaces. Be sure to use the correct place value. For example, 1 is in the hundreds place, 0 is in the tens place, and 8 is in the ones 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 108 correctly entered.

1	0	8	.
<input type="radio"/> 0	<input checked="" type="radio"/>	<input type="radio"/> 0	
<input checked="" type="radio"/>	<input type="radio"/> 1	<input type="radio"/> 1	
<input type="radio"/> 2	<input type="radio"/> 2	<input type="radio"/> 2	
<input type="radio"/> 3	<input type="radio"/> 3	<input type="radio"/> 3	
<input type="radio"/> 4	<input type="radio"/> 4	<input type="radio"/> 4	
<input type="radio"/> 5	<input type="radio"/> 5	<input type="radio"/> 5	
<input type="radio"/> 6	<input type="radio"/> 6	<input type="radio"/> 6	
<input type="radio"/> 7	<input type="radio"/> 7	<input type="radio"/> 7	
<input type="radio"/> 8	<input type="radio"/> 8	<input checked="" type="radio"/>	
<input type="radio"/> 9	<input type="radio"/> 9	<input type="radio"/> 9	

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 this book (pages 134–142). The answer key explains the correct answer, and it also includes some explanations for incorrect answers. After your child answers the practice questions, check the answers. Each question includes a reference to the page number in the answer key.

Even if your child chose the correct answer, it is a good idea to read the answer explanation because it may help your child better understand why the answer is correct.

Your TAKS Progress Chart

Student's Name

When you finish working through each objective, put a sticker next to that objective on the chart. You will find the stickers at the back of this study guide.

MATHEMATICS		
1	<p>Objective 1: For this objective you should be able to</p> <ul style="list-style-type: none">● use place value to read, write, compare, and order whole numbers and decimals;● describe and compare fractions and decimals;● add and subtract to solve problems involving whole numbers and decimals;● multiply and divide to solve problems involving whole numbers; and● estimate to find reasonable answers.	
2	<p>Objective 2: For this objective you should be able to</p> <ul style="list-style-type: none">● use patterns in multiplication and division; and● describe patterns and relationships in data.	
3	<p>Objective 3: For this objective you should be able to</p> <ul style="list-style-type: none">● identify and describe angles, lines, and two-dimensional and three-dimensional figures using formal geometric language;● connect transformations to congruence and symmetry; and● recognize the connection between numbers and points on a number line.	
4	<p>Objective 4: For this objective you should be able to</p> <ul style="list-style-type: none">● measure length, perimeter, area, weight (or mass), and capacity (or volume); and● use measurement concepts to solve problems.	
5	<p>Objective 5: For this objective you should be able to</p> <ul style="list-style-type: none">● determine all possible combinations; and● solve problems by organizing, displaying, and interpreting sets of data.	
6	<p>Objective 6: For this objective you should be able to</p> <ul style="list-style-type: none">● apply mathematics to everyday problem situations;● communicate about mathematics using everyday language; and● use logical reasoning.	

Grade 4 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 fluid ounces
1 quart = 2 pints
1 pint = 2 cups
1 cup = 8 fluid 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.

This side intentionally left blank.

TX-03300132

Objective 1

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

For this objective you should be able to

- use place value to read, write, compare, and order whole numbers and decimals;
- describe and compare fractions and decimals;
- add and subtract to solve problems involving whole numbers and decimals;
- multiply and divide to solve problems involving whole numbers; and
- estimate to find reasonable answers.

How Do You Read Whole Numbers?

When you read numbers, start with the digits on the left. Use the commas to help you read the number.

The number 102,353,928 is a nine-digit number. Look at this number in the place-value chart.

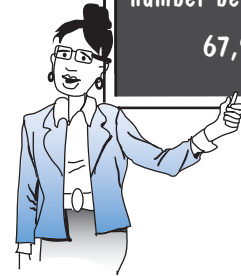
Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
1	0	2	3	5	3	9	2	8

- Read the three-digit number to the left of the first comma, *one hundred two*. Then say the word *million*.
- Next say the three-digit number to the right of the first comma, *three hundred fifty-three*. Then say the word *thousand*.
- Next say the three-digit number to the right of the second comma, *nine hundred twenty-eight*.

Read the complete nine-digit number as *one hundred two million, three hundred fifty-three thousand, nine hundred twenty-eight*.

A comma is used to separate each group of three digits. Look at the number below:

67,986,450



How Do You Compare and Order Whole Numbers?

Look at the place values of the digits to help you compare and order numbers.

Look at these two numbers.

6,814,922 6,820,901

To determine which of these two numbers is greater, look at them in a place-value chart. Then compare the place values.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
6	8	1	4	9	2	2
6	8	2	0	9	0	1

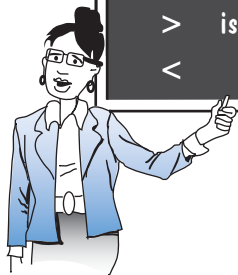
- Look at the digits in the millions place. Both numbers have the digit 6 in the millions place, so look at the next place value.
- Look at the digits in the hundred thousands place. Both numbers have the digit 8 in the hundred thousands place, so look at the next place value.
- Look at the digits in the ten thousands place. Since $2 > 1$, then

$$6,820,901 > 6,814,922.$$

The number 6,820,901 is greater than 6,814,922.

Here are some math symbols you need to know.

Symbol	Meaning
=	is equal to
>	is greater than
<	is less than



You can also use place value to order numbers.

List these numbers in order from greatest to least.

3,742,816 62,875 84,815 914,811

The numbers can be written in a place-value chart.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
3	7	4	2	8	1	6
		6	2	8	7	5
		8	4	8	1	5
	9	1	4	8	1	1

- Look at the digits in the millions place. Only one number has a digit in the millions place, so it is the greatest: 3,742,816.
- Look at the digits in the hundred thousands place. Of the three remaining numbers, only one number has a digit in the hundred thousands place, so it is the second greatest: 914,811.
- Look at the digits in the ten thousands place. Since $8 > 6$, the third greatest number is 84,815.

The numbers in order from greatest to least are

3,742,816 914,811 84,815 62,875

Try It

Use the place-value chart to order these numbers from least to greatest.

965,014 816,982 965,099 816,629

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
9	6	5	0	1	4

- Write the numbers in the place-value chart. The first one has been done for you.
- Look at the digits in the hundred thousands place.

The smallest digit is _____. This means that 816,982 and _____ are less than the other two numbers.

In both 816,982 and 816,629, the digits in the _____ place, the _____ place, and the _____ place are the same.

Compare the digits in the _____ place.

Since _____ is less than 9, the number 816,629 is less than 816,982.

Then look at the two remaining numbers. The digits in the _____ place, the _____ place, the _____ place, and the _____ place are the same. Compare the digits in the tens place.

Since 1 is less than _____, the number 965,014 is less than _____.

The numbers in order from least to greatest are

The smallest digit is 8. This means that 816,982 and 816,629 are less than the other two numbers. In both 816,982 and 816,629, the digits in the **hundred thousands** place, the **ten thousands** place, and the **thousands** place are the same. Compare the digits in the **hundreds** place. Since 6 is less than 9, the number 816,629 is less than 816,982. Then look at the two remaining numbers. The digits in the **hundred thousands** place, the **ten thousands** place, the **thousands** place, and the **hundreds** place are the same. Compare the digits in the tens place. Since 1 is less than 9, the number 965,014 is less than 965,099. The numbers in order from least to greatest are **816,629 816,982 965,014 965,099**

What Are Decimals?

Decimals are a way to write fractions with denominators such as 10, 100, and 1,000. Decimals and fractions both name part of a whole. A decimal names part of a whole that has been divided into 10, 100, 1,000, or more parts.

The fraction $\frac{3}{10}$ is written as the decimal 0.3.

The fraction $\frac{7}{100}$ is written as the decimal 0.07.

The fraction $\frac{9}{1,000}$ is written as the decimal 0.009.

Look at the decimal below:

1.47

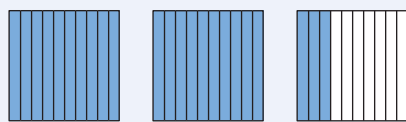
↖ Decimal point

The decimal point separates the whole part of the number from the fractional part of the number. There is a 1 to the left of the decimal point, so there is one whole. There is a 47 to the right of the decimal point. This means 47 out of 100 parts. The decimal point means *and*. The number 1.47 is read: *one and forty-seven hundredths*.

Looking at decimals in a place-value chart can help you read and understand them.

How Do You Read and Write Decimals?

A decimal is represented by the shaded model below. Each completely shaded block represents one whole. The third block is not completely shaded. There are 3 out of 10 parts shaded.



This decimal is written in the place-value chart. Use the chart to help you read the decimal.

Tens	Ones	.	Tenths	Hundredths
	2	.	3	

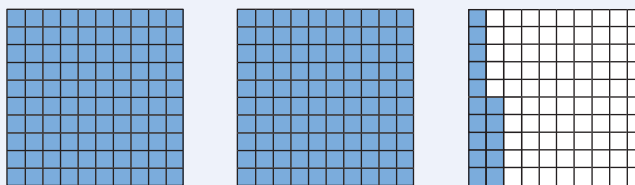
- Read the number to the left of the decimal point, *two*.
- Say the word *and* to represent the decimal point.
- Read the number to the right of the decimal point, *three*.
- Then say the place-value name of the last digit on the right, *tenths*.

Read the number 2.3 as *two and three-tenths*.

When a number with a decimal is written in words, the *-ths* ending tells you that those digits belong on the right side of the decimal point.



A decimal is represented by the shaded model below.



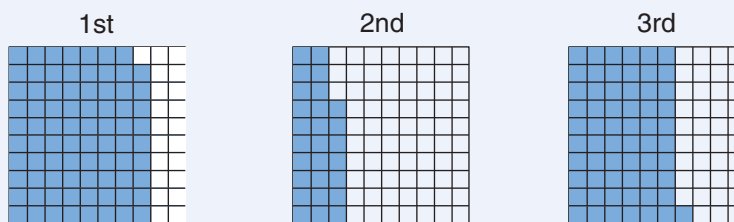
What decimal does this model represent?

- Each block is divided into 100 equal squares. The model shows two blocks completely shaded.
- The two completely shaded blocks represent the whole number 2.
- The third block is not completely shaded. Count the number of shaded squares in the third block. There are 15 shaded squares. The third block shows fifteen-hundredths shaded.

The model represents the number 2.15, which can be read as *two and fifteen-hundredths*.

How Do You Compare and Order Decimals?

You can use models to compare decimals. The blocks below model three different decimals. Each block is divided into 100 small squares.



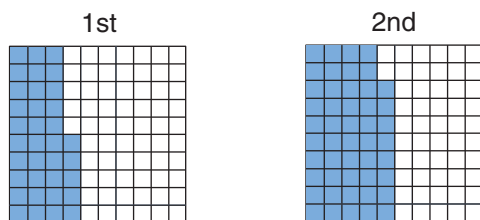
Count the number of shaded squares in each block.

- The first block shows 79 shaded squares out of 100 squares. This model represents 79 hundredths, or 0.79.
- The second block shows 27 shaded squares out of 100 squares. This model represents 27 hundredths, or 0.27.
- The third block shows 61 shaded squares out of 100 squares. This model represents 61 hundredths, or 0.61.

By looking at the models, you can compare the three decimals. The largest decimal is 0.79, 0.61 comes next, and 0.27 is the smallest decimal.

Try It

The models below are shaded to show two different decimals.



What number sentence correctly compares these two decimals?

Count the number of shaded squares in the first block.

The first block has _____ squares shaded out of 100.

It represents the decimal _____.

Count the number of shaded squares in the second block.

The second block has _____ squares shaded out of 100.

It represents the decimal _____.

The number of shaded squares in the first block is _____ than the number of shaded squares in the second block.

The number sentence _____ $<$ _____ correctly compares these two decimals.

The first block has 35 squares shaded out of 100. It represents the decimal 0.35. The second block has 48 squares shaded out of 100. It represents the decimal 0.48. The number of shaded squares in the first block is less than the number of shaded squares in the second block. The number sentence $0.35 < 0.48$ correctly compares these two decimals.

Objective 1

The denominator of a fraction names the total number of equal parts.

The numerator of a fraction tells how many of the equal parts have been selected.

The circle is divided into 3 equal parts, and 2 parts are shaded. The fraction that names the shaded part is $\frac{2}{3}$.



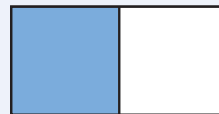
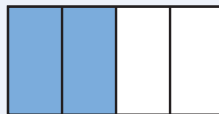
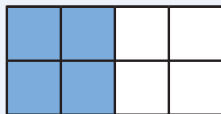
$\frac{2}{3}$ Numerator
Denominator



What Are Equivalent Fractions?

A fraction names part of a whole or part of a group. Sometimes two fractions are written differently but actually name equal parts. These are called **equivalent fractions**.

Is the fraction $\frac{4}{8}$ equivalent to the fractions $\frac{2}{4}$ and $\frac{1}{2}$?



- The first rectangle is divided into 8 equal parts, and 4 of the parts are shaded. Use the fraction $\frac{4}{8}$ to name the shaded part of the whole.
- The second rectangle is the same size as the first rectangle, but it is divided into 4 equal parts. Of the 4 parts, 2 are shaded. Use the fraction $\frac{2}{4}$ to name the part of the whole that is shaded. Notice that the same amount is shaded in both the first and the second rectangles.
- The third rectangle is the same size as the other two rectangles, but it is divided into 2 equal parts. Of the 2 parts, 1 is shaded. Use the fraction $\frac{1}{2}$ to name the part of the whole that is shaded. An equal amount is shaded in all three rectangles.

Because $\frac{4}{8}$, $\frac{2}{4}$, and $\frac{1}{2}$ describe equal parts of a whole, they are equivalent fractions.

$$\frac{4}{8} = \frac{2}{4} = \frac{1}{2}$$

Do you see that . . .



Look at this group of circles. Use a fraction to name the part of the group that is shaded.



There are two ways to look at what part of the group is shaded.



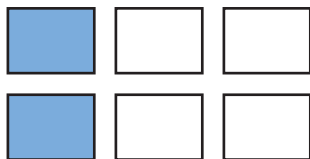
- You can say that 6 of the 8 circles are shaded. In this case, use the fraction $\frac{6}{8}$ to name the part of the group that is shaded.
- You can also say that 3 of the 4 columns of circles are shaded. Use the fraction $\frac{3}{4}$ to name the shaded part of the group.

Because $\frac{6}{8}$ and $\frac{3}{4}$ describe the same part of the group, they are equivalent fractions.

$$\frac{6}{8} = \frac{3}{4}$$

Try It

Use the figure below to write two equivalent fractions.

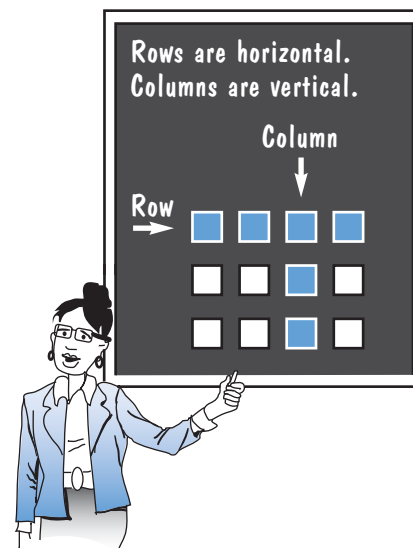


In the figure, _____ of the _____ rectangles are shaded.

In the figure, _____ of the _____ columns is shaded.

The fractions $\frac{\square}{\square}$ and $\frac{\square}{\square}$ are equivalent.

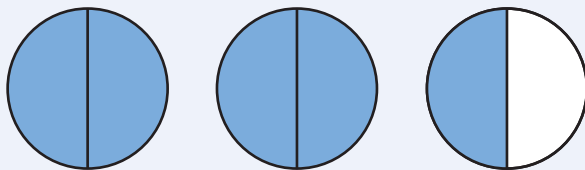
In the figure, 2 of the 6 rectangles are shaded. In the figure, 1 of the 3 columns is shaded. The fractions $\frac{2}{6}$ and $\frac{1}{3}$ are equivalent.



How Do You Name a Fraction Greater Than 1?

There are two ways to name a fraction greater than 1. A **mixed number** includes a whole number and a fraction. For example, $4\frac{2}{3}$ is a mixed number. An **improper fraction** has a numerator that is greater than or equal to the denominator. For example, $\frac{14}{3}$ and $\frac{3}{3}$ are improper fractions.

Look at this group of three circles.



What mixed number names the part of the group that is shaded? In this group, 2 whole circles and $\frac{1}{2}$ of the third circle are shaded. Combine the whole number with the fraction to make a mixed number. The mixed number $2\frac{1}{2}$ is one way to name the shaded part of this model.

What improper fraction names the part of the group that is shaded? Each circle is divided into 2 equal parts. So the denominator equals 2. There are 5 halves shaded because $2 + 2 + 1 = 5$. The numerator is 5. The improper fraction $\frac{5}{2}$ also names the shaded part of this model.

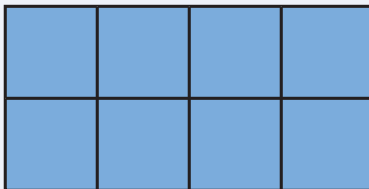


Which number is the denominator? Which number is the numerator?

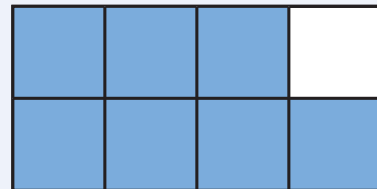
Do you see
that . . .



Look at this model.



$$\frac{8}{8} = 1$$



$$\frac{7}{8}$$

What part of the model is shaded?

The model shows two rectangles that are the same size. Both rectangles are divided into 8 parts, so the denominator is 8. The first rectangle has all 8 parts shaded, and the second rectangle has 7 parts shaded. The numerator is 15 because $8 + 7 = 15$.

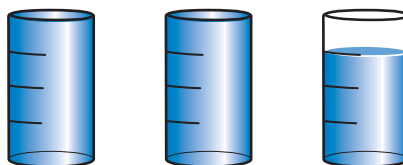
The improper fraction $\frac{15}{8}$ can be used to describe the shaded parts.

This fraction is greater than one. Another way to write $\frac{15}{8}$ is $1\frac{7}{8}$.

Use $\frac{15}{8}$ or $1\frac{7}{8}$ to describe the shaded part of the model.

Try It

What part of the glasses are filled?



Of these glasses, _____ are completely filled, and $\frac{\square}{\square}$ of the last glass is filled.

The mixed number _____ describes the filled part of the glasses.

The improper fraction _____ also describes the filled part of the glasses.

Of these glasses, 2 are completely filled, and $\frac{3}{4}$ of the last glass is filled. The mixed number $2\frac{3}{4}$ describes the filled part of the glasses. The improper fraction $\frac{11}{4}$ also describes the filled part of the glasses.

How Can Models Help You Compare and Order Fractions?

When two fractions are not equivalent, models of these fractions can help you see which fraction is greater. Once you know which fraction is greater, it is easy to order the fractions.

Look at the models below.

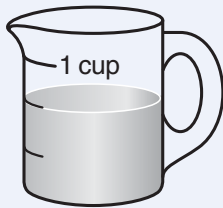


Which fraction is greater? If you look at the shaded areas, you see that the shaded area of the bottom model is larger. The fraction $\frac{2}{3}$ is greater than the fraction $\frac{2}{4}$, or $\frac{2}{3} > \frac{2}{4}$.

James needs these amounts of cooking oil for three different recipes.



$$\frac{1}{2}$$



$$\frac{2}{3}$$



$$\frac{1}{4}$$

How would you order the fractions from greatest to least? Use the pictures to order the fractions.

- The amount shaded for $\frac{2}{3}$ is greater than for the other fractions, so $\frac{2}{3}$ is the first fraction on the list.
- The amount shaded for $\frac{1}{4}$ is the least amount, so $\frac{1}{4}$ is the last fraction on the list.

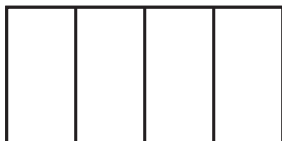
The fractions in order from greatest to least are $\frac{2}{3}$, $\frac{1}{2}$, and $\frac{1}{4}$.

Try It

Paulo, Kyle, and Frita are selling newspapers to raise money for the math club. They each started with the same number of newspapers. They have sold the following fractions of their newspapers:

$$\text{Paulo } \frac{3}{4} \quad \text{Kyle } \frac{3}{6} \quad \text{Frita } \frac{3}{8}$$

Order these fractions from least to greatest. Shade the models to help.



$$\frac{3}{4}$$



$$\frac{3}{6}$$



$$\frac{3}{8}$$

Shade _____ of the 4 parts of the first rectangle.

Shade _____ of the 6 parts of the second rectangle.

Shade _____ of the 8 parts of the third rectangle.

Compare the shaded areas. The fractions in order from least to greatest are as follows:

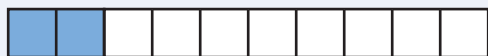
$$\frac{\square}{\square}, \quad \frac{\square}{\square}, \quad \frac{\square}{\square}.$$

Shade 3 of the 4 parts of the first rectangle. Shade 3 of the 6 parts of the second rectangle. Shade 3 of the 8 parts of the third rectangle. The fractions in order from least to greatest are $\frac{3}{8}$, $\frac{3}{6}$, and $\frac{3}{4}$.

How Are Fractions Related to Decimals?

Decimals are a way to write fractions with denominators of tens and hundreds.

The fraction $\frac{2}{10}$ is shown in the model below.



A fraction with a denominator of 10 or 100 can be written as a decimal. Use a place-value chart to help you write $\frac{2}{10}$ as a decimal.

Hundreds	Tens	Ones	.	Tenths	Hundredths
		0	.	2	

- The places to the right of the decimal point represent parts of a whole number.
- On the place-value chart the fraction $\frac{2}{10}$ is written as 0.2.

Read the decimal 0.2 as *two tenths*, which means 2 out of 10 equal parts.

Try It

Some of the pages in Ursula's book report are printed on shaded paper.



What part of Ursula's book report is on shaded paper?

In the book report, _____ of the _____ pages are shaded. The

fraction $\frac{\square}{\square}$ names the part of the book report that is shaded.

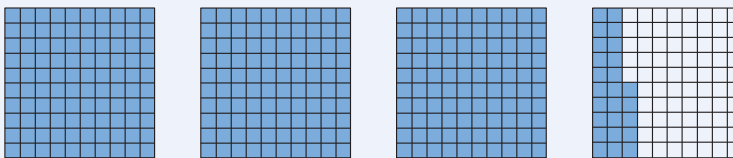
The fraction $\frac{\square}{\square}$ written as a decimal is _____.

In the book report, 4 of the 10 pages are shaded. The fraction $\frac{4}{10}$ names the part of the report that is shaded. The fraction $\frac{4}{10}$ written as a decimal is 0.4.

Objective 1

You can also express a number greater than one as a decimal. Look at the model below.

Each block is divided into 100 squares. Each completely shaded block equals one whole.



What decimal is modeled? In the model, 3 whole blocks are shaded. The last block shows 25 of the 100 squares shaded. The mixed number $3\frac{25}{100}$ names the fraction of the model that is shaded.

Hundreds	Tens	Ones	.	Tenths	Hundredths
		3	.	2	5

Do you see that . . .



When you read this mixed number, say *and* for the decimal point.

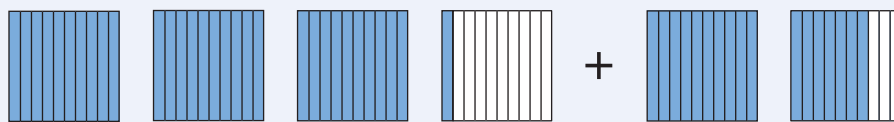
Read the number 3.25 as *three and twenty-five hundredths*.

$$3\frac{25}{100} = 3.25$$

How Can Models Help You Add and Subtract Decimals?

You can use models to help you add and subtract decimals, just as you used models to compare fractions.

This model shows $3.1 + 1.7$.



Each block is divided into 10 equal parts. They are called tenths. A block that is completely shaded represents one whole. There are 4 blocks that are completely shaded.

There are 2 blocks that are not completely shaded. One block shows 1 tenth shaded. The other block shows 7 tenths shaded.

When you combine 1 tenth and 7 tenths, you get 8 tenths:

$$0.1 + 0.7 = 0.8$$

Then add the whole numbers: $3 + 1 = 4$.

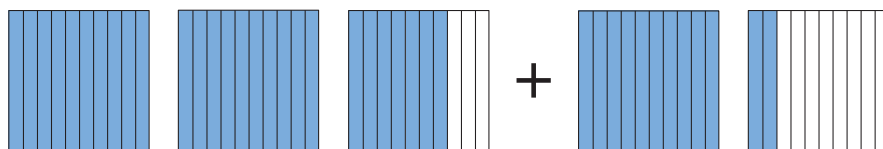
Now combine the whole-number part with the decimal part:

$$4 + 0.8 = 4.8$$

The model shows that $3.1 + 1.7 = 4.8$.

Try It

What is $2.7 + 1.2$, as modeled below?



A block that is completely shaded represents _____ whole.

The completely shaded blocks represent the whole numbers _____ and 1. There are _____ blocks that are not completely shaded. The first block that isn't completely shaded shows _____ tenths shaded, and the other one shows 2 tenths shaded.

Combine 7 tenths and 2 tenths to get _____ tenths.

$$\underline{\quad\quad} + \underline{\quad\quad} = \underline{\quad\quad}$$

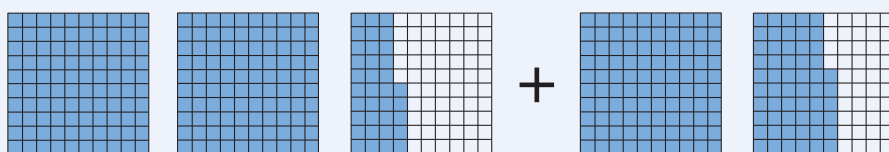
Add the whole numbers: _____ + _____ = _____.

Combine the whole-number part with the decimal part to get _____.

The model shows that $2.7 + 1.2 = \underline{\quad\quad}$.

A block that is completely shaded represents 1 whole. The completely shaded blocks represent the whole numbers 2 and 1. There are 2 blocks that are not completely shaded. The first block that isn't completely shaded shows 7 tenths shaded, and the other one shows 2 tenths shaded. Combine 7 tenths and 2 tenths to get 9 tenths. $0.7 + 0.2 = 0.9$. Add the whole numbers: $2 + 1 = 3$. Combine the whole-number part with the decimal part to get 3.9. The model shows that $2.7 + 1.2 = 3.9$.

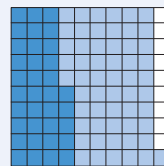
This model shows $2.35 + 1.56$.



Each block is divided into 100 equal squares. They are called hundredths. A block that is completely shaded represents one whole. There are 3 blocks that are completely shaded.

There are 2 blocks that are not completely shaded. One block shows 35 hundredths shaded. The other block shows 56 hundredths shaded. Combine 35 hundredths and 56 hundredths.

Objective 1



When you combine 35 hundredths and 56 hundredths, you get 91 hundredths:

$$0.35 + 0.56 = 0.91$$

Add the blocks that represent whole numbers: $2 + 1 = 3$.

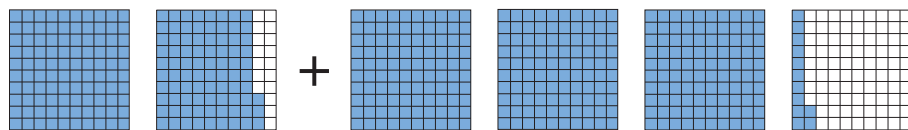
Now combine the whole number part with the decimal part:

$$3 + 0.91 = 3.91$$

The model shows that $2.35 + 1.56 = 3.91$.

Try It

What is $1.83 + 3.12$, as modeled below?



The completely shaded blocks represent the whole numbers _____ and _____. There are _____ blocks that are not completely shaded. The first block that isn't completely shaded shows _____ hundredths shaded, and the other one shows _____ hundredths shaded.

Combine 83 hundredths and 12 hundredths to get _____ hundredths.

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

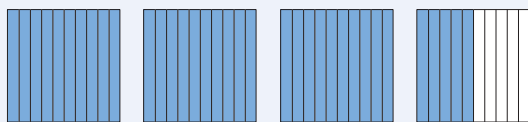
Add the whole numbers: _____ + _____ = _____.

Combine the whole-number part with the decimal part to get _____.

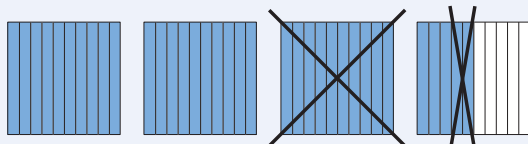
The model shows that $1.83 + 3.12 = \underline{\hspace{2cm}}$.

The completely shaded blocks represent the whole numbers **1** and **3**. There are **2** blocks that are not completely shaded. The first block that isn't completely shaded shows **83** hundredths shaded, and the other one shows **12** hundredths shaded. Combine 83 hundredths and 12 hundredths to get **95** hundredths. $0.83 + 0.12 = 0.95$. Add the whole numbers: $1 + 3 = 4$. Combine the whole-number part with the decimal part to get **4.95**. The model shows that $1.83 + 3.12 = 4.95$.

The shaded part of the model below represents 3.5.



Use the model to solve $3.5 - 1.2$. To take away 1.2, cross out one completely shaded block and 2 tenths from the block that isn't completely shaded.



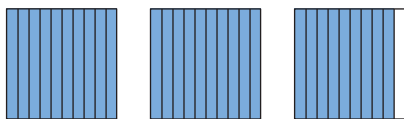
Then count up what is left. There are 2 whole blocks and 3 tenths of a block left.

The second model shows that $3.5 - 1.2 = 2.3$.



Try It

Giana had a piece of string 2.9 meters long. The model below represents 2.9.



She cut off a 1.6-meter piece to use in a project. How much string was left?

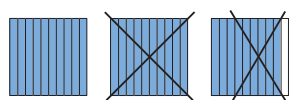
Cross out what you are taking away: _____ whole block and _____ tenths of the third block.

Count up what is left: _____ whole block and _____ tenths of the third block.

The model now shows that $2.9 - 1.6 =$ _____.

Giana had _____ meters of string left.

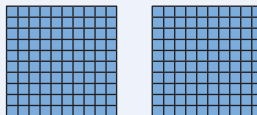
Cross out what you are taking away: 1 whole block and 6 tenths of the third block.



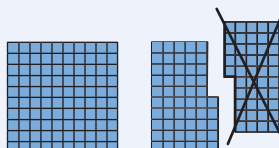
Count up what is left: 1 whole block and 3 tenths of the third block. The model now shows that $2.9 - 1.6 = 1.3$. Giana had 1.3 meters of string left.

Objective 1

Use the model to solve $2 - 0.45$.



Each block is divided into 100 equal squares. A completely shaded block represents 1 whole. One whole is equal to 100 hundredths. Cross out 45 hundredths.

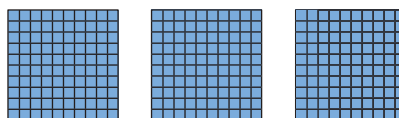


Count up what is left: 1 whole and 55 hundredths.

The second model shows that $2 - 0.45 = 1.55$.

Try It

Use the model to solve $3 - 0.75$.



Each block is divided into 100 equal parts.

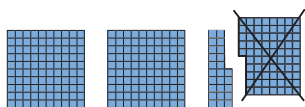
The completely shaded blocks represent _____ wholes.

Cross out what you are taking away: _____ hundredths.

Count up what is left: _____ whole blocks and _____ hundredths of the third block.

The model now shows that $3 - 0.75 =$ _____.

The completely shaded blocks represent **3** wholes. Cross out what you are taking away: **75** hundredths.

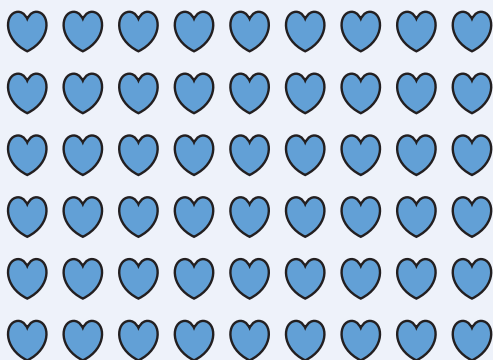


Count up what is left: **2** whole blocks and **25** hundredths of the third block. The model now shows that $3 - 0.75 =$ **2.25**.

How Can Models Help You Multiply and Divide?

One way to model multiplication and division number sentences is to use an array.

Look at the array below.



The array shows 6 rows and 9 columns of hearts. This array models these four number sentences:

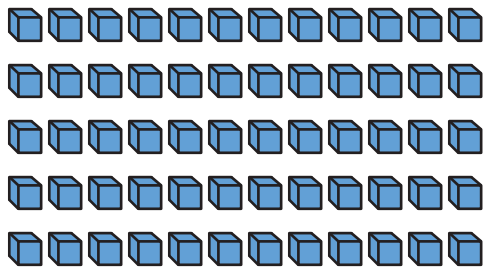
$$6 \times 9 = 54 \quad 9 \times 6 = 54 \quad 54 \div 6 = 9 \quad 54 \div 9 = 6$$

An array is an arrangement of objects in rows and columns. The number of rows represents one factor and the number of columns represents the other factor.



Try It

Look at this array.



Write four number sentences that show the number of cubes in the array.

$$\underline{\quad} \times \underline{\quad} = \underline{\quad} \quad \underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad} \quad \underline{\quad} \div \underline{\quad} = \underline{\quad}$$

The four number sentences are $12 \times 5 = 60$, $5 \times 12 = 60$, $60 \div 5 = 12$, and $60 \div 12 = 5$.

How Can You Represent Multiplication and Division Situations?

When solving a math problem, think about what the words mean.

- First read the problem carefully.
- Then decide whether to multiply or divide.
- Finally use the information to represent this problem in pictures, words, or numbers.

Carol traveled a total of 360 miles on a bus trip. The trip took 6 hours. The bus traveled the same number of miles each hour. What method can be used to find how many miles Carol traveled in 1 hour?

- Read carefully.
- Think about what operation you need to use. You want to separate 360 miles into 6 equal groups. You need to divide.
- Divide 360 by 6 to find how many miles Carol traveled in 1 hour.
- This can also be written as a division number sentence:
 $360 \div 6 = \square$.

Try It

The school track team purchased sweat suits for each person on the team. Each sweat suit cost \$39. There were 9 people on the team. What method can be used to find the total cost of 9 sweat suits?

One sweat suit cost \$_____.

The team purchased _____ sweat suits.

Use the operation of _____ to find the cost of these sweat suits.

Multiply _____ times _____ to find the total cost of 9 sweat suits.

This can also be written as a multiplication number sentence:

$$\underline{\quad} \times \underline{\quad} = \square.$$

One sweat suit cost \$39. The team purchased 9 sweat suits. Use the operation of **multiplication** to find the cost of these sweat suits. Multiply 39 times 9 to find the total cost of 9 sweat suits. This can also be written as a multiplication number sentence: $39 \times 9 = \square$.

How Can Multiplication Facts Help You Solve Problems?

When you know the multiplication facts, it is easier to see relationships between numbers. Recognizing the relationship between factors, products, and multiples is very helpful in learning the multiplication facts.

Factors are the numbers you multiply together. The **product** is the answer to a multiplication problem.

$$\text{Factor} \times \text{factor} = \text{product}$$

$$2 \times 3 = 6$$

The **multiples** of a number are the products of that number and other factors. For example, the multiples of 2 are 2, 4, 6, 8, 10, . . . , because

$$2 \times 1 = 2$$

$$2 \times 2 = 4$$

$$2 \times 3 = 6$$

$$2 \times 4 = 8$$

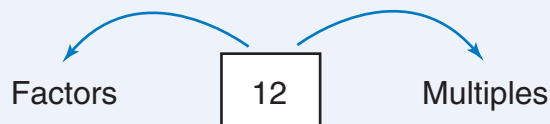
$$2 \times 5 = 10$$

and so on

If you can skip-count by a number, then you know the multiples of that number.



It is important to recognize the difference between factors and multiples. Look at the factors and multiples for the number 12.



$$1 \times 12 = 12$$

$$2 \times 6 = 12$$

$$3 \times 4 = 12$$

$$12 \times 1 = 12$$

$$12 \times 2 = 24$$

$$12 \times 3 = 36$$

$$12 \times 4 = 48$$

The factors of 12 are
1, 2, 3, 4, 6, and 12.

Some multiples of 12 are
12, 24, 36, and 48.

Activity

For this activity, you will need a pencil.

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

How Many of These Multiplication Facts Do You Know?

- Shade the products you have already learned.
- For every product you have learned, you can shade two boxes. For example, if you know that $2 \times 5 = 10$, then you also know that $5 \times 2 = 10$.
- If you can skip-count by twos, then you know all the multiplication facts that have a factor of 2. You can shade the row for 2 and the column for 2.
- If you can skip-count by other numbers, such as fives or tens, then you can shade those multiples.
- Remember the pattern that makes the nines and elevens easy to learn. Shade the products that you have learned.
- Now you can see the products you still need to work on. Practice the multiplication facts that aren't shaded.

When Do You Use Multiplication and Division to Solve Problems?

Use **multiplication** when you want to combine two or more groups that are equal in value. Use **division** when you want to separate a group of objects into smaller groups of equal value.

Ming had 18 bottles of juice. If each bottle contained 32 fluid ounces of juice, how many fluid ounces of juice were in all the bottles?

Multiply 32×18 to find the total number of fluid ounces of juice in all the bottles.

- First multiply the ones.

$$\begin{array}{r} 1 \\ 32 \\ \times 18 \\ \hline 256 \end{array}$$
- Then multiply the tens.

$$\begin{array}{r} 32 \\ \times 18 \\ \hline 256 \\ 320 \end{array}$$
 ← The zero is a place holder.
- Finally, add the products.

$$\begin{array}{r} 32 \\ \times 18 \\ \hline 256 \\ + 320 \\ \hline 576 \end{array}$$

$$32 \times 18 = 576$$

There were 576 fluid ounces of juice in all the bottles.

Mrs. Jamison had \$98 from a school club's fund. She wanted to buy new hats for the members of the club. Each hat cost \$7. How many hats could she buy?

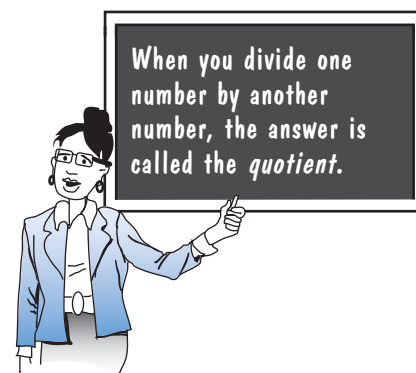
To find the number of hats, divide 98 by 7.

- Divide 9 by 7. Seven will go into 9 one time. Put the 1 in the quotient over the 9. Multiply 1 by 7 and then subtract the product from 9.
- Bring down the 8 and divide again: $28 \div 7 = 4$. The 4 goes in the quotient. Multiply 4 by 7 and then subtract the product from 28. When you subtract, you get 0. There is nothing left to bring down. There is no remainder. This is the last step in the division problem. The quotient is 14.

$$\begin{array}{r} 1 \\ 7 \overline{)98} \\ - 7 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 14 \\ 7 \overline{)98} \\ - 7 \downarrow \\ \hline 28 \\ - 28 \\ \hline 0 \end{array}$$

Mrs. Jamison could buy 14 hats with the \$98 in the fund.



Objective 1

At the Brown Elementary Game Day, 124 students will form teams of 4 students each. How many teams can be formed?

To find the number of teams, divide 124 by 4.

- Four will not go into 1, but it will go into 12. Divide 12 by 4: $12 \div 4 = 3$. The 3 in the quotient goes over the 2. Multiply and subtract.

$$\begin{array}{r} 3 \\ 4 \overline{)124} \\ - \underline{12} \\ 0 \end{array}$$

- Bring down the 4 and divide again: $4 \div 4 = 1$. The 1 goes in the quotient. Multiply and subtract. When you subtract, you get 0. There is nothing left to bring down. There is no remainder. This is the last step in the division problem. The quotient is 31.

$$\begin{array}{r} 31 \\ 4 \overline{)124} \\ - \underline{12} \downarrow \\ 04 \\ - \underline{4} \\ 0 \end{array}$$

A total of 31 teams can be formed.

Try It

Ginny brought granola bars to the school fair. She had 5 boxes of granola bars. Each box contained 24 granola bars. How many granola bars did Ginny bring to the school fair in all?

Use the operation of _____ to find the total number of granola bars.

$$\begin{array}{r} \quad \quad \quad _ \\ \times \quad _ \\ \hline \end{array}$$

Multiply the ones: _____ \times _____ = _____.

Write the zero in the ones place and regroup the 2 with the tens.

Multiply the tens: _____ \times _____ = _____.

Add the tens that were regrouped: _____ + _____ = _____.

Write the _____ in the tens place.

Write the _____ in the hundreds place.

Ginny brought _____ granola bars to the school fair.

Use the operation of **multiplication**.

$$\begin{array}{r} \quad 2 \\ 24 \\ \times 5 \\ \hline 120 \end{array}$$

Multiply the ones: $5 \times 4 = 20$. Multiply the tens: $5 \times 2 = 10$. Add the tens that were regrouped: $10 + 2 = 12$. Write the 2 in the tens place. Write the 1 in the hundreds place. Ginny brought 120 granola bars to the school fair.



What operation can you use to combine groups of equal value?



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Try It

A baseball coach ordered 9 baseball gloves. The total cost of the gloves was \$225. How much did each glove cost?

Use the operation of _____ to find the cost of each glove.

$$9 \overline{)225}$$

Divide: _____ \div 9. Multiply: $2 \times 9 =$ _____.

Subtract: $22 - 18 =$ _____. Bring down the _____.

Divide: $45 \div 9 =$ _____. Subtract: $45 - 45 =$ _____.

There is no _____. Each baseball glove cost \$ _____.

Use the operation of **division** to find the cost of each glove.

$$\begin{array}{r} 25 \\ 9 \overline{)225} \\ -18 \\ \hline 45 \\ -45 \\ \hline 0 \end{array}$$

Divide: $22 \div 9$. Multiply: $2 \times 9 = 18$. Subtract: $22 - 18 = 4$. Bring down the 5. Divide: $45 \div 9 = 5$. Subtract: $45 - 45 = 0$. There is no **remainder**. Each baseball glove cost \$25.

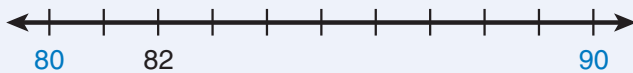
When Should You Estimate an Answer?

When you do not need an exact answer to a problem, you can **estimate** to find an answer that is close to the exact answer. For example, some problems ask *about how many* or *approximately how much*. Use estimation when solving such problems.

One way to estimate an answer to a problem is to round the numbers before working the problem. You can round numbers to the nearest ten, nearest hundred, or nearest thousand. A number line or a set of rounding rules can help you.

During 4 months Jamie earned \$82 each month. About how much did Jamie earn during these 4 months?

- Since the problem says *about how much*, estimate the answer. Round 82 to the nearest ten.
- On a number line, 82 is closer to 80 than to 90. The number 82 rounds to 80.



- Multiply the amount Jamie earned each month by the number of months.

$$80 \times 4 = 320$$

Jamie earned about \$320 during the 4 months.

The distance from Brownsville to Laredo is 203 miles. The distance from Brownsville to Tyler is 580 miles. About how much farther from Brownsville is Tyler than Laredo?

Since the problem says *about how much*, estimate the answer.

Round each number to the nearest 100. The number 203 rounds to 200. The number 580 rounds to 600.

$$600 - 200 = 400$$

Tyler is about 400 miles farther from Brownsville than Laredo is.

When rounding to the nearest hundred, look at the tens place.

- If the digit in the tens place is 0 to 4, the digit in the hundreds place stays the same. Change the digits in the ones and tens place to zeros.
- If the digit in the tens place is 5 to 9, the digit in the hundreds place rounds to the next-higher hundred. Change the digits in the ones and tens place to zeros.



Try It

The town where Henry lives has a population of 3,782 people. During the last two years, 319 people have moved into town. About how many people lived in Henry's town two years ago?

The number 3,782 rounded to the nearest hundred is _____.

The number 319 rounded to the nearest hundred is _____.

The number sentence _____ - _____ = _____

shows about how many people lived in Henry's town two years ago.

The population of Henry's town two years ago was about _____ people.

The number 3,782 rounded to the nearest hundred is **3,800**. The number 319 rounded to the nearest hundred is **300**. The number sentence **$3,800 - 300 = 3,500$** shows about how many people lived in Henry's town two years ago. The population of Henry's town two years ago was about **3,500** people.

Another way to estimate is by using compatible numbers. **Compatible numbers** are numbers that are easy to add, subtract, multiply, or divide. Using compatible numbers makes the computation easier.

Use compatible numbers to estimate the sum below. Group together numbers that approximately equal 100.

$$\begin{array}{r}
 100 + 200 + 200 + 100 = 600 \\
 \begin{array}{r}
 127 \\
 273 \\
 211 \\
 + 192 \\
 \hline
 \end{array}
 \end{array}$$

27 is close to 25 and 73 is close to 75: $25 + 75 = 100$

11 is close to 10 and 92 is close to 90: $10 + 90 = 100$

Add the hundreds: $600 + 100 + 100 = 800$

The sum is approximately 800.

Compatible numbers can also be helpful when estimating the answer to a multiplication or division problem. Changing the numbers to other numbers that form a basic fact can help you solve the problem in your head.

Use compatible numbers to estimate the product and quotient below. Think of numbers that can form basic facts.

Estimate the product of 19×32 .

- Think: 19 is close to 20
32 is close to 30
- Use the basic fact $2 \times 3 = 6$ to help solve the problem in your head: $20 \times 30 = 600$

The product of 19×32 is approximately 600.

Estimate the quotient of $177 \div 3$.

- Find a number close to 177 that you can divide by 3 in your head. Use the basic fact $18 \div 3 = 6$ to help.
- Think: $180 \div 3 = 60$

The quotient of $177 \div 3$ is approximately 60.

Try It

A roller coaster holds 6 people per car. When the ride was almost full, 38 people were riding the roller coaster. About how many cars does the roller coaster have?

Use a number close to 38 that divides easily by 6.

38 is close to _____, which is a multiple of 6.

What number sentence can be used to find how many cars the roller coaster might have?

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

The roller coaster has about _____ cars.

38 is close to **36**, which is a multiple of 6. $36 \div 6 = 6$. The roller coaster has about **6** cars.

Now practice what you've learned.

Question 1

Alana read about three European countries. The table below shows the area in square kilometers of each of the countries she read about.

European Countries

Country	Area (square kilometers)
France	543,965
Germany	356,970
Spain	505,990

Which list shows the three countries in order from greatest to least area?

- A Spain, France, Germany
- B France, Germany, Spain
- C France, Spain, Germany
- D Not here



Answer Key: page 134

Question 2

How is the number 2,003,068 written in words?

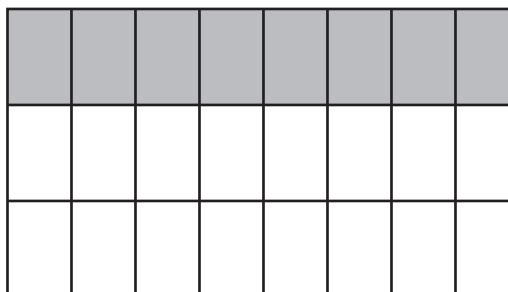
- A Two thousand, three hundred sixty-eight
- B Two million, three hundred thousand, sixty-eight
- C Two hundred three thousand, sixty-eight
- D Two million, three thousand, sixty-eight



Answer Key: page 134

Question 3

Cammy decided to shade some of the boxes in the grid below.



What fraction is equivalent to the part of the grid she shaded?

- A $\frac{3}{24}$
- B $\frac{3}{1}$
- C $\frac{1}{8}$
- D $\frac{1}{3}$



Answer Key: page 134

Question 4

A post office sold a total of 6,731 stamps in 3 days. On the first day 2,955 stamps were sold. On the second day 2,372 stamps were sold. What was the total number of stamps the post office sold on the third day?

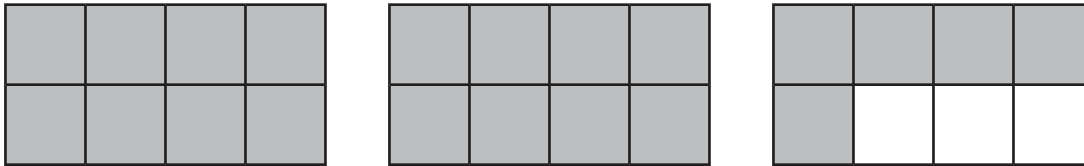
- A 1,404
- B 5,327
- C 6,148
- D 1,416



Answer Key: page 134

Question 5

Look at the model below.



What mixed number does the shaded part of the model represent?

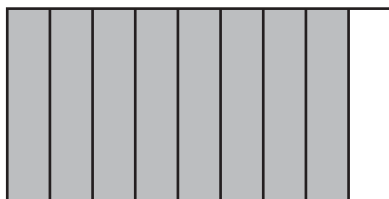
- A $2\frac{3}{8}$
 B $2\frac{5}{8}$
 C $2\frac{3}{5}$
 D $3\frac{5}{8}$



Answer Key: page 134

Question 6

Look at the models of two different fractions below. The models are shaded to show that —



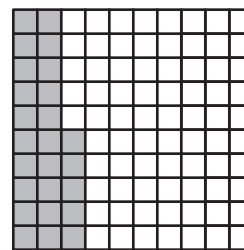
- A $\frac{3}{6} > \frac{4}{6}$
 B $\frac{2}{9} = \frac{1}{6}$
 C $\frac{2}{6} < \frac{1}{6}$
 D $\frac{8}{9} > \frac{5}{6}$



Answer Key: page 134

Question 7

The model is shaded to represent 0.25.



What fraction does the model represent?

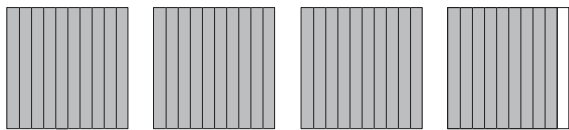
- A $\frac{75}{100}$
 B $\frac{25}{100}$
 C $\frac{25}{10}$
 D $\frac{75}{10}$



Answer Key: page 134


Question 8

The number 3.9 is represented by the model below.



How is the number 3.9 written in words?

- A Thirty-nine
- B Three and nine-hundredths
- C Three and nine-tenths
- D Thirty-nine hundredths

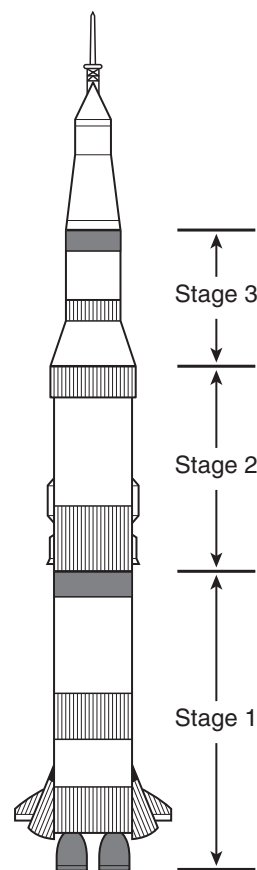
 Answer Key: page 134

Question 9

A spacecraft was built with three stages so that it could separate while traveling through space. The table below shows the length of each stage.


Spacecraft Stages

Stage	Length (feet)
1	96
2	76
3	47



After Stage 1 separated from the spacecraft, what was the total length of the two remaining stages?

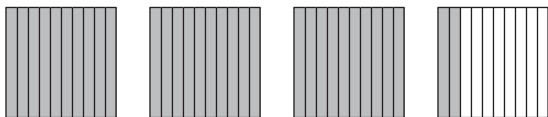
- A 172 ft
- B 113 ft
- C 123 ft
- D 162 ft

 Answer Key: page 135

Objective 1


Question 10

Jennifer has 3.2 liters of orange juice.



If Jennifer drinks 0.3 liter of orange juice, what will be the amount of orange juice she has remaining?

- A 3.5 L
- B 0.2 L
- C 3.1 L
- D 2.9 L


 **Answer Key: page 135**

Question 11

Mr. Alexis is making flower arrangements. Each arrangement will have 18 flowers. If Mr. Alexis makes 12 arrangements, how many flowers in all will he use?

Record your answer and fill in the bubbles. Be sure to use the correct place value.

			.
0	0	0	
1	1	1	
2	2	2	
3	3	3	
4	4	4	
5	5	5	
6	6	6	
7	7	7	
8	8	8	
9	9	9	

 **Answer Key: page 135**

Question 12

Lana placed the bowls shown below on shelves.



Which number sentence shows the total number of bowls on shelves?

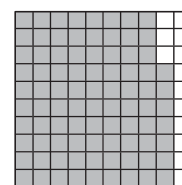
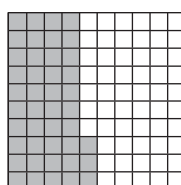
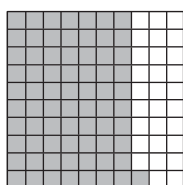
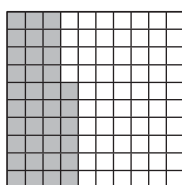
- A $6 \times 8 = 48$
- B $48 - 6 = 42$
- C $6 \times 9 = 54$
- D $6 + 8 = 14$



Answer Key: page 135

Question 13

The shaded models below represent four different decimals.



Which list shows these decimals in order from greatest to least?

- A 0.87 0.71 0.43 0.36
- B 0.36 0.43 0.71 0.87
- C 0.87 0.43 0.71 0.36
- D 0.36 0.71 0.43 0.87



Answer Key: page 135

Question 14

Dr. Miller sees the same number of patients each day. If she saw 24 patients each day, which number sentence can be used to find the number of patients Dr. Miller saw in 5 days?

A $24 - 5 = \square$

B $24 \times 7 = \square$

C $24 + 5 = \square$

D $24 \times 5 = \square$



Answer Key: page 135

Question 15

Ms. Castro rides a bike for exercise 4 days each week. She rides 15 miles each day. How many miles does she ride each week?

A 19 mi

B 60 mi

C 75 mi

D 80 mi



Answer Key: page 135

Question 16

Matthew collected 130 sports cards. He separated them into 5 piles. If each pile had the same number of cards, how many sports cards were in each pile?

Record your answer and fill in the bubbles. Be sure to use the correct place value.

			.
0	0	0	
1	1	1	
2	2	2	
3	3	3	
4	4	4	
5	5	5	
6	6	6	
7	7	7	
8	8	8	
9	9	9	



Answer Key: page 135

Question 17

On Monday Sofi and her family drove 113 miles to her aunt's house. On Friday they drove 185 miles to her grandmother's house. On Sunday they drove 328 miles home. About how many miles in all did they drive on these days?

A 700 mi

B 500 mi

C 600 mi

D 300 mi



Answer Key: page 135

Question 18

A rock climber took 3 hours to climb up a rock wall that was 923 meters high. About how many meters did the rock climber climb each hour?

A 300 m

B 600 m

C 900 m

D 2,700 m



Answer Key: page 136

Objective 2

The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

For this objective you should be able to

- use patterns in multiplication and division; and
- describe patterns and relationships in data.

What Kinds of Patterns Are in Multiplication and Division?

A fact family is a group of related number sentences. These number sentences all use the same set of numbers. There are patterns in multiplication and division fact families.

Look at the pattern in the multiplication and division fact family below.

Multiplication Facts	Division Facts
$9 \times 8 = 72$	$72 \div 8 = 9$
$8 \times 9 = 72$	$72 \div 9 = 8$

All four number sentences use the same three numbers: 8, 9, and 72. The four equations in this fact family are made up of two multiplication equations and two division equations.



Fact families can help you find missing numbers in equations.

Look at this number sentence. It is missing a number:

$$3 \times \square = 27$$

Use related number sentences to find the missing number.

What multiplication and division facts use 3 and 27?

$$27 \div 3 = 9 \qquad 3 \times 9 = 27$$

$$27 \div 9 = 3 \qquad 9 \times 3 = 27$$

Since $27 \div 3 = 9$, the missing number is 9 because $3 \times \square = 27$.

Objective 2

Look at this equation that is missing a number:

$$\square \div 8 = 5$$

The fact family for $\square \div 8 = 5$ has the numbers 8 and 5 in it. To find the missing number, think about the product you get when you multiply 8 by 5. Since $8 \times 5 = 40$, this fact family also has the number 40 in it. Since $40 \div 8 = 5$, the missing number is 40.

A baker made a total of 56 loaves of bread. He worked for 8 hours and made the same number of loaves each hour. How many loaves of bread did he make each hour?

What number sentence can you use to solve this problem?

Use division to separate a large group into smaller groups of equal size.

Solve the number sentence $56 \div 8 = \square$.

The related multiplication fact in this fact family is $8 \times 7 = 56$.

Since $56 \div 8 = 7$, the number that goes in the box is 7.

The baker made 7 loaves of bread each hour.

Try It

List all the members of the fact family for 4, 9, and 36.

The multiplication and division facts that use 4, 9, and 36 are

$$\underline{\quad} \times 9 = \underline{\quad}$$

$$36 \div \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = 36$$

$$\underline{\quad} \div 9 = \underline{\quad}$$

$$4 \times 9 = 36 \quad 36 \div 4 = 9$$

$$9 \times 4 = 36 \quad 36 \div 9 = 4$$

What Is the Pattern When You Multiply a Number by 10 or by 100?

Look at these number sentences. Notice the pattern.

$$5 \times 1 = 5 \qquad 5 \times 10 = 50 \qquad 5 \times 100 = 500$$

$$6 \times 1 = 6 \qquad 6 \times 10 = 60 \qquad 6 \times 100 = 600$$

$$7 \times 1 = 7 \qquad 7 \times 10 = 70 \qquad 7 \times 100 = 700$$

$$8 \times 1 = 8 \qquad 8 \times 10 = 80 \qquad 8 \times 100 = 800$$

When you multiply a number by 1, the pattern is that it equals the number you started with.

When you multiply a number by 10, the pattern is to put a zero at the end of the number.

When you multiply a number by 100, the pattern is to put two zeros at the end of the number.



Do you see
that . . .

Use the pattern to multiply.

$$9 \times 10 = 90 \qquad 9 \times 100 = 900$$

$$10 \times 10 = 100 \qquad 10 \times 100 = 1,000$$

$$11 \times 10 = \square \qquad 11 \times 100 = \square$$

The number that goes in the first box is 110. When you multiply a number by 10, put a zero at the end of that number to get your answer.

$$11 \times 10 = 110$$

The number that goes in the second box is 1,100. When you multiply a number by 100, put two zeros at the end of the number to get your answer.

$$11 \times 100 = 1,100$$

What pair of numbers could complete the following equation?

$$\triangle \times 10 = \bigcirc$$

When you multiply a number by 10, put a zero at the end of that number to get your answer.

If 15 was in the \triangle , the number in the \bigcirc would be 150.

If 87 was in the \triangle , the number in the \bigcirc would be 870.

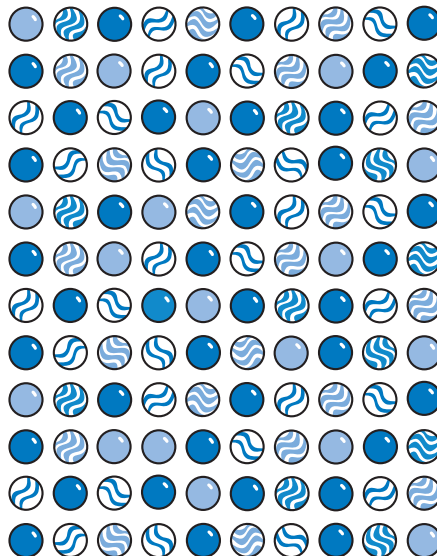
If 40 was in the \triangle , the number in the \bigcirc would be 400.



What is the pattern when you multiply by 10?

Try It

Jaime arranges his collection of marbles in rows of 10, as shown below.



How many marbles does Jaime have?

There are _____ rows of marbles, with 10 marbles in each row.

$$\underline{\hspace{2cm}} \times 10 = \underline{\hspace{2cm}}$$

There are **12** rows of marbles, with 10 marbles in each row. $12 \times 10 = 120$.

Try It

Fill in the missing numbers.

$$\underline{\hspace{2cm}} \times 100 = 200$$

$$3 \times \underline{\hspace{2cm}} = 300$$

$$4 \times 10 = \underline{\hspace{2cm}}$$

$$14 \times 100 = \underline{\hspace{2cm}}$$

$$2 \times 100 = 200$$

$$3 \times 100 = 300$$

$$4 \times 10 = 40$$

$$14 \times 100 = 1,400$$

How Can You Find a Pattern in Sets of Related Numbers?

You can use a table to find a pattern in a set of related numbers.

Look at the table of paired numbers below. The table shows the number of crates of milk in a school cafeteria and the total number of cartons of milk in the crates.

Milk	
Number of Crates of Milk	Total Number of Cartons of Milk
3	36
5	60
7	84

Look at the relationship between the numbers.

3 crates of milk have 36 cartons. $3 \times \square = 36$

5 crates of milk have 60 cartons. $5 \times \square = 60$

7 crates of milk have 84 cartons. $7 \times \square = 84$

Multiply the number of crates of milk by 12 to get the total number of cartons of milk.

The number of crates of milk $\times 12 =$ the number of cartons of milk



Can you use fact families to help find patterns in tables too?

The table below shows the total number of fish in different numbers of fish tanks.

Fish			
Number of Fish Tanks	8	2	5
Total Number of Fish	48	12	30

What is the relationship between the total number of fish and the number of fish tanks?

There are 48 fish in 8 fish tanks. $48 \div \square = 8$

There are 12 fish in 2 fish tanks. $12 \div \square = 2$

There are 30 fish in 5 fish tanks. $30 \div \square = 5$

Each number is divided by 6.

The total number of fish $\div 6 =$ the number of fish tanks

Try It

Look at the table below.

Set A	2	6	7	9
Set B	18	54	63	81

Describe the relationship between the numbers in Set A and Set B.

Look at the pairs of numbers: 2 and 18

6 and 54

7 and 63

9 and 81

How are the numbers in Set A related to the numbers in Set B?

$$2 \times \underline{\quad} = 18$$

$$6 \times \underline{\quad} = 54$$

$$7 \times \underline{\quad} = 63$$

$$9 \times \underline{\quad} = 81$$

The numbers in Set $\underline{\quad} \times 9 =$ the numbers in Set $\underline{\quad}$.

$$2 \times 9 = 18$$

$$6 \times 9 = 54$$

$$7 \times 9 = 63$$

$$9 \times 9 = 81$$

The numbers in Set $A \times 9 =$ the numbers in Set B.

Now practice what you've learned.

Question 19

The number 6 makes which of the following equations true?

A $\square \times 8 = 56$

B $42 \times 7 = \square$

C $42 \div 7 = \square$

D $\square \div 8 = 56$



Answer Key: page 136

Question 20

What number belongs in the box?

$$45 \div \square = 9$$

A 5

B 9

C 4

D 14



Answer Key: page 136

Question 21

Which pair of numbers best completes the equation?

A and

B and

C and

D and



Answer Key: page 136

Objective 2

Question 22

The table below shows the total number of pieces in different numbers of puzzles. Each puzzle has the same number of pieces.

Puzzles

Number of Puzzles	Total Number of Pieces
2	200
4	400
7	700
10	1,000

Which of the following correctly describes the relationship in the table?

- A Number of puzzles + 200 = total number of pieces
- B Number of puzzles - 200 = total number of pieces
- C Number of puzzles \div 100 = total number of pieces
- D Number of puzzles \times 100 = total number of pieces



Answer Key: page 136

Question 23

María helped Ms. Jiménez move books from her classroom to a storage room. The table shows the total number of books María moved during different numbers of trips.

Moving Books

Number of Trips	Total Number of Books
2	14
10	70
20	140
30	

Based on the information in the table, how many books did María move during 30 trips?

- A 210
- B 160
- C 170
- D 260



Answer Key: page 136

Question 24

Jared is going to buy boxes of cookies at the grocery store. The table shows the total number of cookies in different numbers of boxes.

Boxes of Cookies

Number of Boxes	Total Number of Cookies
2	36
4	72
5	90
10	180

Which of the following correctly describes the relationship in the table?

- A Number of boxes + 12 = total number of cookies
- B Number of boxes - 12 = total number of cookies
- C Number of boxes \times 18 = total number of cookies
- D Number of boxes \div 18 = total number of cookies



Answer Key: page 136

Objective 3

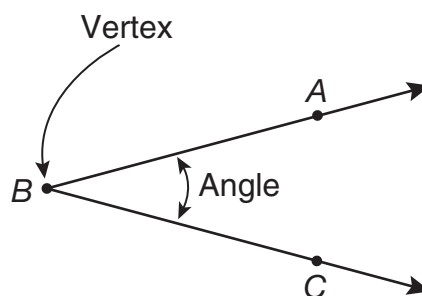
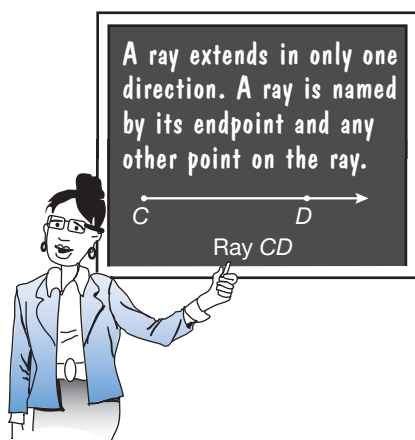
The student will demonstrate an understanding of geometry and spatial reasoning.

For this objective you should be able to

- identify and describe angles, lines, and two-dimensional and three-dimensional figures using formal geometric language;
- connect transformations to congruence and symmetry; and
- recognize the connection between numbers and points on a number line.

What Is an Angle?

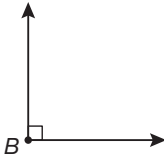
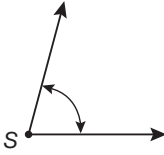
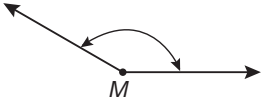
When two rays meet at a common endpoint, they form an **angle**. Look at the angle formed by two rays.



Point B is the vertex of this angle. The vertex of an angle is the common endpoint of the rays that form the angle.

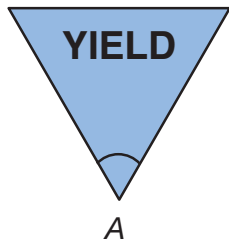
There are three types of angles that you should know.

- A right angle is like a corner of a square.
- An obtuse angle is bigger than a right angle.
- An acute angle is smaller than a right angle.

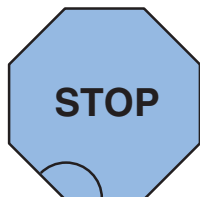
Angle	Example	Description
Right angle		Angles in squares and rectangles are right angles. The small box at the vertex shows that the angle is a right angle.
Acute angle		Compared to a right angle, an acute angle seems more closed.
Obtuse angle		Compared to a right angle, an obtuse angle seems more open.

Try It

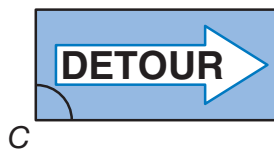
These traffic signs have angles. Identify angles A , B , and C as an acute angle, a right angle, or an obtuse angle.



A



B

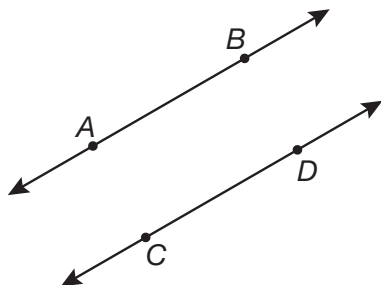


C

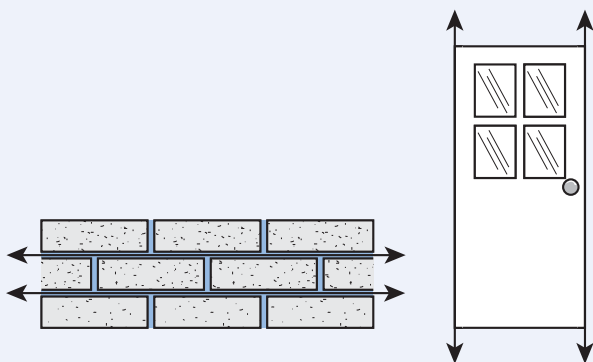
Angle A is an **acute** angle. It is smaller than a right angle. Angle B is an **obtuse** angle. It is bigger than a right angle. Angle C is a **right** angle. The sign has square corners.

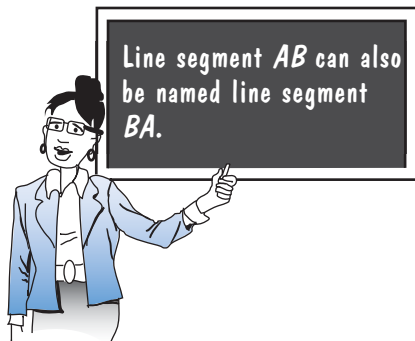
What Are Parallel Lines?

Parallel lines are lines that are the same distance apart at all points. Line AB and line CD are parallel. These lines will never cross, or intersect.



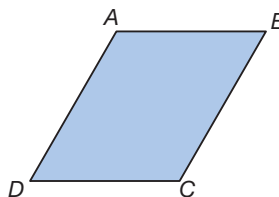
There are examples of parallel lines all around you. The thin layers of cement between the rows of bricks in a brick wall model parallel lines. Opposite sides of a rectangular door are parallel lines.





Try It

Look at the figure below.



Which two pairs of line segments appear to be parallel?

Two line segments are _____ when they are the same distance apart at all points.

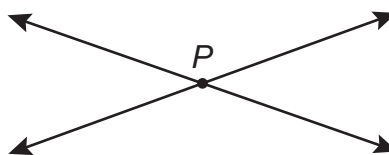
Line segment AB and line segment _____ appear to be parallel.

Line segment _____ and line segment _____ also appear to be parallel.

Two line segments are **parallel** when they are the same distance apart at all points. Line segment AB and line segment DC appear to be parallel. Line segment AD and line segment BC also appear to be parallel.

What Are Intersecting Lines?

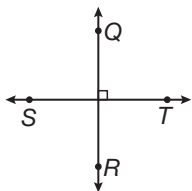
Intersecting lines are lines that cross each other and have one point in common.



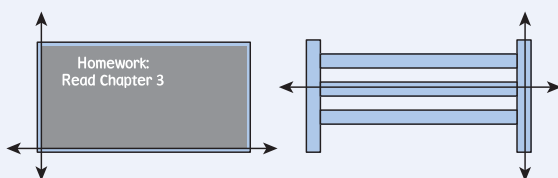
There are examples of intersecting lines all around you. These letters are made of intersecting lines.



Perpendicular lines are special intersecting lines that form right angles where they intersect. Line QR and line ST below are perpendicular.

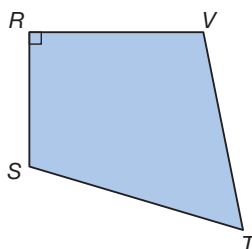


There are examples of perpendicular lines all around you. The bottom and side of a chalkboard form perpendicular lines. The rails of a fence are usually perpendicular to the posts of the fence.



Try It

Look at the figure below.



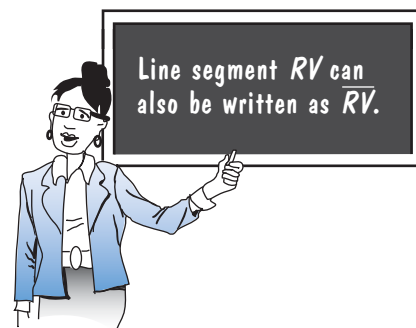
List the segments that intersect.

\overline{RV} intersects \overline{VT} . \overline{VT} intersects _____.

\overline{TS} intersects _____. \overline{SR} intersects _____.

Two line segments are perpendicular if they intersect to form a _____ angle. Angle _____ is a right angle. Line segments _____ and _____ are perpendicular. All the other line segments intersect but are not perpendicular.

\overline{VT} intersects \overline{TS} . \overline{TS} intersects \overline{SR} . \overline{SR} intersects \overline{RV} . Two line segments are perpendicular if they intersect to form a **right** angle. Angle **R** is a right angle. Line segments **RS** and **RV** are perpendicular.

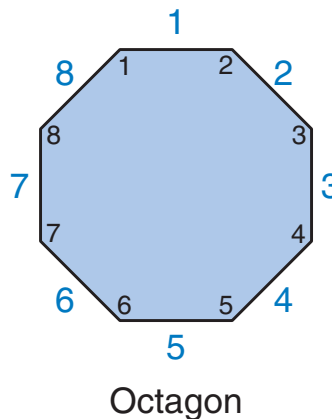
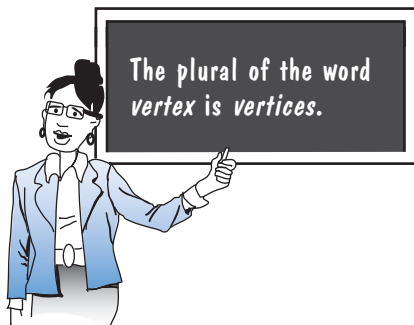


Objective 3

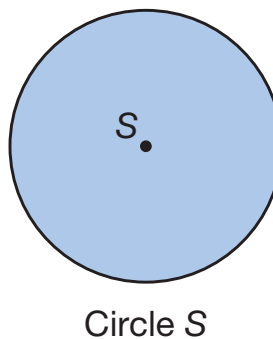
How Can You Describe a Two-Dimensional Figure?

Plane figures are also called two-dimensional figures. You can describe many two-dimensional figures by counting the number of sides and vertices they have.

A closed two-dimensional figure with straight sides is called a **polygon**. The point where two sides of a polygon meet is called a **vertex**. A polygon is often named by the number of sides and vertices it has. For example, a polygon with eight sides and eight vertices is called an octagon.

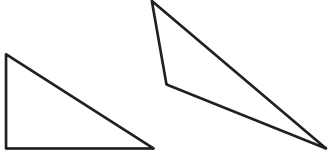


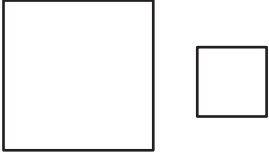
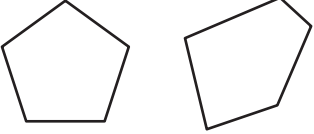
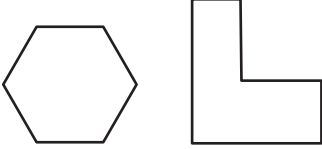
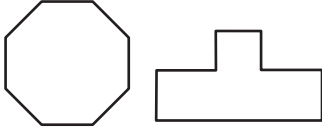



Circles are closed two-dimensional figures that are not polygons. A circle is often named by its center point.



This table shows some two-dimensional figures you should be able to recognize and describe. All of these two-dimensional figures, except circles, are polygons.

Two-Dimensional Figures

Figure	Examples	Description
Triangle		A triangle has <ul style="list-style-type: none"> • 3 sides • 3 vertices
Quadrilateral		A quadrilateral has <ul style="list-style-type: none"> • 4 sides • 4 vertices
Rectangle		A rectangle has <ul style="list-style-type: none"> • 4 sides (opposite sides are congruent) • 4 vertices • 4 right angles
Square		A square has <ul style="list-style-type: none"> • 4 congruent sides • 4 vertices • 4 right angles
Pentagon		A pentagon has <ul style="list-style-type: none"> • 5 sides • 5 vertices
Hexagon		A hexagon has <ul style="list-style-type: none"> • 6 sides • 6 vertices
Octagon		An octagon has <ul style="list-style-type: none"> • 8 sides • 8 vertices
Circle		A circle has <ul style="list-style-type: none"> • no sides • no vertices

Try It

Look at each figure below. Identify the number of sides and vertices in the figure. Then write the name of the figure in the blank.

1.

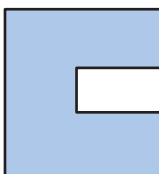


Number of sides: _____

Number of vertices: _____

Name: _____

2.

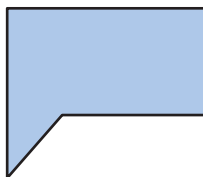


Number of sides: _____

Number of vertices: _____

Name: _____

3.

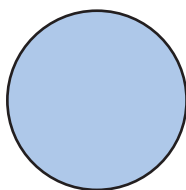


Number of sides: _____

Number of vertices: _____

Name: _____

4.

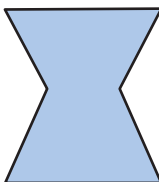


Number of sides: _____

Number of vertices: _____

Name: _____

5.

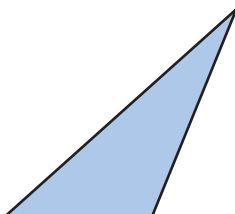


Number of sides: _____

Number of vertices: _____

Name: _____

6.



Number of sides: _____

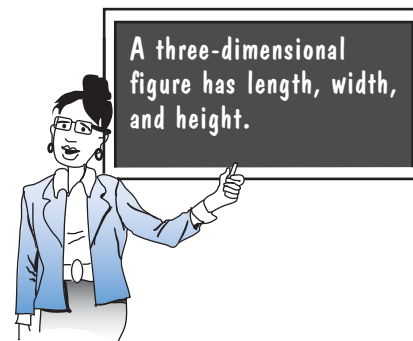
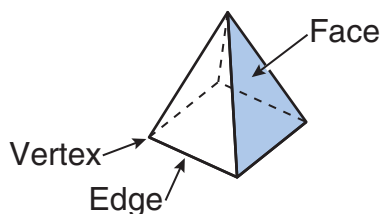
Number of vertices: _____

Name: _____

Figure 1 has **four** sides and **four** vertices. It is a **quadrilateral** or a **rectangle**.
 Figure 2 has **eight** sides and **eight** vertices. It is an **octagon**. Figure 3 has **five** sides and **five** vertices. It is a **pentagon**. Figure 4 has **no** sides and **no** vertices. It is a **circle**. Figure 5 has **six** sides and **six** vertices. It is a **hexagon**.
 Figure 6 has **three** sides and **three** vertices. It is a **triangle**.

How Can You Describe a Three-Dimensional Figure?

Solid figures are also called **three-dimensional figures**. You can describe many three-dimensional figures by counting the number of faces, edges, and vertices they have.



- A **face** is a flat surface in the shape of a two-dimensional figure.
- An **edge** is a line segment where two faces meet.
- A **vertex** is the point where three or more edges meet.

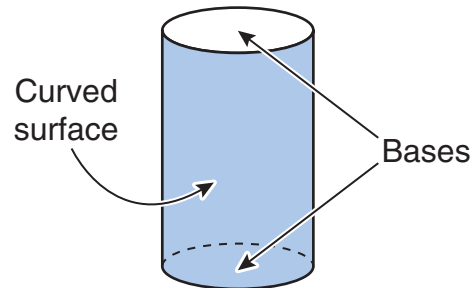
Here are some three-dimensional figures you should be able to recognize and describe.

Three-Dimensional Figures

Figure	Example	Description
Triangular prism		A triangular prism has <ul style="list-style-type: none"> • 5 faces (2 triangular, 3 rectangular) • 9 edges • 6 vertices
Rectangular prism		A rectangular prism has <ul style="list-style-type: none"> • 6 rectangular faces • 12 edges • 8 vertices
Cube		A cube has <ul style="list-style-type: none"> • 6 square faces • 12 edges • 8 vertices
Triangular pyramid		A triangular pyramid has <ul style="list-style-type: none"> • 4 triangular faces • 6 edges • 4 vertices
Square pyramid		A square pyramid has <ul style="list-style-type: none"> • 5 faces (1 square, 4 triangular) • 8 edges • 5 vertices

Objective 3

Some three-dimensional figures have a curved surface. Some of these figures also have one or two flat circular surfaces called **bases**.



Here are some three-dimensional figures with curved surfaces that you should be able to recognize and describe.

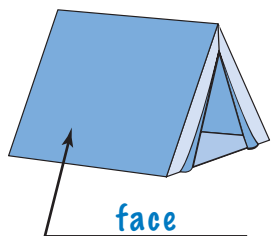
Three-Dimensional Figures

Figure	Example	Description
Cylinder		A cylinder has <ul style="list-style-type: none">• 1 curved surface• 2 circular bases
Cone		A cone has <ul style="list-style-type: none">• 1 curved surface• 1 circular base
Sphere		A sphere has 1 curved surface.

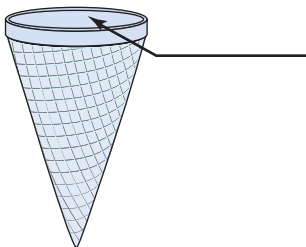
Try It

Look at each picture below. Then name the figure and identify the specified characteristic with the correct term from this list: face, base, edge, or vertex. The first one has been done for you.

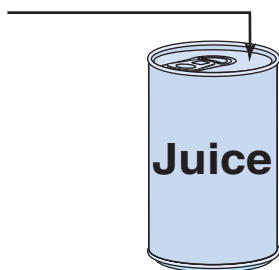
1. triangular prism



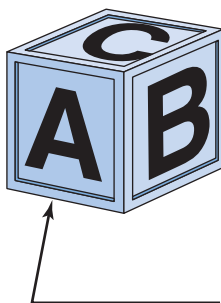
2. _____



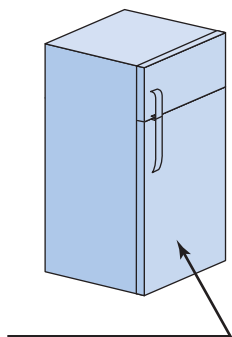
3. _____



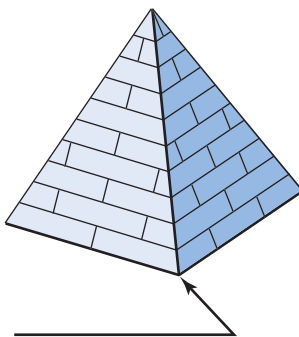
4. _____



5. _____



6. _____

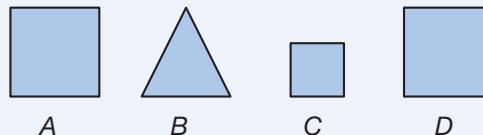


1. Triangular prism, face
2. Cone, base
3. Cylinder, base
4. Cube, edge
5. Rectangular prism, face
6. Square or triangular pyramid, vertex

What Are Congruent Figures?

Congruent figures have exactly the same shape and exactly the same size.

Look at these figures.



Only figures A and D are congruent. They have the same shape and the same size. Figure C has the same shape as figures A and D, but it is not the same size.

A transformation is a way of moving a figure. Three kinds of transformations are rotations, translations, and reflections.

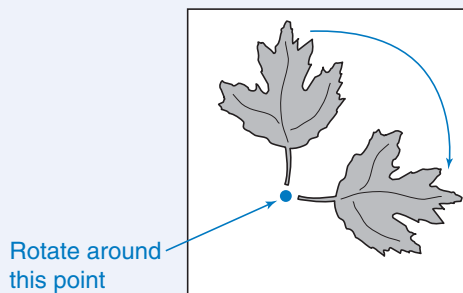


How Can You Tell Whether Figures Are Congruent?

Rotations, translations, and reflections can be used to check whether two figures are congruent. If you can make one figure look exactly like another figure by completing any of these transformations, then the figures are congruent.

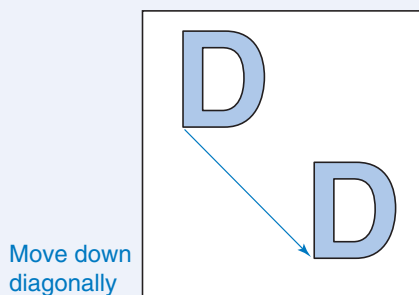
- A **rotation** is a turning movement around a point.

These two figures are congruent. They are the same size and the same shape. One leaf is a rotation of the other.



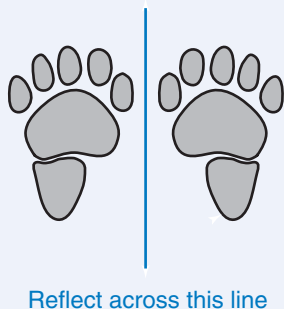
- A **translation** is a sliding movement. A figure can be moved left, right, up, down, or diagonally.

These two figures are congruent. They are the same size and the same shape. One letter is a translation of the other.



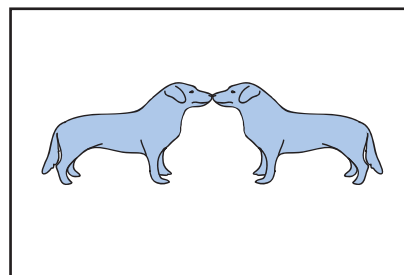
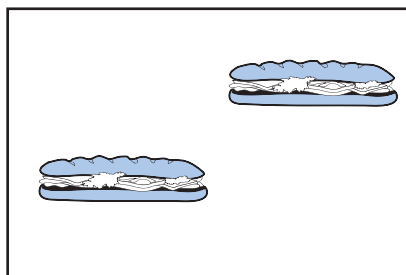
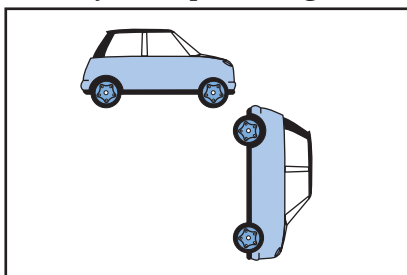
- A **reflection** is a mirror image across a line.

These two figures are congruent. They are the same size and the same shape. One footprint is a reflection of the other.



Try It

Identify each pair of figures as a translation, reflection, or rotation.

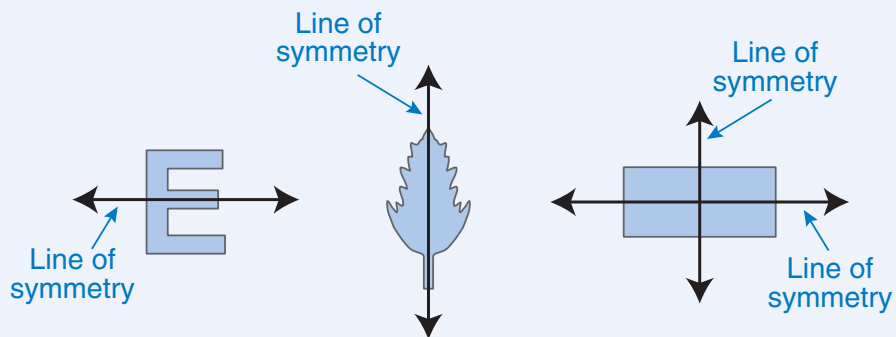


The first pair of figures shows one car turned to form the second car. This is a **rotation**. The next pair of figures shows a sliding movement up and to the right. This is a **translation**. The third pair of figures shows one dog as a mirror image of another dog. This is a **reflection**.

How Can Reflections Show Symmetry?

Reflections can also be used to check whether a figure is symmetric. If a figure can be folded in half to make two congruent halves, then the figure is **symmetric**. The line at which a figure can be folded so that its two halves match exactly is called a **line of symmetry**. Some figures have more than one line of symmetry. Some figures have no line of symmetry.

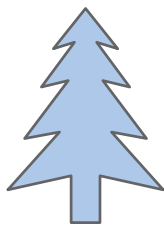
Look at these three symmetrical figures.

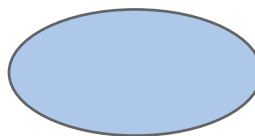


Each figure can be folded along a line of symmetry to form two congruent halves.

Try It

How many lines of symmetry does each drawing have?

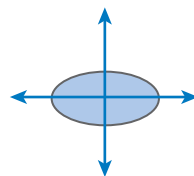








1 line of symmetry



2 lines of symmetry

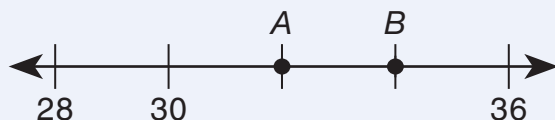


0 lines of symmetry
(It cannot be
folded to form
2 congruent halves.)

How Can You Use a Number Line?

A number line is one way to show numbers in order from least to greatest. Some number lines start with 0 at the left. Other number lines show a section of a number line that does not include 0. Number lines do not always show every number.

This section of a number line begins at 28 and ends at 36. Only some of the numbers are marked and labeled. What numbers are represented by points *A* and *B*?

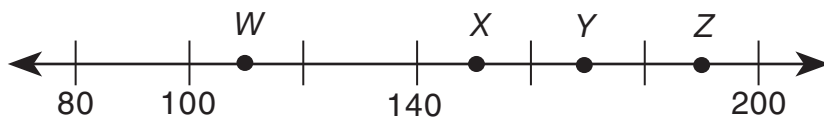


The first two numbers on the number line are 28 and 30. Each mark on the number line represents 2. Point *A* is one mark past the number 30. Point *A* represents the number 32. Point *B* represents the number 34.



Try It

Which point best represents the number 150 on the number line?



The first two numbers on the number line are _____ and _____ .

Each mark on the number line represents _____ .

Count by _____ to find the missing numbers on the number line.

The number 150 is halfway between _____ and _____ .

Point _____ best represents 150.

The first two numbers on the number line are 80 and 100. Each mark on the number line represents 20. Count by 20 to find the missing numbers on the number line. The number 150 is halfway between 140 and 160. Point *X* best represents 150.

Objective 3

Some number lines divide the space between the whole numbers into smaller equal parts. These equal parts can represent fractions.

This section of a number line begins at 18 and ends at 20. It shows the points halfway between the numbers. Where is the number $18\frac{1}{2}$ on the number line?

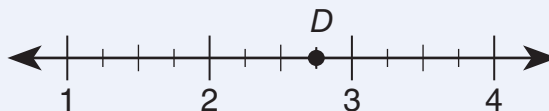


The number $18\frac{1}{2}$ is halfway between 18 and 19. Point C shows the location of $18\frac{1}{2}$.

Do you see
that . . .



This section of a number line begins at 1 and ends at 4. Where is the number $2\frac{3}{4}$ on the number line?



The number $2\frac{3}{4}$ is between 2 and 3. There are 4 equal parts between the 2 and the 3. Each mark represents $\frac{1}{4}$. Count 3 marks, or $\frac{3}{4}$, past the whole number 2. Point D shows the location of $2\frac{3}{4}$.

Try It

Look at the number line below. What number does point P represent?



Point P is between the whole numbers _____ and _____.

There are _____ equal parts between these numbers. Each mark

represents $\frac{\square}{\square}$.

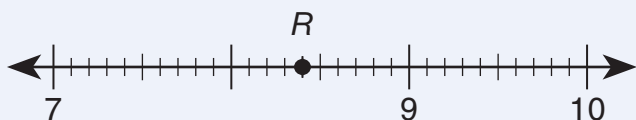
Point P is _____ marks past 25.

Point P represents _____.

Point P is between the whole numbers 25 and 26. There are 4 equal parts between these numbers. Each mark represents $\frac{1}{4}$. Point P is 3 marks past 25. Point P represents $25\frac{3}{4}$.

A number line can also show decimal amounts. Marks between the whole numbers on a number line can represent decimal amounts.

This section of a number line begins at 7 and ends at 10. What number is represented by point R on the number line?



The whole number 8 is between the 7 and the 9.

Point R is between the whole numbers 8 and 9.

The space between the 8 and the 9 is divided into 10 equal parts. Each mark represents the decimal 0.1. Point R is 4 marks, or 0.4, past the whole number 8. Point R is at 8.4.

Try It

Which point best represents the number 61.2 on the number line?



The number 61.2 is between the two whole numbers _____ and _____.

The number line shows _____ equal parts between these two whole numbers.

Each mark represents the decimal _____.

The number 61.2 is _____ marks to the right of _____.

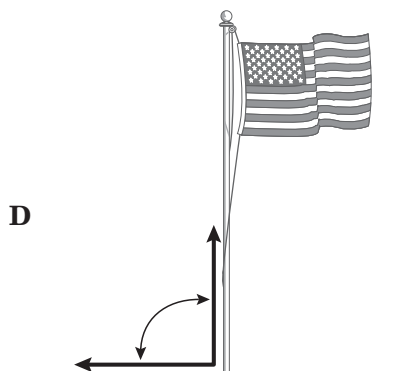
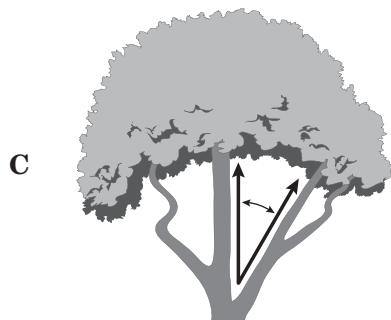
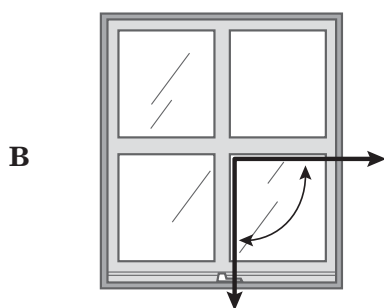
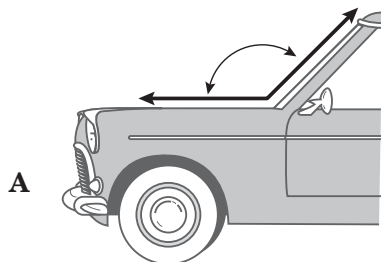
Point _____ best represents 61.2 on the number line.

The number 61.2 is between the two whole numbers **61** and **62**. The number line shows **10** equal parts between these two whole numbers. Each mark represents the decimal **0.1**. The number 61.2 is **2** marks to the right of **61**. Point **C** best represents 61.2 on the number line.

Now practice what you've learned.

Question 25

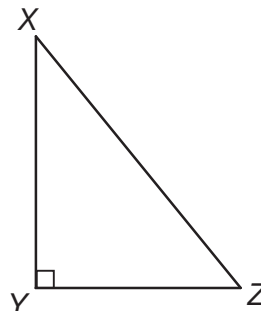
Which angle appears to be an obtuse angle?



Answer Key: page 136

Question 26

Look at the triangle below.



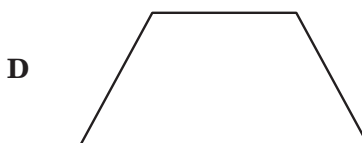
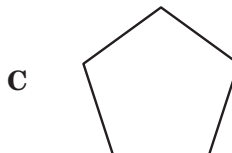
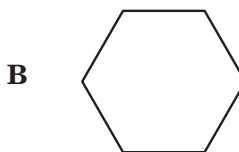
Which two line segments are perpendicular?

- A \overline{ZY} and \overline{XZ}
- B \overline{XY} and \overline{XZ}
- C \overline{XY} and \overline{YZ}
- D Not here

Answer Key: page 136

Question 27

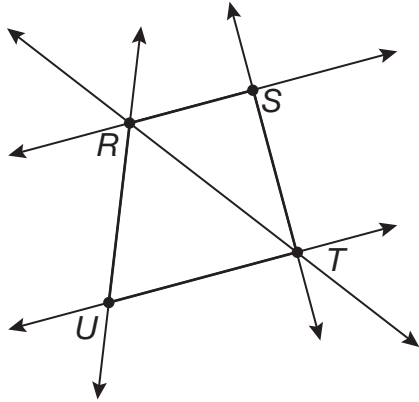
Which figure does **NOT** have at least one pair of sides that appear to be parallel?



Answer Key: page 136

Question 28

Look at the figure below.



Which two lines appear to be perpendicular?

- A Line RU and line TU
- B Line RS and line ST
- C Line RS and line RU
- D Line RT and line TU

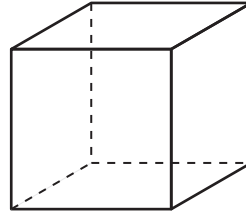


Answer Key: page 136

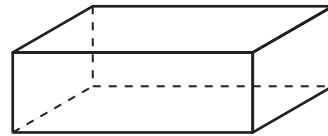
Question 29

Which figure has exactly 5 faces, 8 edges, and 5 vertices?

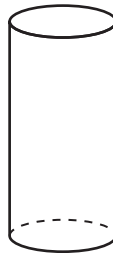
A



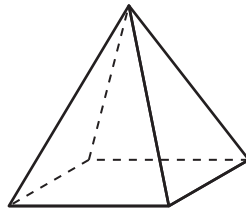
B



C



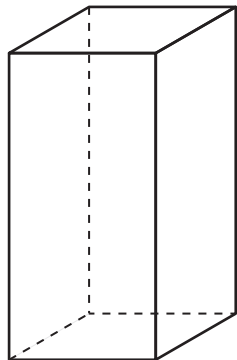
D



Answer Key: page 137

Question 30

How many edges does this three-dimensional figure have?



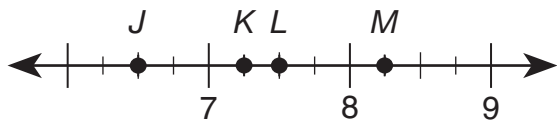
- A 4
- B 6
- C 8
- D 12



Answer Key: page 137

Question 31

Which point on this number line best represents $7\frac{2}{4}$?



- A Point *J*
- B Point *K*
- C Point *L*
- D Point *M*

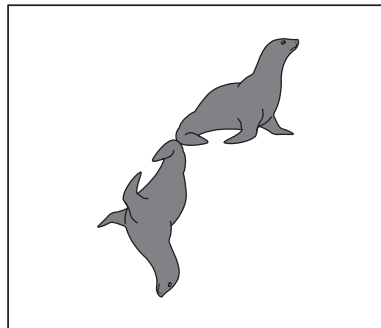


Answer Key: page 137

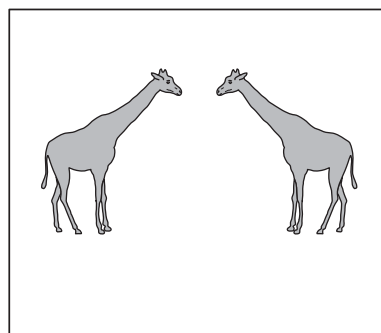
Question 32

Which of these drawings shows a translation?

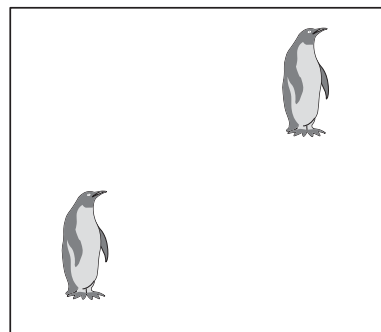
A



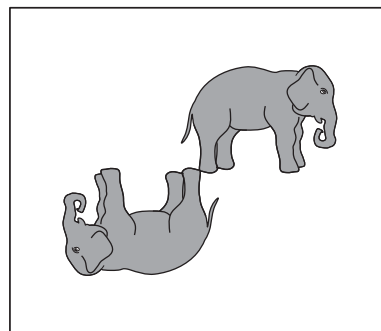
B



C



D

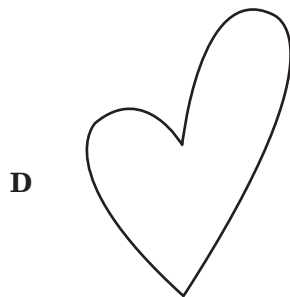
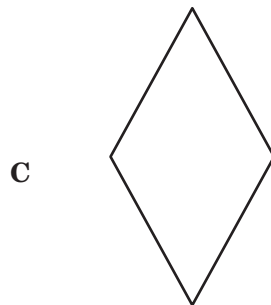
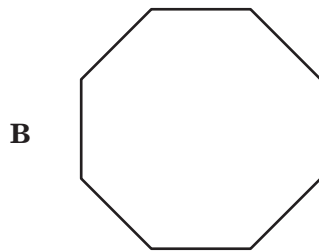
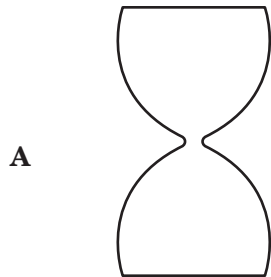



Answer Key: page 137

Objective 3

Question 33

Which figure does **NOT** have a line of symmetry?



 **Answer Key: page 137**


Question 34

Look at the letter below.



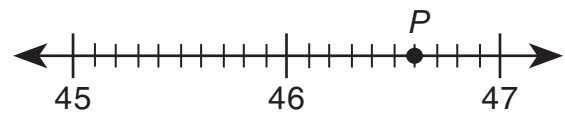
How many lines of symmetry does this letter appear to have?

- A** 0
- B** 1
- C** 2
- D** 3


 **Answer Key: page 137**

Question 35

Which number on the number line does point *P* best represent?



- A** 46.2
- B** 46.6
- C** 45.8
- D** 46.8

 **Answer Key: page 137**

Objective 4

The student will demonstrate an understanding of the concepts and uses of measurement.

For this objective you should be able to

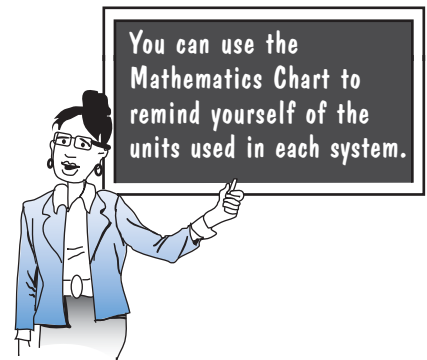
- measure length, perimeter, area, weight (or mass), and capacity (or volume); and
- use measurement concepts to solve problems.

When Do You Use Measurement?

You can use measurement for many things. You can measure your arm to find out how long it is, or you can place a bag of tomatoes on a scale to find out how much it weighs. If you look at a clock to tell the time or at a thermometer to read the temperature, you are using measurement.

There are two main systems people use to measure things: the customary system and the metric system.

- Most people in the United States use the **customary system**. If you measure capacity in the customary system, you use units such as quarts and gallons.
- Scientists and people in most other countries use the **metric system**. If you measure capacity in the metric system, you use units such as milliliters and liters.



How Do You Measure Length?

One way to describe an object is to measure its length. The following charts show some common units of length used in the customary and the metric systems of measurement.

Customary Units

Unit	Example
Inch (in.)	About the length of a small paper clip
Foot (ft)	About the length of a sheet of notebook paper
Yard (yd)	About the width of a door
Mile (mi)	Used to measure long distances, such as the distance between two towns

Metric Units

Unit	Example
Millimeter (mm)	About the thickness of a dime
Centimeter (cm)	About the width of a fingernail
Meter (m)	About the width of a door
Kilometer (km)	Used to measure long distances, such as the distance between two towns

A park ranger wants to measure the height of a tall tree. Which is the best unit of measure to use—the inch, mile, centimeter, or meter?

Think about the length of each unit.

- The units inch and centimeter are too small.
- The unit mile is too large.
- The unit meter is the best unit. The width of a door is about 1 meter. It would be reasonable to express the height of a tall tree in meters.

Of the choices given, the meter is the best for measuring the height of a tall tree.

Try It

Use inches, yards, or miles to estimate the lengths of the following objects.

A car key is about 3 _____ in length.

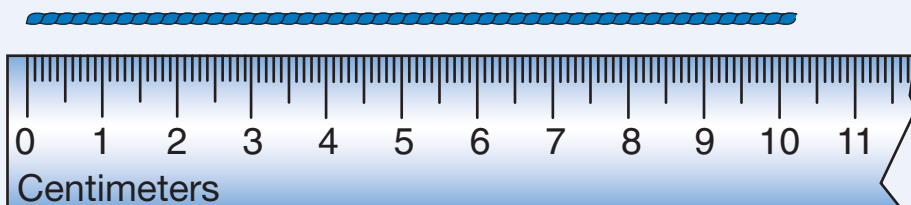
Houston, Texas, is about 156 _____ from Austin, Texas.

A football field is 100 _____ long.

A car key is about 3 **inches** in length. Houston, Texas, is about 156 **miles** from Austin, Texas. A football field is 100 **yards** long.

You can use a ruler to measure the lengths of many objects. There are two rulers on the Mathematics Chart in the back of this book.

Use the ruler below to measure this piece of string to the nearest centimeter.

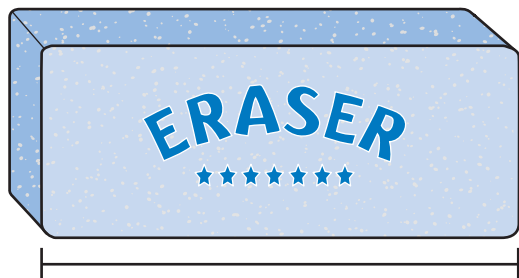


- Notice that the ruler is numbered in centimeters. The marks between each number indicate millimeters.
- The 0-centimeter mark on the ruler is placed at the left end of the string.
- The right end of the string aligns with the mark on the ruler that is slightly past the 10.

The length of the string is about 10 centimeters.

Try It

Use the ruler on the Mathematics Chart to measure the length of the line segment under the eraser to the nearest half inch.



The length of the eraser is about _____ inches.

The end of the eraser is closest to the $2\frac{1}{2}$ -inch mark. The length of the eraser is about $2\frac{1}{2}$ inches.

What Is Perimeter?

Perimeter is the distance around a figure. To find the perimeter of a figure, add the lengths of all its sides.

Look at this quadrilateral. What is the perimeter of the quadrilateral? Use the ruler on the Mathematics Chart to measure each side to the nearest inch.

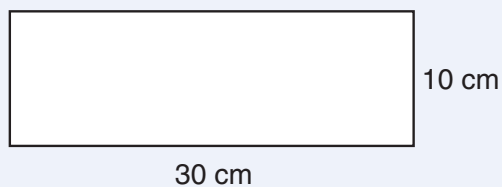


Add the lengths of all the sides.

$$2 + 3 + 2 + 4 = 11$$

The perimeter of the quadrilateral is about 11 inches.

Look at the rectangle below. The dimensions are given in centimeters. What is the rectangle's perimeter?



The opposite sides of a rectangle are congruent. This rectangle has 2 sides that are 10 centimeters and 2 sides that are 30 centimeters. Find the perimeter by adding the lengths of the 4 sides.

$$10 + 10 + 30 + 30 = 80$$

The perimeter of the rectangle is 80 centimeters.

Try It

Find the perimeter of the rectangle below. The length is 52 feet and the width is 13 feet.



The opposite sides of a rectangle are _____.

Two sides are _____ feet and two sides are _____ feet.

To find the perimeter, _____ the lengths of the sides of the rectangle.

$$\underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

The perimeter of the figure is _____ feet.


The opposite sides of a rectangle are **congruent**. Two sides are **52** feet and two sides are **13** feet. To find the perimeter, **add** the lengths of the sides of the rectangle. $52 + 52 + 13 + 13 = 130$. The perimeter of the figure is **130** feet.

What Is Area?

Area is the measure of how many square units a figure covers. Some of the units used to measure area are square inches, square centimeters, square feet, and square meters.

One way to find area is by counting square units. Count the number of square units in the rectangle below.

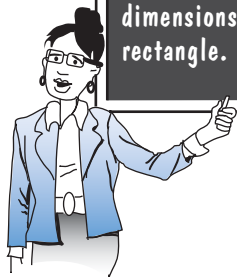
1	2	3	4
5	6	7	8
9	10	11	12

The area of a rectangle equals the number of square units in the rectangle. Each  equals 1 square unit. The area of this rectangle is 12 square units.

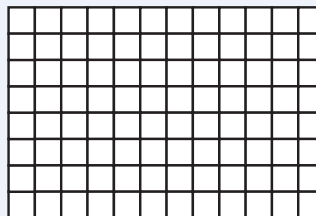
Objective 4

Another way to find the area of a rectangle is by counting the squares in one row and the squares in one column and multiplying them together to find the total number of squares.

An area model is like an array. Remember, an array is made of rows and columns and can be used to model multiplication. In an area model of a rectangle, the number of rows and the number of columns represent the dimensions of the rectangle.



Find the area of this rectangle.



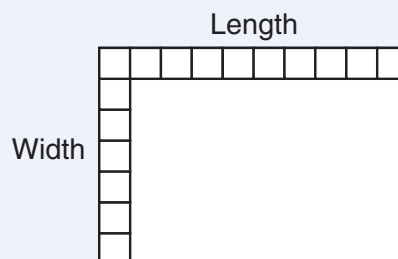
□ = 1 square inch

In this rectangle there are 8 rows and 12 columns of square inches.

$$8 \times 12 = 96$$

The area of this rectangle is 96 square inches.

The rectangle below represents Mr. Allen's kitchen floor. The small squares represent the length and width of the floor in feet.



□ = 1 square foot

What is the area of Mr. Allen's kitchen floor?

Count the number of squares that represent the length. There are 10 squares. Then count the number of squares that represent the width. There are 7 squares. If the entire floor is covered with squares, there will be 7 rows and 10 columns of squares.

Multiply the number of squares in each row by the number of squares in each column to find the total number of squares.

$$7 \times 10 = 70$$



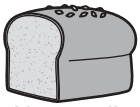
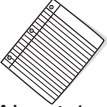
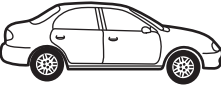

It takes 70 squares to cover the entire kitchen floor. The area of the kitchen floor is 70 square feet.

Do you see that . . .



How Do You Measure Weight and Mass?

The **weight** or **mass** of an object tells how heavy it is. The charts below show some common units of weight and mass used in the customary and metric systems.

Customary Units of Weight		Metric Units of Mass	
Unit	Example	Unit	Example
Ounce	 About 1 oz	Milligram	 Grain of rice About 1 mg
Pound	 About 1 lb	Gram	 About 1 g
Ton	 About 1 ton	Kilogram	 About 1 kg

To understand which is the best unit to describe the weight or mass of an object, you need to understand the basic units of measure. For example, you could weigh a car in ounces, but the number of ounces would be very large.

What unit of measure should Jennifer use to describe the weight of a nickel?

- Jennifer knows that the units pound and ton are too large.
- She knows that the unit ounce is a good choice.

Ounces are the best units to use to describe the weight of a nickel.

Try It

Use milligrams, grams, or kilograms to estimate the mass of the following objects.

The mass of a dog is about 10 _____.

The mass of a paper clip is about 1 _____.

The mass of a marker is about 7 _____.





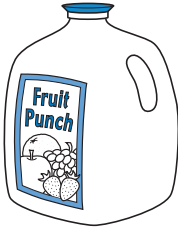
The mass of a pea is about 2 _____.

The mass of a dog is about 10 **kilograms**. The mass of a paper clip is about 1 **gram**. The mass of a marker is about 7 **grams**. The mass of a pea is about 2 **milligrams**.



How Do You Measure Capacity?

Capacity is a measure of how much a container can hold. The charts below show some common units of capacity or volume used in the customary and metric systems.

Customary Units

Unit	Example
Fluid ounce	 1 fluid ounce
Cup	 1 c
Pint	 1 pt
Quart	 1 qt
Gallon	 1 gal

Metric Units

Unit	Example
Milliliter	 About 1 mL
Liter	 1 L

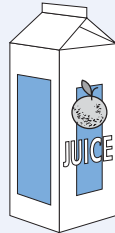
Michael went to the store to buy some orange juice for his family. There are 4 people in his family. He noticed that orange juice comes in many different-size containers.



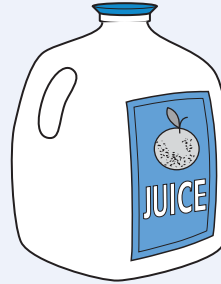
8 fluid ounces,
or 1 cup



1 pint



1 quart



1 gallon

Which size container of orange juice should Michael buy for his family to last an entire week?

- Michael knows that he could drink about 8 fluid ounces, or 1 cup. But this amount would be too small for the whole family for a week.
- If Michael were going to buy enough orange juice for himself and his brother for one day, he could buy the 1-pint container. One pint is equal to two cups. But one pint would also be too small for the whole family for a week.
- One quart is equal to two pints. One quart would probably be enough for the family for one day.
- One gallon is equal to four quarts. One gallon would be enough for a week.

Michael decided that one gallon of orange juice would be the best size to buy for his family for the week.

Objective 4

Remi's class is planning a party. There will be about 45 people at the party. Remi asks some classmates how much lemonade is needed for the party. Here are the answers she gets:

30 cups 30 liters 30 milliliters 30 gallons

How can Remi determine which of these is the most reasonable amount of lemonade?

- Remi knows that the units cup and milliliter are too small because a cup would be used for an individual serving and milliliters are even smaller than cups.
- Remi thinks about the suggestion 30 liters. She thinks that a 1-liter bottle will serve about 2 people. Since $30 \times 2 = 60$, then this amount would serve 60 people. Everyone could have a glass of lemonade, and there would be some left over.
- Then Remi thinks about 30 gallons. She knows that a gallon is a lot more than a liter. She thinks that this amount is too much.

Remi decides that the most reasonable amount of lemonade needed is 30 liters.

Try It

Use gallons, milliliters, or liters to estimate the capacity of the following objects.

The capacity of a spoon is about 5 _____.

The capacity of a bucket is about 2 _____.

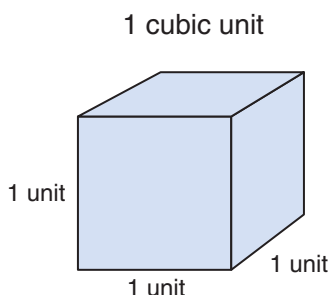
The capacity of a water bottle is about 1 _____.

The capacity of a spoon is about 5 **milliliters**. The capacity of a bucket is about 2 **gallons**. The capacity of a water bottle is about 1 **liter**.

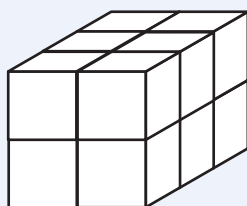
How Do You Measure Volume?

The **volume** of an object is the number of cubic units it takes to fill the object. One way to find the volume of an object is to count the number of cubes it takes to fill it.

Volume is measured in cubic units. The cube below has edges that each measure 1 unit long. It has a volume of 1 cubic unit.

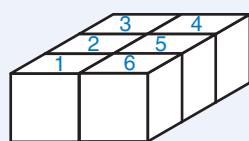


The rectangular prism shown below is made of 1-centimeter cubes.

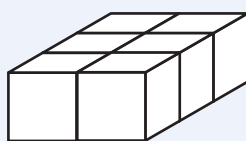


What is its volume?

One way to find its volume is to count the cubes. The prism has two layers.



Top layer



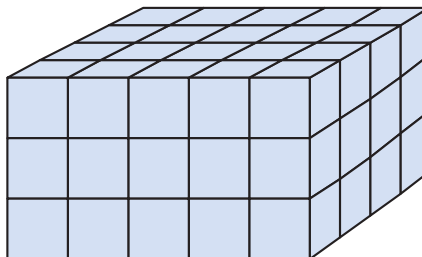
Bottom layer

- There are 6 cubes in the top layer.
- There are also 6 cubes in the bottom layer, even though you cannot see all of them in the original figure.
- There are 12 cubes in all.

Since the rectangular prism is made of 1-centimeter cubes, the volume of the prism is 12 cubic centimeters.

Try It

A rectangular prism made of 1-unit cubes is shown below.



What is the volume of this prism?

There are _____ cubic units in the top layer.

There are _____ cubic units in the middle layer.

There are _____ cubic units in the bottom layer.

Add the number of cubic units in each layer:

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

The prism has a volume of _____ cubic units.

There are 20 cubic units in the top layer. There are 20 cubic units in the middle layer. There are 20 cubic units in the bottom layer. Add the number of cubic units in each layer: $20 + 20 + 20 = 60$. The prism has a volume of 60 cubic units.

How Do You Convert Units of Measure?

Sometimes you will need to convert from one unit of measure to another, such as feet to inches or cups to pints.

- To convert a smaller unit to a larger unit, divide by the number of smaller units there are in one of the larger units.
- To convert a larger unit to a smaller unit, multiply by the number of smaller units there are in one of the larger units.

Use the information on the Mathematics Chart to help convert units of measure.

Grade 4 Mathematics Chart	
LENGTH	
Metric	Customary
1 kilometer = 1000 meters	1 mile = 1760 yards
1 meter = 100 centimeters	1 mile = 5280 feet
1 centimeter = 10 millimeters	1 yard = 3 feet
	1 foot = 12 inches
CAPACITY AND VOLUME	
Metric	Customary
1 liter = 1000 milliliters	1 gallon = 4 quarts
	1 gallon = 128 fluid ounces
	1 quart = 2 pints
	1 pint = 2 cups
	1 cup = 8 fluid ounces
MASS AND WEIGHT	
Metric	Customary
1 kilogram = 1000 grams	1 ton = 2000 pounds
1 gram = 1000 milligrams	1 pound = 16 ounces

John needs 20 feet of decorative lights for a display. Lights come in 4-yard, 7-yard, and 10-yard lengths.

- To decide which length he should purchase, John needs to convert the number of yards to the number of feet.
- Look at the Mathematics Chart to find the number of feet in a yard. There are 3 feet in 1 yard.
- A yard is a larger unit than a foot. To convert a larger unit to a smaller unit, multiply.

$$4 \text{ yards} \times 3 \text{ feet per yard} = 12 \text{ feet}$$

$$7 \text{ yards} \times 3 \text{ feet per yard} = 21 \text{ feet}$$

$$10 \text{ yards} \times 3 \text{ feet per yard} = 30 \text{ feet}$$

John wants the length of the lights to be as close as possible to the exact length he needs. John needs 20 feet of lights. There are 21 feet in 7 yards.

The 7-yard length of lights is the best choice.

Try It



1 gal



1 qt

James bought 2 gallons of milk, and Amanda bought 5 quarts of milk. How many quarts of milk did James and Amanda buy altogether?

James bought 2 _____ of milk and Amanda bought 5 _____ of milk.

The question asks to find the number of _____ of milk James and Amanda bought. Convert the 2 gallons of milk James bought into quarts.

Use the Mathematics Chart to find how many quarts are in one gallon. There are _____ quarts in one gallon.

If 1 gallon equals 4 quarts, then 2 gallons equals

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ quarts.}$$

James bought _____ quarts of milk.

Add to find the total number of quarts of milk both James and Amanda bought.

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

James and Amanda bought _____ quarts of milk altogether.

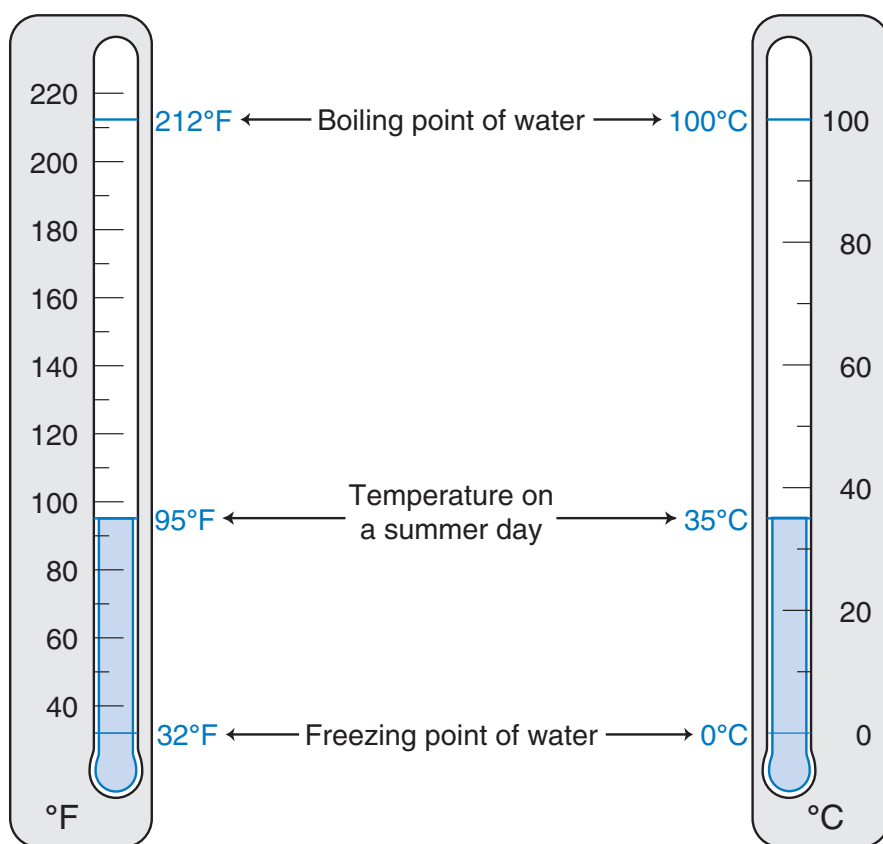
James bought 2 **gallons** of milk and Amanda bought 5 **quarts** of milk. The question asks to find the number of **quarts** of milk. There are 4 quarts in one gallon. If 1 gallon equals 4 quarts, then 2 gallons equals $4 \times 2 = 8$ quarts. James bought 8 quarts of milk. $8 + 5 = 13$. James and Amanda bought 13 quarts of milk altogether.

How Do You Measure Temperature?

Temperature is a measure of how hot or cold something is. Temperature is measured with a thermometer. There are two common systems for measuring temperature: the customary system and the metric system.

- The customary system measures temperature in degrees Fahrenheit. Degrees Fahrenheit can be written $^{\circ}\text{F}$. Most people in the United States use thermometers labeled in degrees Fahrenheit.
- The metric system measures temperature in degrees Celsius. Degrees Celsius can be written $^{\circ}\text{C}$. Scientists and people in most other countries use thermometers labeled in degrees Celsius.

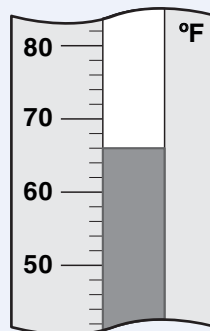
Look at the thermometers below. The shaded portion of the thermometer indicates the temperature on a summer day. The Fahrenheit thermometer reads 95°F . The Celsius thermometer reads 35°C .



Objective 4

You can find a change in temperature by subtracting the lower temperature from the higher temperature.

The thermometer below shows the temperature of Lake Michigan one day.



The temperature of Lake Superior that day was 19°F lower than the temperature of Lake Michigan. What was the temperature of Lake Superior that day?

Look at the shaded part of the thermometer to find the temperature of Lake Michigan.

- The top of the shaded part is between 60 and 70.
- It stops 3 marks above 60.
- Each mark represents 2 degrees Fahrenheit.

The thermometer reads 66°F .

The temperature of Lake Superior was 19°F lower than Lake Michigan. To find the temperature of Lake Superior, subtract 19 from the temperature of Lake Michigan.

$$66 - 19 = 47$$

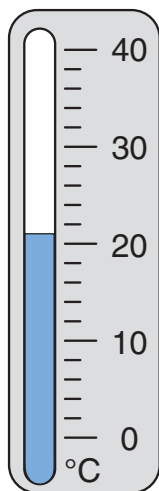
The temperature of Lake Superior was 47°F .

Do you see
that ...

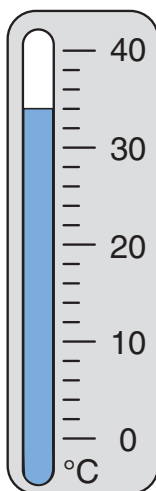


Try It

Look at the two thermometers below.



8:00 A.M.



2:00 P.M.

How many degrees did the temperature increase from 8:00 A.M. to 2:00 P.M.?

At 8:00 A.M. the temperature was _____ °C.

At 2:00 P.M. the temperature was _____ °C.

Use the operation of _____ to find the number of degrees the temperature increased.

The number sentence _____ - _____ = _____ shows the number of degrees the temperature increased.

The temperature increased _____ degrees.

At 8:00 A.M. the temperature was 21°C. At 2:00 P.M. the temperature was 34°C. Use **subtraction** to find the number of degrees the temperature increased. The number sentence $34 - 21 = 13$ shows the number of degrees the temperature increased. The temperature increased 13 degrees.

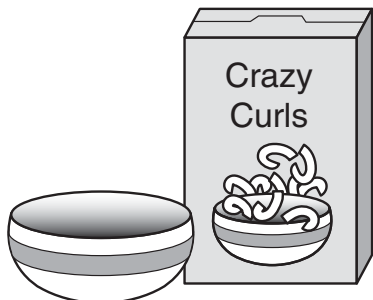


What do the marks on the thermometer represent?

Now practice what you've learned.

Question 36

Look at the picture below.



Which is the best estimate of the mass of the full box of cereal?

- A 3 grams
- B 3 kilograms
- C 300 grams
- D 300 kilograms



Answer Key: page 138

Question 37

Bill is measuring an object's weight in ounces. Which object is he most likely weighing?

- A A pencil eraser
- B A chair
- C A horse
- D A bowling ball



Answer Key: page 138

Question 38

Ann used 3 pounds of butter making cookies. How many ounces of butter did she use?

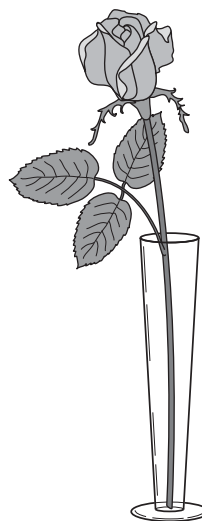
- A 16 ounces
- B 27 ounces
- C 48 ounces
- D 54 ounces



Answer Key: page 138

Question 39

Loren put one rose in a small vase.



About how much water should she add to fill the small vase?

- A 6 fluid ounces
- B 6 pints
- C 6 quarts
- D 6 gallons



Answer Key: page 138

Question 40

Heather filled a pitcher with fruit punch.



Which is the best estimate of the capacity of the pitcher?

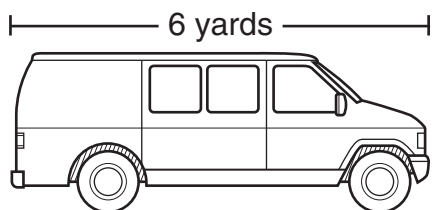
- A 2 liters
- B 2 milliliters
- C 20 liters
- D 20 milliliters



Answer Key: page 138

Question 41

What is the length of the van in feet?



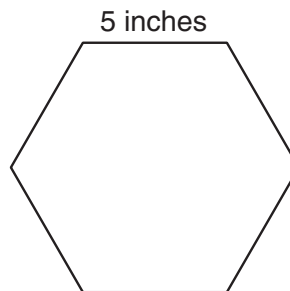
- A 2 ft
- B 24 ft
- C 18 ft
- D 9 ft



Answer Key: page 138

Question 42

The sides of this hexagon are all the same length.



What is the perimeter of the hexagon?

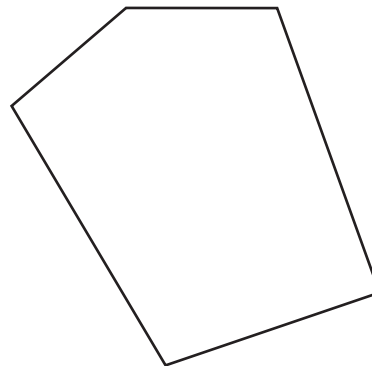
- A 5 in.
- B 6 in.
- C 11 in.
- D 30 in.



Answer Key: page 138

Question 43

Use the ruler on the Mathematics Chart to measure the sides of this figure to the nearest centimeter.



Which is closest to the perimeter of this figure?

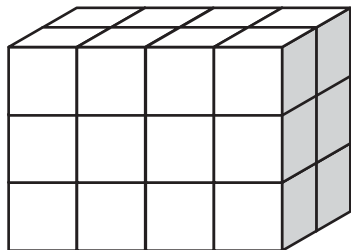
- A 9 cm
- B 15 cm
- C 6 cm
- D 12 cm



Answer Key: page 138

Question 44

Walter made a rectangular prism out of 1-inch cubes, as shown below.



What is the volume of Walter's rectangular prism?

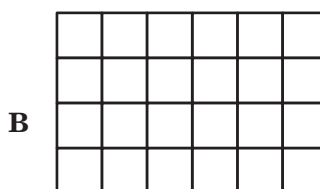
- A 8 cubic inches
- B 12 cubic inches
- C 24 cubic inches
- D 26 cubic inches

Question 45

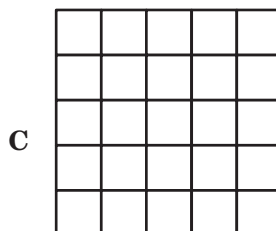
Which of these rectangles does **NOT** have an area of 24 square units?



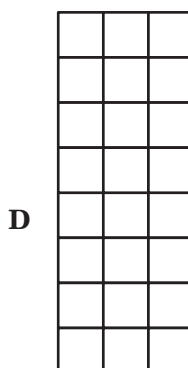
= 1 square unit



= 1 square unit



= 1 square unit



= 1 square unit



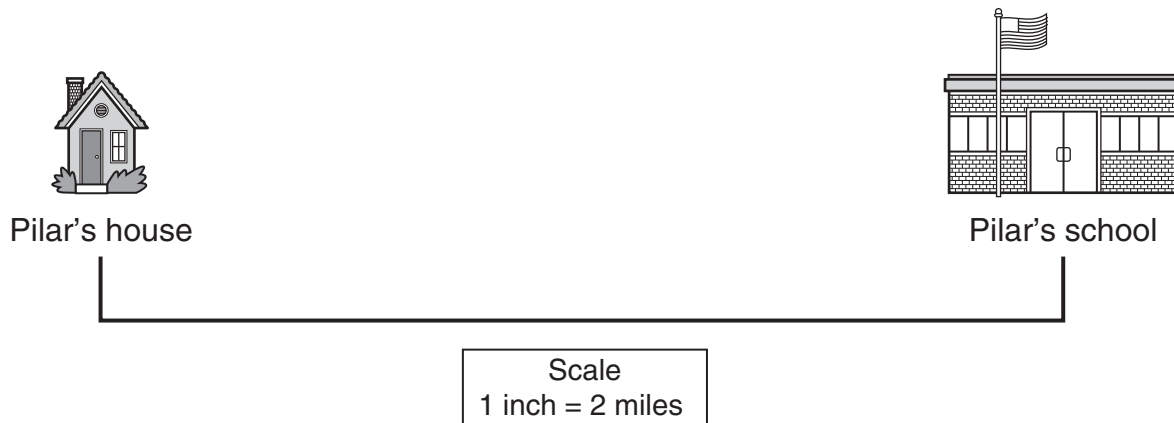
Answer Key: page 138



Answer Key: page 138

Question 46

Pilar rides in a car to school using the same route every day. Look at the drawing below. Use the ruler on the Mathematics Chart to measure the distance from Pilar's house to her school to the nearest inch.



What is closest to the actual distance in miles from Pilar's house to her school?

- A 5 mi
- B 3 mi
- C 2 mi
- D 10 mi

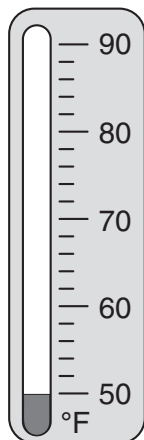


Answer Key: page 139

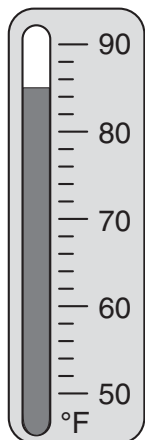
Objective 4

Question 47

Caron looked at the thermometer in her garden in the morning and again in the afternoon.



Morning



Afternoon

How much had the temperature increased?

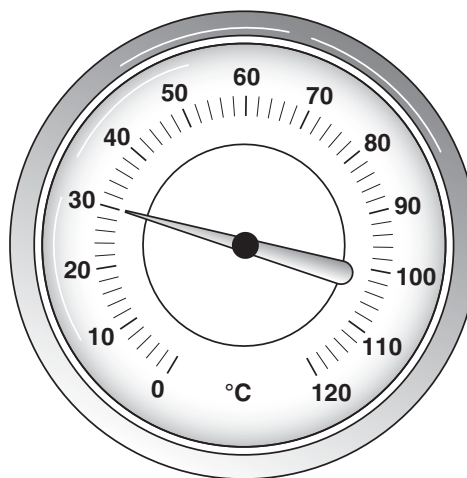
- A 25°F
- B 35°F
- C 80°F
- D 135°F



Answer Key: page 139

Question 48

The thermometer below shows the current temperature. A weather reporter predicts that by sunrise the temperature will have fallen 12°C. If the reporter is correct, what will the temperature be at sunrise?



- A 12°C
- B 18°C
- C 22°C
- D 42°C



Answer Key: page 139

Objective 5

The student will demonstrate an understanding of probability and statistics.

For this objective you should be able to

- determine all possible combinations; and
- solve problems by organizing, displaying, and interpreting sets of data.

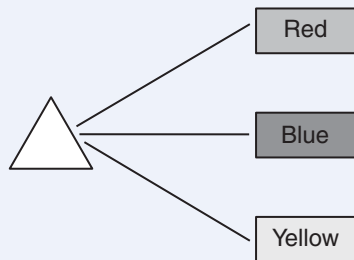
How Can You Determine All Possible Combinations?

You can use pictures or objects to determine all the possible combinations of sets of data.

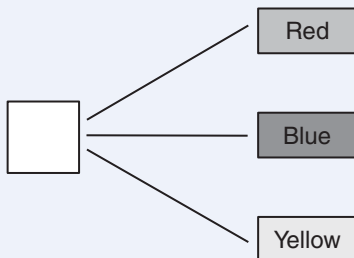
In a set of cards there are three different shapes (triangle, square, circle) and three different colors (red, blue, yellow).

How many combinations of 1 shape card and 1 color card can be made? You could draw a line from each shape to each color to show each combination.

- From the triangle, you could draw a line to the red card, the blue card, and the yellow card. There are three combinations of the triangle card and a color card.



- From the square, you could draw a line to the red card, the blue card, and the yellow card. There are three combinations of the square card and a color card.

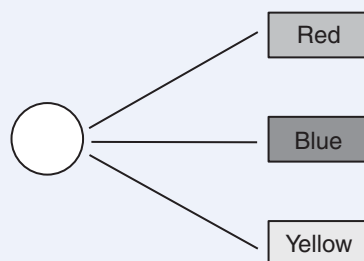


Objective 5

Do you see
that . . .



- From the circle, you could draw a line to the red card, the blue card, and the yellow card. There are three combinations of the circle card and a color card.

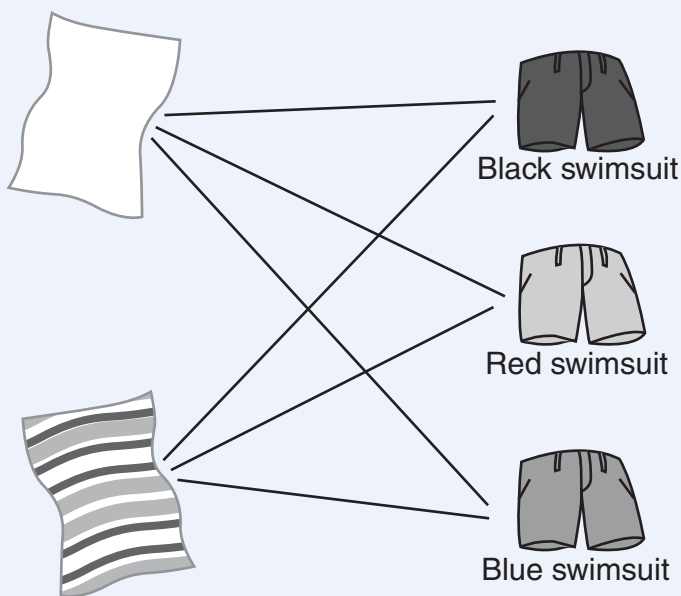


To find the total number of combinations of 1 shape card and 1 color card, add the number of combinations for each shape:

$$3 + 3 + 3 = 9$$

The total number of combinations of 1 shape card and 1 color card is 9.

Peter is going to the beach. He has two towels: a white one and a striped one. He has 3 swimsuits: a black one, a red one, and a blue one. How many combinations of 1 towel and 1 swimsuit are possible?



Draw a line from each towel to each of the swimsuits to find the total number of combinations of 1 towel and 1 swimsuit.

Peter can have the white towel with the black, red, or blue swimsuit. This is 3 combinations.

He can have the striped towel with the black, red, or blue swimsuit. This is 3 combinations.

There are three ways to find the total number of combinations. You could:

- Count the lines you drew
- Add the number of combinations for each towel:

$$3 + 3 = 6$$
- Multiply the number of towels by the number of swimsuits:

$$2 \times 3 = 6$$

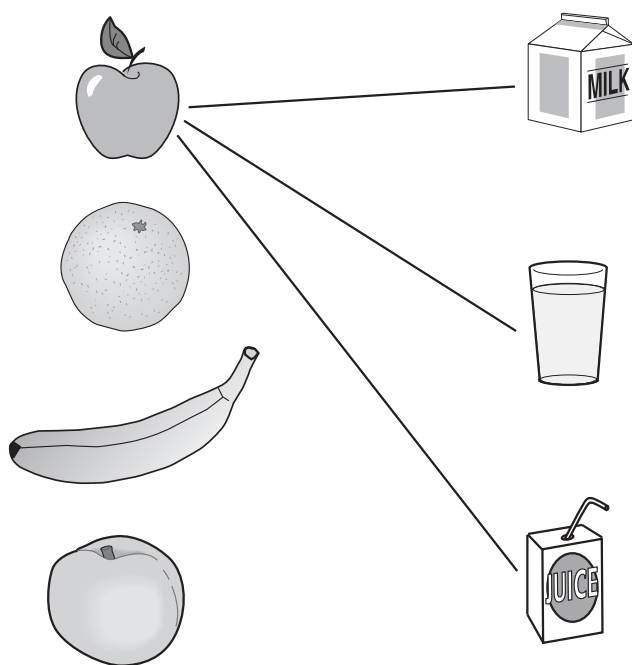
The total number of combinations of 1 towel and 1 swimsuit is 6.



Try It

Molly wants to have a snack. She can have an apple, an orange, a banana, or a peach to eat and milk, water, or juice to drink. How many combinations of 1 fruit and 1 drink can she make?

Draw a line from each piece of fruit to each type of drink.



If Molly chooses an apple, there are _____ combinations of an apple and a drink.

If Molly chooses an orange, there are _____ combinations of an orange and a drink.

If Molly chooses a banana, there are _____ combinations of a banana and a drink.

If Molly chooses a peach, there are _____ combinations of a peach and a drink.

Objective 5

To find the total number of combinations, _____ the number of combinations for each fruit.

$$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

Or multiply the number of pieces of fruit by the number of drinks:

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}.$$

The total number of combinations of 1 fruit and 1 drink is

_____.

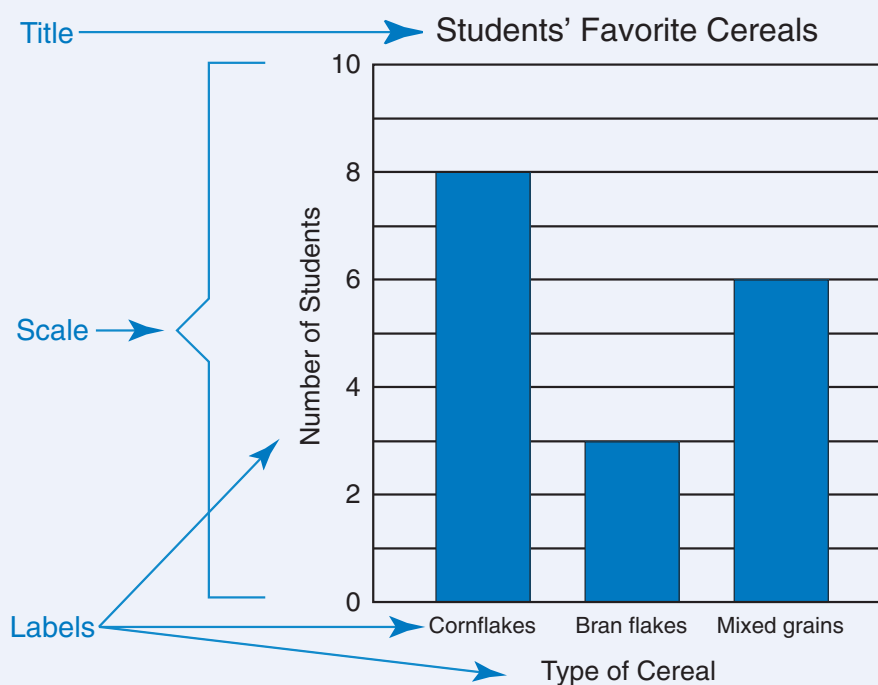
There are **3** combinations of an apple and a drink. There are **3** combinations of an orange and a drink. There are **3** combinations of a banana and a drink. There are **3** combinations of a peach and a drink. To find the total number of combinations, **add** the number of combinations for each fruit. $3 + 3 + 3 + 3 = 12$. Or multiply the number of pieces of fruit by the number of drinks: $4 \times 3 = 12$. The total number of combinations of 1 fruit and 1 drink is **12**.

How Can You Interpret Data?

Data is another word for information. Organizing data in tables, charts, and graphs helps you interpret the data. Interpret means to find meaning in the data.

A **bar graph** is often used to display or represent data. The bars on the graph may be horizontal (across the page) or vertical (up and down the page).

Look at this vertical bar graph.



- A title at the top of a graph identifies the kind of information shown on the graph. The title of this graph is “Students’ Favorite Cereals.”
- Along the left side of the graph is a scale. On this graph the lines on the scale are evenly spaced from 0 to 10. Every number has a mark, but only the even numbers are labeled. The scale represents the number of students.
- The graph has vertical bars that each represent one type of cereal. The labels on the graph describe the data being graphed. The height of each bar shows the number of students who prefer that type of cereal.

Objective 5

You can use graphs to answer questions and solve problems.

Look at the “Students’ Favorite Cereals” bar graph again.

- Which type of cereal do most students prefer?

The heights of the bars tell how many students prefer each type of cereal. Look at the tops of the bars. Follow the top of each bar to the scale to see how many students prefer that type of cereal.

According to the graph, 8 students prefer cornflakes, 3 students prefer bran flakes, and 6 students prefer mixed grains.

The bar for cornflakes is the tallest bar. The cereal most students prefer is cornflakes.

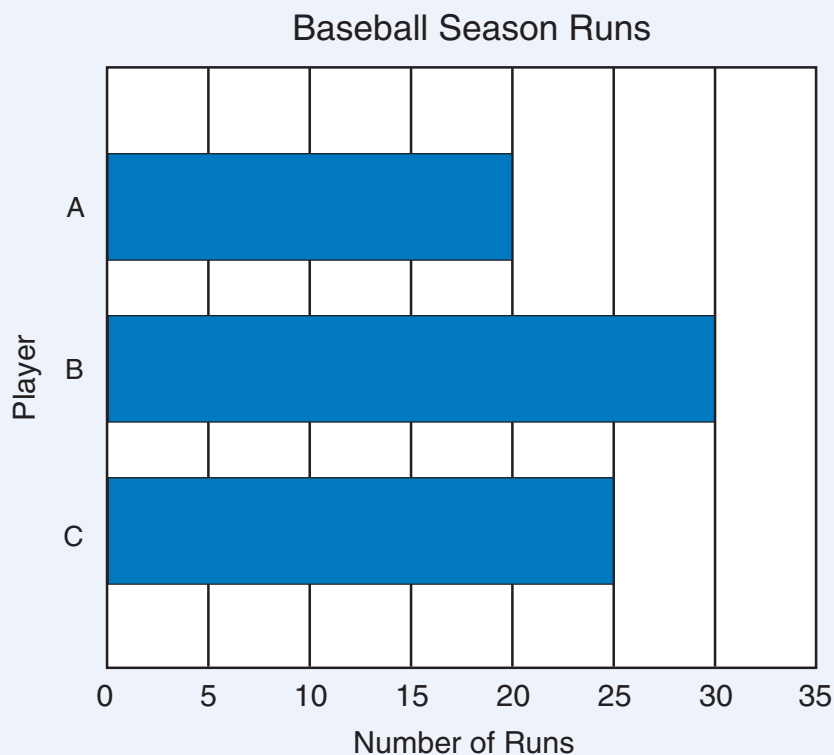
- How many more students prefer cornflakes than prefer bran flakes?

Subtract to compare the number of students who prefer cornflakes with those who prefer bran flakes.

$$8 - 3 = 5$$

According to the information in the graph, 5 more students prefer cornflakes than prefer bran flakes.

Look at this horizontal bar graph.



How many runs in all did the three players score for the season?

Use the graph to find how many runs each player scored.

Look from left to right on the bar for each player. At the end of the bar, look down at the scale to see how many units long the bar is.

- The bar for Player A is 20 units long. Player A scored 20 runs for the season.
- The bar for Player B is 30 units long. Player B scored 30 runs for the season.
- The bar for Player C is 25 units long. Player C scored 25 runs for the season.

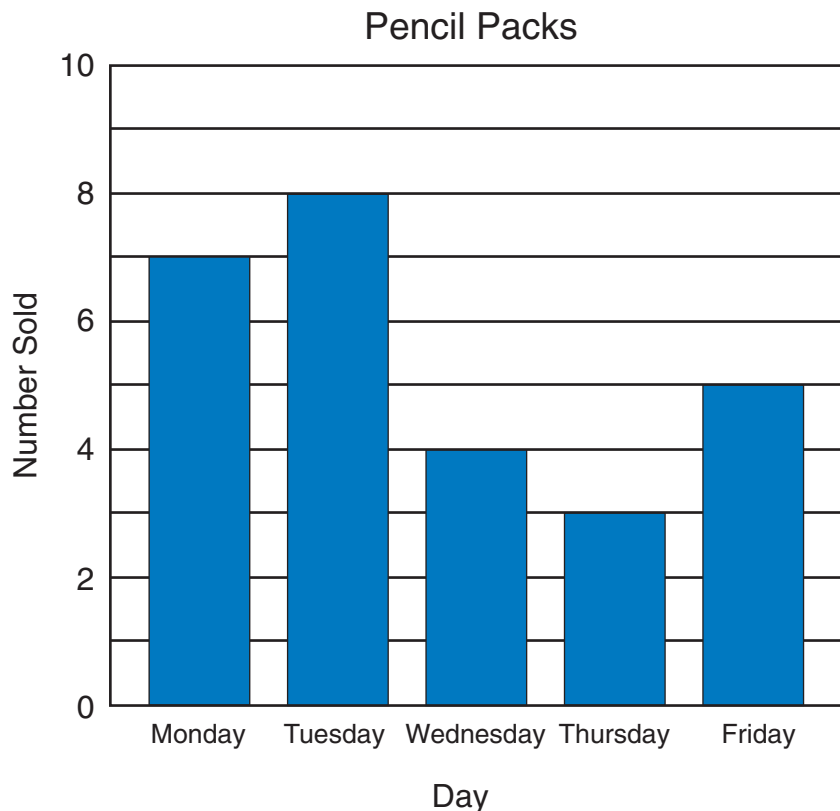
To find the total number of runs for all three players, add the number of runs each player scored.

$$20 + 30 + 25 = 75$$

The three players scored a total of 75 runs for the season.

Try It

This bar graph shows the number of pencil packs sold at a school store each day one week.



On which two days were a total of 10 pencil packs sold?

There were _____ pencil packs sold on Monday.

There were _____ pencil packs sold on Tuesday.

There were _____ pencil packs sold on Wednesday.

There were _____ pencil packs sold on Thursday.

There were _____ pencil packs sold on Friday.

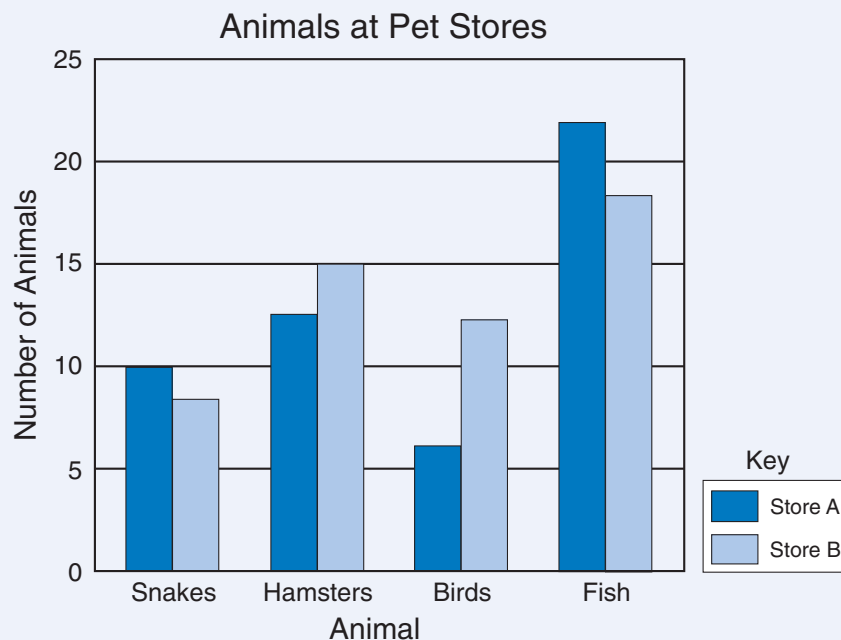
A total of 10 pencil packs were sold on _____

and _____ .

There were 7 pencil packs sold on Monday, 8 on Tuesday, 4 on Wednesday, 3 on Thursday, and 5 on Friday. A total of 10 pencil packs were sold on **Monday** and **Thursday**.

A **double-bar graph** can be used to show data about two different groups. One bar shows the information about one of the groups, and the other bar shows information about the other group. With the bars placed side-by-side, it is easy to compare the data between the two groups. A key tells you which bar represents each group.

Look at this double-bar graph. It shows the number of different animals at two different pet stores.



The key tells you that the information for Store A is represented by the dark (■) bars, and the information for Store B is represented by the light (□) bars. The heights of the bars tell how many of each type of animal each store has.

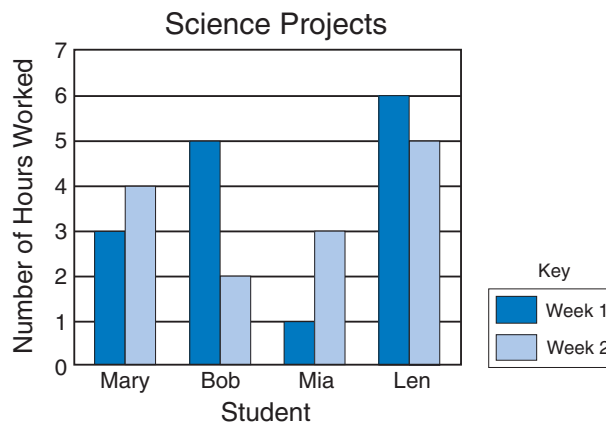
By looking at the bars, it is easy to see that Store A has more snakes than Store B, Store B has more hamsters than Store A, Store B has more birds than Store A, and Store A has more fish than Store B.



What does the key tell you?

Try It

This double-bar graph shows the number of hours that four students worked on their science projects in two different weeks.



- Which student worked the greatest number of hours for the two weeks?
- Which student worked the least number of hours for the two weeks?
- Which students worked more hours in the first week than in the second week?

Mary worked _____ hours in week 1 and _____ hours in week 2.

Bob worked _____ hours in week 1 and _____ hours in week 2.

Mia worked _____ hours in week 1 and _____ hours in week 2.

Len worked _____ hours in week 1 and _____ hours in week 2.

The student who worked the greatest number of hours for the two weeks was _____.

The student who worked the least number of hours for the two weeks was _____.

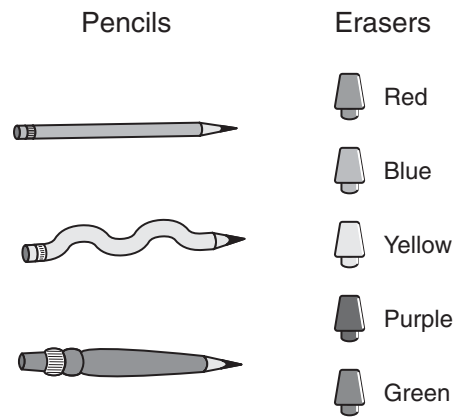
The students who worked more hours in the first week than in the second week were _____ and _____.

Mary worked 3 hours in week 1 and 4 hours in week 2. Bob worked 5 hours in week 1 and 2 hours in week 2. Mia worked 1 hour in week 1 and 3 hours in week 2. Len worked 6 hours in week 1 and 5 hours in week 2. The student who worked the greatest number of hours for the two weeks was **Len**. The student who worked the least number of hours for the two weeks was **Mia**. The students who worked more hours in the first week than in the second week were **Bob** and **Len**.

Now practice what you've learned.

Question 49

A student council is selling pencils and colorful erasers. Students may choose from the pencils and erasers shown below.



How many different combinations of 1 pencil and 1 eraser are possible?

- A 18
- B 3
- C 8
- D 15

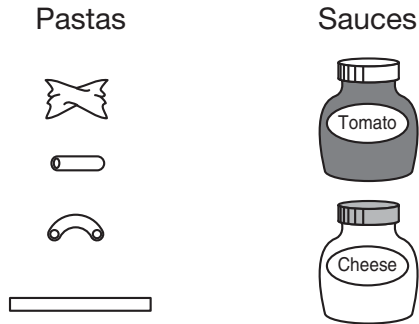


Answer Key: page 139

Objective 5


Question 50

Trina is making pasta for dinner. The picture below shows her choices of pastas and sauces.



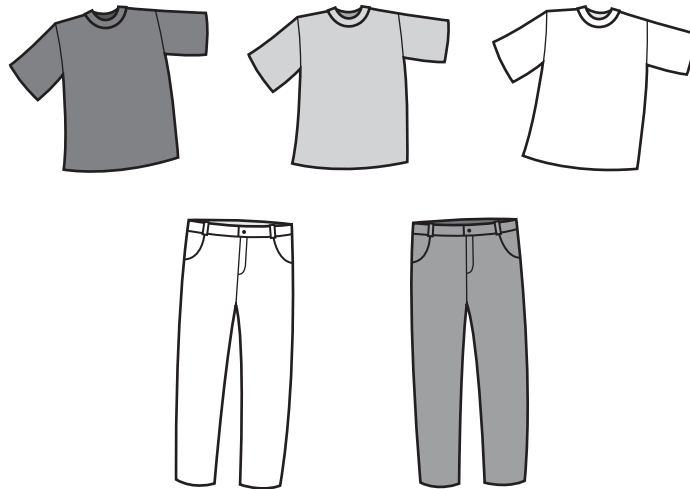
How many different dinner combinations consisting of 1 pasta and 1 sauce can Trina make?
Record your answer and fill in the bubbles in the grid below. Be sure to use the correct place value.

			.
0	0	0	
1	1	1	
2	2	2	
3	3	3	
4	4	4	
5	5	5	
6	6	6	
7	7	7	
8	8	8	
9	9	9	

 **Answer Key: page 139**

Question 51

Tyrone is dressing for school. He can choose from 3 shirts and 2 pairs of pants.



How many possible combinations consisting of 1 shirt and 1 pair of pants can Tyrone make with these choices?

- A 6
- B 2
- C 3
- D 5

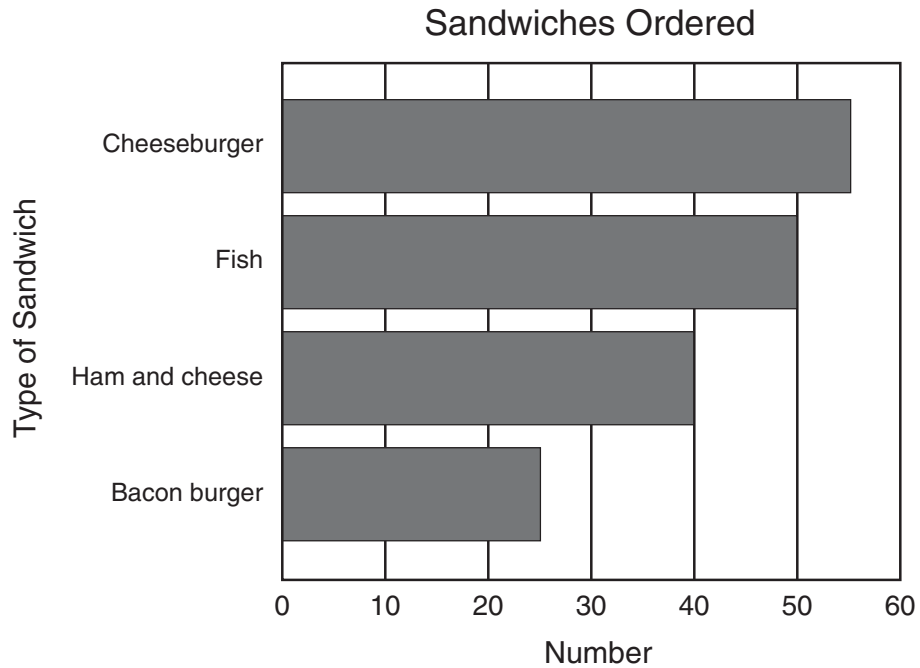


Answer Key: page 139

Objective 5


Question 52

This graph shows how many of each type of sandwich were ordered at a restaurant in a day.



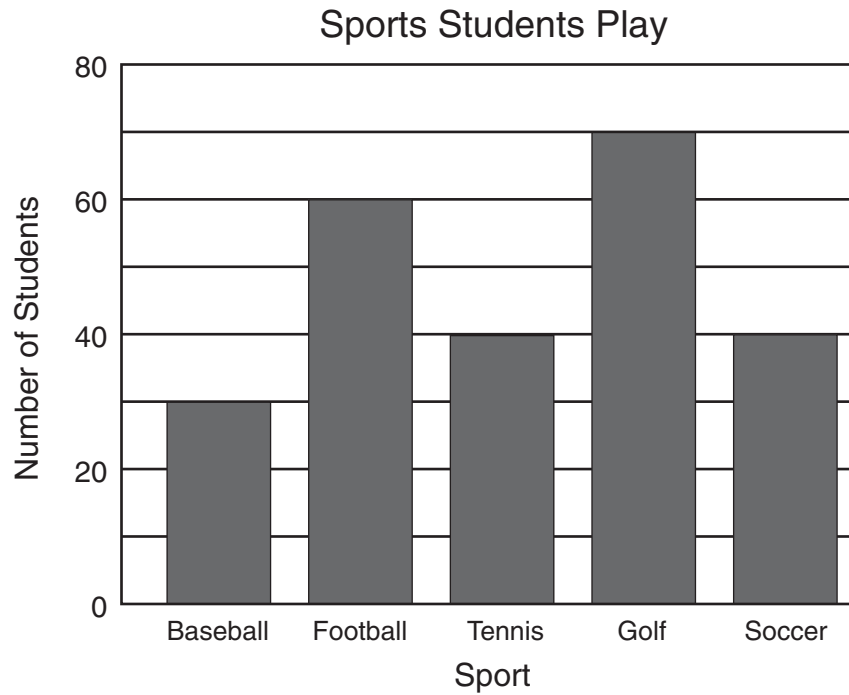
About how many more cheeseburgers than fish sandwiches were ordered?

- A 12
- B 3
- C 5
- D 16

 **Answer Key: page 139**

Question 53

This bar graph shows how many students at Ríos Elementary School play each of the sports listed.



How many students in all play either baseball or soccer?

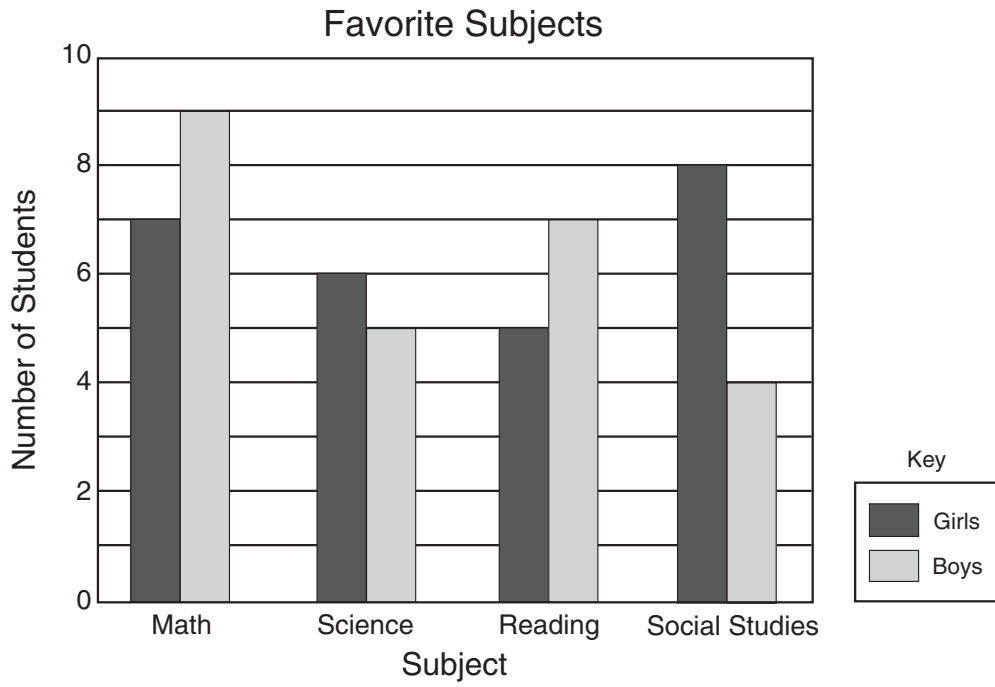
- A 30
- B 40
- C 60
- D 70



Answer Key: page 139

Question 54

The double-bar graph below shows the favorite subjects of the boys and girls in Mr. Wester's class.



How many more boys than girls chose math or reading as their favorite subject?

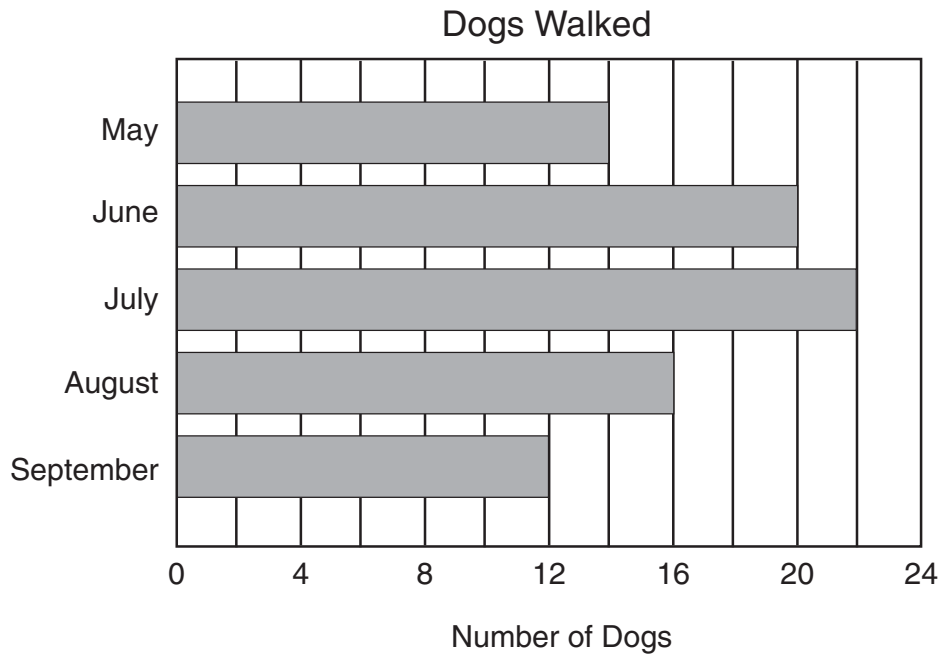
- A 2
- B 3
- C 4
- D 5



Answer Key: page 140

Question 55

Pasha has a dog-walking business. The graph shows the total number of dogs she walked each month from May through September.



How many more dogs did Pasha walk during the months of July, August, and September than she walked during the months of May and June?

- A 84
- B 52
- C 32
- D 16



Answer Key: page 140

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 problem situations;
- communicate about mathematics using everyday language; and
- use logical reasoning.

What Is Problem Solving?

Problem solving is finding a solution that is sometimes not easy to find. You should first decide what problem needs to be solved. Then you should make a plan to solve the problem.

A group of 22 students and 4 adults is going on a field trip to a science museum. Museum tickets cost \$5 each. What will be the total cost of the tickets?

Understand the problem.

- Identify the question you need to answer.
What will be the total cost of the tickets?

- Identify what you know.

There are 22 students and 4 adults.

The tickets cost \$5 each.

Make a plan.

- Add the number of students and adults to find the total number of people.
- Multiply the total number of people by the cost of each ticket to find the total cost of the tickets.

Carry out the plan.

- $22 \text{ students} + 4 \text{ adults} = 26 \text{ people}$
- $26 \text{ people} \times \$5 \text{ per ticket} = \$130$

The total cost of the tickets is \$130.

Try It

Brian collects sports cards. He has 8 soccer cards and 13 baseball cards in his card collection. If he wants to have 3 times as many sports cards in his collection, how many more cards will he need to collect?

Understand the problem.

Look at the whole problem. What do you know?

Brian has _____ soccer cards.

Brian has _____ baseball cards.

Brian wants to have _____ times as many sports cards.

Make a plan.

You need to find how many cards he has in all.

Use the operation of _____ to find the total number of cards Brian has.

Brian wants to have 3 times as many cards in his collection.

_____ by 3 to find the number of cards Brian wants to have.

Carry out the plan.

The number sentence _____ + _____ = _____ shows the total number of cards Brian has.

The number sentence _____ \times _____ = _____ shows how many cards Brian wants to have.

The number sentence _____ - _____ = _____ shows how many cards Brian will need to add to his collection in order to make it 3 times as large.

Brian will need to collect _____ more cards.

Brian has 8 soccer cards and 13 baseball cards. Brian wants to have 3 times as many sports cards. Use the operation of **addition** to find the total number of cards Brian has. **Multiply** by 3 to find the number of cards Brian wants to have. The number sentence $8 + 13 = 21$ shows the total number of cards Brian has. The number sentence $21 \times 3 = 63$ shows how many cards Brian wants to have. The number sentence $63 - 21 = 42$ shows how many cards Brian will need to add to his collection in order to make it 3 times as large. Brian will need to collect 42 more cards.

What Is a Reasonable Answer?

A reasonable answer is an answer that makes sense. An answer makes sense if it is not too big or too small for the question.

Kerrim bought a new CD that has 15 songs on it. The longest song is 3 minutes 57 seconds, and the shortest song is 2 minutes 4 seconds. What could be a reasonable length for the entire CD?

Think about what you know.

- There are 15 songs on the CD.
- The longest song is 3 minutes 57 seconds. This is close to 4 minutes.

Multiply 4 minutes by 15 songs to find what the length of the entire CD would be if every song were 4 minutes.

$$4 \times 15 = 60$$

The entire CD would be 60 minutes if every song were 4 minutes.

Is 60 minutes a reasonable length of time? No, this is too long because not every song is 4 minutes. Some songs are shorter.

- The shortest song is 2 minutes and 4 seconds. This is close to 2 minutes.

Multiply 2 minutes by 15 songs to find what the length of the entire CD would be if every song were 2 minutes.

$$2 \times 15 = 30$$

The entire CD would be 30 minutes if every song were 2 minutes.

Is 30 minutes a reasonable length of time? No, this is too short because not every song is 2 minutes.

It would be reasonable for Kerrim's entire CD to be any length of time between 30 minutes and 60 minutes.

Do you see
that . . .



Try It

Mr. Hill bought 3 boxes of tomatoes for the salad bar at his restaurant. Each box contains 18 tomatoes. If Mr. Hill cuts each tomato into 4 to 6 slices, what is a reasonable number of tomato slices he would have?

Mr. Hill bought _____ boxes and there are _____ tomatoes in each box. Use _____ to find how many tomatoes he bought.

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

Mr. Hill bought _____ tomatoes.

He will cut each tomato into _____ to _____ slices.

What if Mr. Hill cuts each tomato into 4 slices? Multiply _____ by _____ to find the total number of slices he will have.

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

Mr. Hill will have _____ tomato slices if he cuts each tomato into 4 slices.

What if Mr. Hill cuts each tomato into 6 slices? Multiply _____ by _____ to find the total number of slices he will have.

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

Mr. Hill will have _____ tomato slices if he cuts each tomato into 6 slices.

It would be reasonable for Mr. Hill to have between _____ and _____ tomato slices.

Mr. Hill bought 3 boxes of tomatoes and there are 18 tomatoes in each box. Use **multiplication** to find how many tomatoes he bought. $3 \times 18 = 54$. Mr. Hill bought 54 tomatoes. He will cut each tomato into 4 to 6 slices. Multiply 54 by 4 to find the total number of tomato slices he will have. $54 \times 4 = 216$. Mr. Hill will have 216 tomato slices if he cuts each tomato into 4 slices. Multiply 54 by 6 to find the total number of tomato slices he will have. $54 \times 6 = 324$. Mr. Hill will have 324 tomato slices if he cuts each tomato into 6 slices. It would be reasonable for Mr. Hill to have between 216 and 324 tomato slices.

What Is a Problem-Solving Strategy?

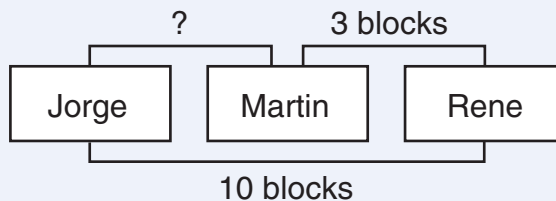
A problem-solving strategy is a plan for solving a problem. The strategy you choose depends on the type of problem you are solving. Sometimes you can use more than one strategy to solve a problem. Some problem-solving strategies include:

- drawing a picture;
- looking for a pattern;
- guessing and checking;
- acting out the problem;
- making a table;
- working a simpler problem; and
- working backward.

One way of solving a problem is to draw a picture. Organize the information you know into a picture. Then use the picture to help you solve the problem.

Jorge, Rene, and Martin all live on the same street. Martin lives between Jorge and Rene. Jorge lives 10 blocks from Rene. Rene lives 3 blocks from Martin. How many blocks is it from Jorge's house to Martin's house?

The picture below will help you write a number sentence to solve the problem.



What number sentence tells how many blocks Jorge's house is from Martin's house?

$$10 - 3 = 7$$

Jorge's house is 7 blocks from Martin's house.

Another way to solve a problem is to use the guess-and-check strategy. To guess and check means to try numbers that make sense until you find the correct number. Each number you guess should help you make a better guess the next time.

Pete is 2 years older than his brother Jim. The sum of their ages is 12. How old are Pete and Jim?

Guess two ages whose sum is 12. Then check to see whether Pete would be 2 years older than Jim.

Guess: Their ages are 4 and 8. ($4 + 8 = 12$)

Check: $8 - 4 = 4$

The difference between their ages is 4. The difference should be 2. The guess is not correct. Guess again.

Guess: Their ages are 5 and 7. ($5 + 7 = 12$)

Check: $7 - 5 = 2$

The difference between their ages is 2. This guess is correct.

Pete is the older brother. Pete is 7 years old, and Jim is 5 years old.

Another way to solve a problem is to work backward. When you work backward, you start with the last information given in the problem.

Marcus, Rick, and Juanita sold tickets to a school play. Marcus sold 3 more tickets than Rick sold. Rick sold twice as many tickets as Juanita sold. Juanita sold 18 tickets. How many tickets did Marcus sell?

Start at the end of the problem.

You know that Juanita sold 18 tickets.

You know that Rick sold twice as many tickets as Juanita sold.

Multiply by 2 to find twice as many.

$$18 \times 2 = 36$$

Rick sold 36 tickets.

You know that Marcus sold 3 more tickets than Rick sold.

Add to find 3 more than.

$$36 + 3 = 39$$

Marcus sold 39 tickets.



Objective 6

Making a table is another strategy to help solve problems.

Joey and Mitch each have a collection of toy cars. Joey has 6 more toy cars than Mitch does. Together, they have 14 toy cars. How many toy cars does each boy have?

To solve this problem, look for two numbers whose sum is 14 and whose difference is 6.

Make a table of the numbers that add to 14. Then find the pair of numbers whose difference is 6.

Number of Cars Joey Has	Number of Cars Mitch Has	Sum	Difference
13	1	$13 + 1 = 14$	$13 - 1 = 12$
12	2	$12 + 2 = 14$	$12 - 2 = 10$
11	3	$11 + 3 = 14$	$11 - 3 = 8$
10	4	$10 + 4 = 14$	$10 - 4 = 6$
9	5	$9 + 5 = 14$	$9 - 5 = 4$
8	6	$8 + 6 = 14$	$8 - 6 = 2$
7	7	$7 + 7 = 14$	$7 - 7 = 0$

The only pair of numbers whose sum is 14 and whose difference is 6 is 10 and 4:

$$10 + 4 = 14 \text{ and } 10 - 4 = 6$$

Joey has 10 toy cars and Mitch has 4 toy cars. Joey has 6 more toy cars than Mitch. The total number of toy cars they have is 14.

Try It

Rachael, Anneka, and Dora collected seashells at the beach. Rachael collected 3 more seashells than Dora did. Dora collected 4 times as many seashells as Anneka did. Anneka collected 5 seashells. How many seashells did Rachael collect?

Start at the end of the problem and work backward.

Anneka collected _____ seashells.

Dora collected 4 times as many seashells as Anneka did.

_____ the number of seashells Anneka collected by 4 to find how many seashells Dora collected.

$$4 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Dora collected _____ seashells.

Rachael collected 3 more seashells than Dora did. _____ 3 to the number of seashells Dora collected.

$$\underline{\hspace{2cm}} + 3 = \underline{\hspace{2cm}}$$

Rachael collected _____ seashells.

Anneka collected 5 seashells. **Multiply** the number of seashells Anneka collected by 4 to find how many seashells Dora collected. $4 \times 5 = 20$. Dora collected 20 seashells. **Add** 3 to the number of seashells Dora collected. $20 + 3 = 23$. Rachael collected 23 seashells.

Try It

Mrs. Evans is going to buy pizza for her class. She wants to have enough pizza so that her 24 students will each get two slices. Each pizza comes in 12 slices. How many pizzas does Mrs. Evans need to buy?

Mrs. Evans has _____ students. Mrs. Evans wants _____ slices of pizza for each student.

Use the operation of _____ to find the total number of slices of pizza Mrs. Evans needs.

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

Mrs. Evans needs a total of _____ slices.

Make a table to find the number of pizzas Mrs. Evans needs to buy. Fill in the total number of slices for one pizza. Then complete the table.

Number of Pizzas	Total Number of Slices
1	
2	
3	
4	

If one pizza has 12 slices, then two pizzas will have _____ slices, three pizzas will have _____ slices, and four pizzas will have _____ slices.

Mrs. Evans needs to buy _____ pizzas in order to have enough for all her students.

Mrs. Evans has 24 students. Mrs. Evans wants 2 slices of pizza for each student. Use the operation of **multiplication** to find the total number of slices Mrs. Evans needs. $24 \times 2 = 48$. Mrs. Evans needs a total of 48 slices.

Number of Pizzas	Total Number of Slices
1	12
2	24
3	36
4	48

If one pizza has 12 slices, then two pizzas will have 24 slices, three pizzas will have 36 slices, and four pizzas will have 48 slices. Mrs. Evans needs to buy 4 pizzas in order to have enough for all her students.

How Do You Change Words into Math Language and Symbols?

An important part of solving story problems is to rewrite the problem using math language and symbols. The words in the problem will give you clues about what operations to use.

Sometimes you will not be asked to solve a problem. Instead, you will be asked what math needs to be done to solve the problem.

Mr. Anton has two jobs. One is at a restaurant, and the other is at a car wash.

- Last week he earned \$186 at the restaurant and \$128 at the car wash.
- This week he earned \$175 at the restaurant and \$136 at the car wash.

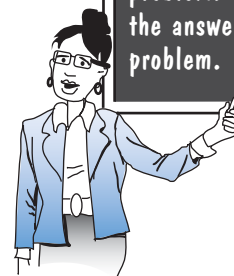
What should Mr. Anton do in order to find how many more dollars he earned at the restaurant than he earned at the car wash in these two weeks?

The question doesn't ask you to find the solution. It asks about the steps to find the solution. Think about the math that needs to be done to reach the solution.

- First, use addition to find the amount Mr. Anton earned at the restaurant for the two weeks. Find the sum of 186 and 175.
- Next, use addition to find the amount he earned at the car wash for the two weeks. Find the sum of 128 and 136.
- In the question, the phrase *how many more* means that you should use subtraction to find the difference between the two amounts Mr. Anton earned.

In order to find how many more dollars Mr. Anton earned at the restaurant than he earned at the car wash in these two weeks, he should subtract the sum of 128 and 136 from the sum of 186 and 175.

The *sum* is the answer to an addition problem. The *difference* is the answer to a subtraction problem. The *product* is the answer to a multiplication problem. The *quotient* is the answer to a division problem.





Try It

A roller coaster has 20 cars. Each car seats 4 people. There are 93 people in line for the next ride. What method can be used to find the number of people in line who will not be able to get on the next ride?

Look at the question again. Think about the math that needs to be done to find the solution.

The roller coaster has _____ cars. Each car seats _____ people.

Use the operation of _____ to find the total number of people who can ride the roller coaster at the same time.

Find the product of _____ and _____.

The roller coaster can seat _____ people.

There are _____ people in line for the next ride.

Use the operation of _____ to find the number of people who will not be able to get on the next ride.

Subtract _____ from _____.

To find the number of people in line who will not be able to get on the next ride, _____ 20 by 4, and then _____ the product from 93.

The roller coaster has 20 cars. Each car seats 4 people. Use the operation of **multiplication** to find the total number of people who can ride the roller coaster at the same time. Find the product of 20 and 4. The roller coaster can seat 80 people. There are 93 people in line for the next ride. Use the operation of **subtraction** to find the number of people who will not be able to get on the next ride. Subtract 80 from 93. To find the number of people in line who will not be able to get on the next ride, **multiply** 20 by 4, and then **subtract** the product from 93.

What Is Logical Reasoning?

Logical reasoning is thinking about something in a way that makes sense. Being logical can mean looking for a pattern or looking for what a group has in common.

Sometimes you will need to apply what you know about certain math concepts to determine what characteristics a set of numbers have in common.

Look at the numbers below.

3		9
	15	
33		27

What characteristics do these numbers have in common?

- Each of these numbers is a multiple of three.
- Each of these numbers is an odd number.

For a number to belong to this group, it must be a multiple of 3 and it must be an odd number.

Could 24, 36, or 21 belong to this group of numbers?

- Does 24 belong to this group? 24 is a multiple of 3, but it is an even number.
- Does 36 belong to this group? 36 is a multiple of 3, but it is an even number.
- Does 21 belong to this group? 21 is a multiple of 3, and it is an odd number.

So 21 belongs in this group of numbers.

Objective 6

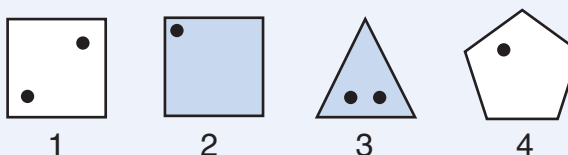
Another way to use logical reasoning is to look for a common characteristic in a set of figures or objects.

The figures below all belong in the same set.



Notice that each figure is either a square or a triangle. Each figure is white and has exactly one dot in it.

The figures below do not belong in the set.



They do not belong in the set because:

- figure 1 has two dots in it, not one;
- figure 2 is shaded, not white;
- figure 3 has two dots in it and is shaded;
- figure 4 is a pentagon, not a square or triangle.

Try It

Jonah calls these numbers *biggles*.

171 939 515 393

Think about rules that describe *biggles*.

- Rule 1: A *biggle* is a number that has _____ digits.
- Rule 2: In a *biggle* the digit in the hundreds place is the same as the digit in the _____ place.
- Rule 3: Each of the digits in a *biggle* is an even odd number.
(circle one)

These numbers are not *biggles*.

868 533 696 625

Look at the numbers that are not *biggles*. Do they follow the same rules?

- The number 868 follows Rule _____ and Rule _____ but not Rule _____.
- The number 533 follows Rule _____ and Rule _____ but not Rule _____.
- The number 696 follows Rule _____ and Rule _____ but not Rule _____.
- The number 625 follows Rule _____ but not Rule _____ or Rule _____.

Which of the following numbers could be a *biggle*?

383 717 643

- The number _____ follows Rule 1 but not Rule 2 or Rule 3.
- The number _____ follows Rule 1 and Rule 2 but not Rule 3.
- The number _____ follows Rule 1, Rule 2, and Rule 3.

The only one of these numbers that could be a *biggle* is _____.

Rule 1: A *biggle* is a number that has **3** digits.

Rule 2: In a *biggle* the digit in the hundreds place is the same as the digit in the **ones** place.

Rule 3: Each of the digits in a *biggle* is an **odd** number.

The number 868 follows Rule **1** and Rule **2** but not Rule **3**.

The number 533 follows Rule **1** and Rule **3** but not Rule **2**.

The number 696 follows Rule **1** and Rule **2** but not Rule **3**.

The number 625 follows Rule **1** but not Rule **2** or Rule **3**.

The number **643** follows Rule 1 but not Rule 2 or Rule 3.

The number **383** follows Rule 1 and Rule 2 but not Rule 3.

The number **717** follows Rule 1, Rule 2, and Rule 3.

The only one of these numbers that could be a *biggle* is **717**.

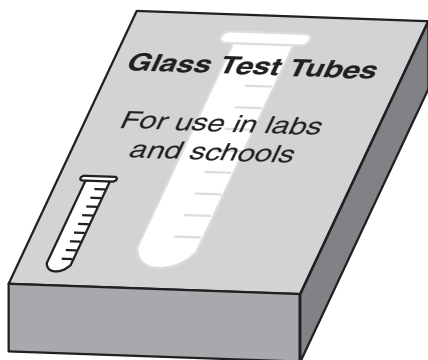
Special made-up words, such as *biggles*, may be used to name a set of examples.



Now practice what you've learned.

Question 56

A science teacher needs a total of 63 test tubes. She buys 7 boxes of test tubes. Each box she buys contains 6 test tubes.



What is one way to find how many more test tubes the teacher needs to buy?

- A Multiply 7 by 6 and then divide the product by 7
- B Subtract 7 from 63 and then multiply the difference by 6
- C Multiply 7 by 6 and then subtract the product from 63
- D Add 7 to 63 and then multiply the sum by 6



Answer Key: page 140

Question 57

Each player on a youth football team weighs between 95 and 145 pounds. Which is a reasonable total weight of the 10 players on the team?

- A 900 pounds
- B 1,200 pounds
- C 1,500 pounds
- D 2,000 pounds



Answer Key: page 140

Question 58

Maria rode her scooter on 2 days. She rode 3 more miles the first day than she did the second day. The total number of miles she rode on both days was 9. How many miles did she ride on the first day?

- A 9
- B 2
- C 3
- D 6



Answer Key: page 140

Question 59

The 15 players on a soccer team need new shirts. The shirts come in small, medium, and large sizes. The coach has ordered 4 large and 7 medium shirts. The rest of the team members wear small shirts. Which of the following shows how to find the number of small shirts the coach needs to order?

- A Add 4 and 7 and then multiply the sum by 15
- B Add 15, 4, and 7
- C Add 4 and 7 and then subtract the sum from 15
- D Add 15 and 4 and then subtract 3 from the sum



Answer Key: page 141

Question 60

Tisha has 100 stickers. She gives 15 stickers to each of 5 friends. Which pair of number sentences shows the number of stickers that Tisha has left?

- A** $100 \div 5 = 20$
 $20 - 15 = 5$
- B** $15 \times 5 = 75$
 $100 - 75 = 25$
- C** $100 - 15 = 85$
 $85 \div 5 = 17$
- D** $5 + 15 = 20$
 $100 - 20 = 80$



Answer Key: page 141

Question 61

Patty is twice as old as her sister Melissa. Melissa is 7 years younger than Patty. Which statement about the sisters' ages is true?

- A** Patty is 13, and Melissa is 6.
- B** Patty is 8, and Melissa is 4.
- C** Patty is 16, and Melissa is 8.
- D** Patty is 14, and Melissa is 7.



Answer Key: page 141

Question 62

Kenji rents a bike for 5 hours from the Golden Park Bike Shop.



What is the cost to rent the bike for 5 hours?

- A** \$8
- B** \$17
- C** \$15
- D** \$25



Answer Key: page 141

Question 63

In his collection Amar has 13 more football cards than baseball cards. He has twice as many baseball cards as basketball cards. He has 12 basketball cards. How many football cards does Amar have in his collection?

- A 12
- B 24
- C 25
- D 37



Answer Key: page 141

Question 64

Mr. Green plants 4 rows of tomato plants in his garden. Each plant costs \$2. Which information is needed in order to find the total cost in dollars of the tomato plants in Mr. Green's garden?

- A The number of plants in each row
- B The number of tomatoes on each plant
- C The number of tomato plants Mr. Green planted last year
- D The number of rows Mr. Green planted last year



Answer Key: page 141

Question 65

The fourth grade at Markham Elementary School has 10 more students than the fifth grade has. The fourth grade has 80 students. Which of these methods can be used to find how many students are in the fifth grade?

- A Find the sum of 80 and 10
- B Find the sum of 80 and 70
- C Find the difference between 80 and 10
- D Find the difference between 80 and 70



Answer Key: page 141

Question 66

Carmina runs in the park. The list shows the dates she went running in June.

June 3, June 6, June 9, June 12, June 15

If Carmina continues to run following this pattern, on what date will she **NOT** run?

- A June 24
- B June 22
- C June 21
- D June 18



Answer Key: page 141

Question 67

Which statement about these numbers is true?

18	30
54	24

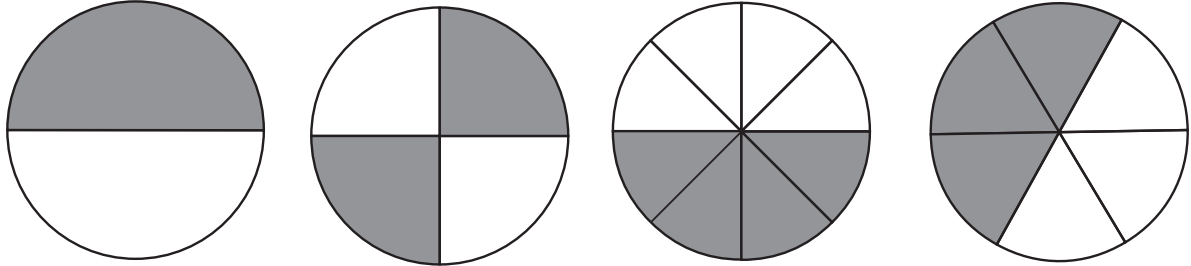
- A They are all evenly divisible by 4.
- B They are all evenly divisible by 5.
- C They are all evenly divisible by 9.
- D They are all evenly divisible by 6.



Answer Key: page 142


Question 68

William drew the circles below.



Which statement about these circles is **NOT** true?

- A They all appear to be congruent figures.
- B They all show one half shaded.
- C They all are divided equally into fourths.
- D They all are closed figures.

 Answer Key: page 142

Objective 1

Question 1 (page 41)

- C Correct.** The order should be from greatest (largest) to least (smallest). First look at the digits in the hundred thousands place.

543,965 356,970 505,990

The numbers 543,965 and 505,990 have the digit 5 in the hundred thousands place. The number 356,970 has the digit 3 in the hundred thousands place. Because 5 is greater than 3, the numbers 543,965 and 505,990 are the larger numbers.

Compare 543,965 and 505,990. Look at the digits in the ten thousands place.

543,965 505,990

Because 4 is greater than 0, the number 543,965 is greater than 505,990.

Since 543,965 and 505,990 are the larger numbers, 356,970 is the least number.

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

543,965 505,990 356,970

Matching the areas with the countries, you will find that the area of France is the greatest and the area of Germany is the least. The countries in order from greatest to least area are France, Spain, and Germany.

Question 2 (page 41)

- D Correct.** Write the digits of the number in a place value chart to help you write the number in words.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
2	0	0	3	0	6	8

Write the first number to the left of the first comma, *two*, and then write the word *million*. There are no hundred thousands or ten thousands. Write the number to the right of the first comma, *three*, and then write the word *thousand*. There are no hundreds. Write the two-digit number to the right of the second comma, *sixty-eight*. The number can be written in words as *two million, three thousand, sixty-eight*.

Question 3 (page 41)

- D Correct.** There are 24 boxes arranged in 3 rows, with 8 boxes in each row. The grid shows that 8 of the 24 boxes, or $\frac{8}{24}$, are shaded. The grid also shows that 1 of the 3 rows, or $\frac{1}{3}$, is shaded. The fractions $\frac{8}{24}$ and $\frac{1}{3}$ are equivalent.

Question 4 (page 41)

- A Correct.** Use addition and then subtraction to find the total number of stamps the post office sold on the third day. Add the number of stamps sold on the first and second days: $2,955 + 2,372 = 5,327$. Then subtract the sum from 6,731 to get the number of stamps sold on the third day: $6,731 - 5,327 = 1,404$. The post office sold 1,404 stamps on the third day.

Question 5 (page 42)

- B Correct.** Two rectangles are completely shaded, and part of the third rectangle is shaded. Since two rectangles are completely shaded, 2 is the whole number. In the third rectangle, 5 of the 8 parts are shaded. The fraction shaded is $\frac{5}{8}$. The model represents $2\frac{5}{8}$.

Question 6 (page 42)

- D Correct.** The first model is divided into 6 parts, with 5 parts shaded. It is $\frac{5}{6}$ shaded. The second model is divided into 9 parts, with 8 parts shaded. It is $\frac{8}{9}$ shaded. If you compare the shaded parts, you will see that $\frac{8}{9}$ is greater than $\frac{5}{6}$.

Question 7 (page 42)

- B Correct.** The block is divided into 100 equal squares. The denominator of the fraction is 100. Twenty-five of the squares are shaded. The numerator is 25. The fraction that the model represents is $\frac{25}{100}$.

Question 8 (page 43)

- C Correct.** The model shows 4 blocks. Each block is divided into ten equal parts. The first three blocks are completely shaded. In the 4th block, 9 of the 10 parts are shaded. The three completely shaded blocks represent the whole number *three*. Write the word *and* to represent

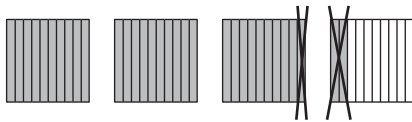
the decimal point. The 4th block represents *nine-tenths*. The number 3.9 can be written in words as *three and nine-tenths*.

Question 9 (page 43)

C Correct. The first stage had already separated from the spacecraft. The lengths of the remaining two stages were 76 feet and 47 feet. Add to find the total remaining length: $76 + 47 = 123$. The total length of the two remaining stages of the spacecraft was 123 feet.

Question 10 (page 44)

D Correct. The base-ten blocks model 3.2 liters, the amount of orange juice Jennifer has. This number is made up of 3 wholes and 2 tenths. To subtract 3 tenths, cross out 2 tenths from the fourth block and 1 tenth from the third block. This leaves 2 wholes and 9 tenths.



There will be 2.9 liters of orange juice remaining.

Question 11 (page 44)

The correct answer is 216.

Use multiplication to combine equal groups.

$$\begin{array}{r} 18 \\ \times 12 \\ \hline 36 \\ + 180 \\ \hline 216 \end{array}$$

2	1	6	.
0	0	0	
1	●	1	
●	2	2	
3	3	3	
4	4	4	
5	5	5	
6	6	●	
7	7	7	
8	8	8	
9	9	9	

Question 12 (page 45)

A Correct. There are 6 rows of bowls, with 8 bowls in each row, for a total of 48 bowls. Use multiplication to combine groups of equal size. The number sentence $6 \times 8 = 48$ shows the total number of bowls on shelves.

Question 13 (page 45)

A Correct. The first block has 36 of the 100 squares shaded. This represents 36 hundredths, or 0.36. The second block has 71 of the 100 squares

shaded. This represents 71 hundredths, or 0.71. The third block has 43 of the 100 squares shaded. This represents 43 hundredths, or 0.43. The last block has 87 of the 100 squares shaded. This represents 87 hundredths, or 0.87. The largest decimal, or the block with the most squares shaded, is 0.87. The next largest decimal is 0.71. The third largest decimal is 0.43. The smallest decimal is 0.36. The decimals in order from greatest to least are:
0.87 0.71 0.43 0.36

Question 14 (page 46)

D Correct. There are 24 patients each day for 5 days, or 5 groups of 24. To combine equal groups, multiply. The number sentence $24 \times 5 = \square$ can be used to find the total number of patients Dr. Miller saw in 5 days.

Question 15 (page 46)

B Correct. Use multiplication to combine equal groups. The number sentence $15 \times 4 = 60$ shows how many miles Ms. Castro rides her bike each week. She rides her bike 60 miles each week.

Question 16 (page 46)

The correct answer is 26. There were 130 sports cards. They needed to be separated into 5 equal piles. Use division to separate a whole into equal parts.

$$\begin{array}{r} 26 \\ 5 \overline{)130} \\ -10 \\ \hline 30 \\ -30 \\ \hline 0 \end{array}$$

	2	6	.
0	0	0	
1	1	1	
2	●	2	
3	3	3	
4	4	4	
5	5	5	
6	6	●	
7	7	7	
8	8	8	
9	9	9	

Question 17 (page 46)

C Correct. Since the question asks *about how many*, round the numbers in the problem before solving. Round the number 113 to 100, the number 185 to 200, and the number 328 to 300. Use addition to find the total number of miles. They drove about 600 miles.

Question 18 (page 46)

- A Correct.** Since the question asks *about how many*, estimate. The number 923 is close to 900. Use division to separate a whole into equal parts. The number sentence $900 \div 3 = 300$ shows about how many meters the rock climber climbed each hour. The rock climber climbed about 300 meters each hour.

Objective 2

Question 19 (page 53)

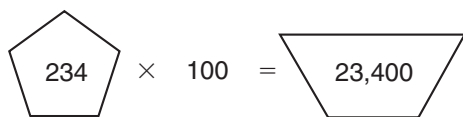
- C Correct.** Only $42 \div 7 = \square$ is true for the number 6.

Question 20 (page 53)

- A Correct.** The number sentence $45 \div \square = 9$ is part of a fact family that includes $9 \times \square = 45$. Since $9 \times 5 = 45$, then $45 \div 5 = 9$.

Question 21 (page 53)

- A Incorrect.** These two numbers would work for multiplying 234 times 10, but the problem asks for multiplying a number by 100.
- B Correct.** When you multiply 234 by 100, place two zeros to the right of 234:
 $234 \times 100 = 23,400$.



- C Incorrect.** These two numbers would work for multiplying 24 times 1,000, but the problem asks for multiplying a number by 100.
- D Incorrect.** These numbers do not show multiplying by 100.

Question 22 (page 54)

- D Correct.** The rule for this set of related numbers is to multiply the number of puzzles by 100 pieces to find the total number of pieces.

Question 23 (page 54)

- A Correct.** The rule for this set of related numbers is to multiply the number of trips by 7 books. The number of trips times 7 can be used to find the total number of books Maria moved in 30 trips. So $30 \times 7 = 210$. Maria moved 210 books in 30 trips.

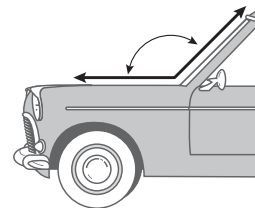
Question 24 (page 55)

- C Correct.** The rule for this set of numbers is to multiply the number of boxes by 18 cookies to find the total number of cookies.

Objective 3

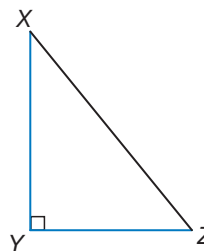
Question 25 (page 73)

- A Correct.** An obtuse angle is larger than a right angle. Only answer choice A shows an angle that appears to have a measurement greater than that of a right angle.



Question 26 (page 73)

- C Correct.** Perpendicular lines are lines that intersect to form a right angle. Only line segment XY and line segment YZ match this description.

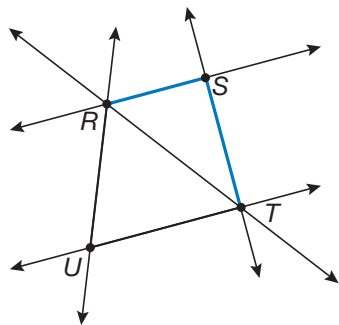


Question 27 (page 73)

- A Incorrect.** A rectangle has two pairs of parallel sides.
- B Incorrect.** This hexagon has three pairs of parallel sides.
- C Correct.** No side is parallel to another side on this pentagon.
- D Incorrect.** A trapezoid has one pair of parallel sides.

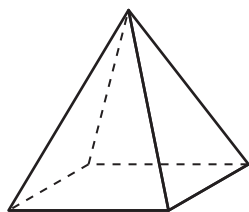
Question 28 (page 74)

- B Correct.** Two lines are perpendicular if they intersect to form a right angle. Line RS and line ST appear to form a right angle.



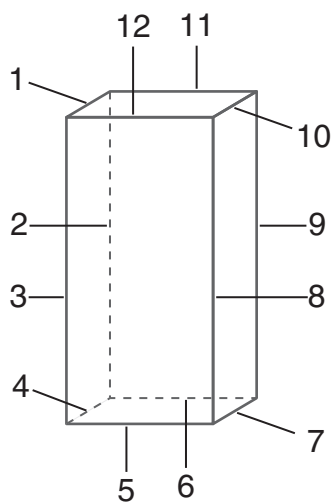
Question 29 (page 74)

D Correct. Only this figure has 5 faces, 8 edges, and 5 vertices.



Question 30 (page 75)

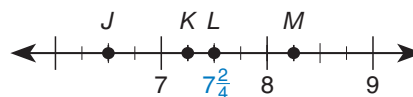
D Correct. An edge is a line segment formed when two faces meet. Count the edges in the figure. There are a total of 12 edges.



Question 31 (page 75)

C Correct. Point *L* is located between 7 and 8 on the number line. There are 4 equal parts between the

7 and the 8, so each part represents $\frac{1}{4}$. Point *L* is 2 marks, or $\frac{2}{4}$, past the whole number 7. Point *L* is located at $7\frac{2}{4}$.



Question 32 (page 75)

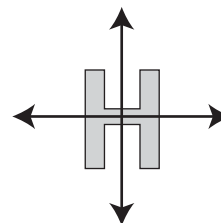
- A Incorrect.** This answer choice shows a rotation, a turning movement around a point.
- B Incorrect.** This answer choice shows a reflection, a mirror image across a line.
- C Correct.** A translation is a sliding movement. In this answer choice the top penguin has been moved down and left.
- D Incorrect.** This answer choice shows a rotation, a turning movement around a point.

Question 33 (page 76)

D Correct. There is no place to fold this figure so that the two halves fit exactly on each other. It is not possible to draw a line of symmetry.

Question 34 (page 76)

C Correct. The letter H has two lines of symmetry. It can be folded in half in two places to make two congruent mirror images. One half is a reflection of the other half across the line of symmetry.



Question 35 (page 76)

B Correct. Point *P* is located between the whole numbers 46 and 47 on the number line. Each small mark on the number line represents 0.1. Point *P* is 6 marks, or 0.6, past the whole number 46. Point *P* best represents 46.6 on the number line.

Objective 4

Question 36 (page 94)

- A Incorrect. 3 grams is about the mass of three sheets of paper. This is not heavy enough to be the mass of the full box of cereal.
- B Incorrect. 3 kilograms is about the mass of three textbooks. This is too heavy to be the mass of the full box of cereal.
- C **Correct.** 300 grams is a good estimate of the mass of the full box of cereal.
- D Incorrect. 300 kilograms is about the mass of a female polar bear. This is too heavy to be the mass of the full box of cereal.

Question 37 (page 94)

- A **Correct.** A pencil eraser weighs a few ounces.
- B Incorrect. A chair weighs several pounds.
- C Incorrect. Most horses weigh between 800 and 1,500 pounds.
- D Incorrect. A bowling ball weighs about 12 pounds.

Question 38 (page 94)

- C **Correct.** Ann used 3 pounds of butter. There are 16 ounces in one pound.

$$3 \times 16 = 48$$
 Ann used 48 ounces of butter making cookies.

Question 39 (page 94)

- A **Correct.** The small vase is about the size of a small drinking glass. It would hold about 6 fluid ounces.

Question 40 (page 95)

- A **Correct.** The pitcher is about the same size as a large bottle of water. The capacity of the pitcher is about 2 liters.
- B Incorrect. 2 milliliters is about the capacity of two eyedroppers. This would be too small to be the capacity of the pitcher.
- C Incorrect. 20 liters is about the capacity of 20 small bottles of water. This would be too large to be the capacity of the pitcher.
- D Incorrect. 20 milliliters is about the capacity of 20 eyedroppers. This would be too small to be the capacity of the pitcher.

Question 41 (page 95)

- C **Correct.** The van is 6 yards long. There are 3 feet in 1 yard.

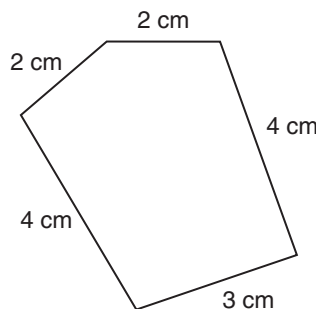
$$6 \text{ yards} \times 3 \text{ feet per yard} = 18 \text{ feet}$$
 The length of the van is 18 feet.

Question 42 (page 95)

- D **Correct.** Each of the six sides has a length of 5 inches. To find the perimeter, add the lengths of all the sides: $5 + 5 + 5 + 5 + 5 + 5 = 30$. The perimeter is 30 inches.

Question 43 (page 95)

- B **Correct.** The perimeter is the distance around the figure. Use your ruler to measure each side in centimeters. The sides measure 2, 4, 3, 4, and 2 centimeters. To find the perimeter, add the lengths of all the sides. The perimeter is $2 + 4 + 3 + 4 + 2 = 15$ centimeters.



Question 44 (page 96)

- C **Correct.** One way to find the volume of Walter's rectangular prism is to count the 1-inch cubes. There are 8 cubes in the top layer. There are 8 cubes in the middle layer, and there are 8 cubes in the bottom layer.

$$8 + 8 + 8 = 24$$
 The volume of Walter's rectangular prism is 24 cubic inches.

Question 45 (page 96)

- A Incorrect. There are 2 rows and 12 columns of square units.

$$2 \times 12 = 24$$
 The area of this rectangle is 24 square units.
- B Incorrect. There are 4 rows and 6 columns of square units.

$$4 \times 6 = 24$$

The area of this rectangle is 24 square units.

- C Correct.** There are 5 rows and 5 columns of square units.

$$5 \times 5 = 25$$

The area of this rectangle is NOT 24 square units. The area of this rectangle is 25 square units.

- D Incorrect.** There are 8 rows and 3 columns of square units.

$$8 \times 3 = 24$$

The area of this rectangle is 24 square units.

Question 46 (page 97)

- D Correct.** The distance on the drawing from Pilar's house to her school is 5 inches. The scale shows that 1 inch on the drawing is equal to 2 miles. To find a distance in miles, multiply by 2: $5 \times 2 = 10$. The actual distance from Pilar's house to her school is 10 miles.

Question 47 (page 98)

- B Correct.** Read the temperature on each thermometer. The morning temperature was 50°F. The afternoon temperature was 85°F. To find the amount the temperature had increased, subtract the morning temperature from the afternoon temperature.

$$85 - 50 = 35$$

The temperature had increased 35°F.

Question 48 (page 98)

- B Correct.** The thermometer shows 30°C. Subtract to find the temperature that is 12 degrees less than 30°C.

$$30 - 12 = 18$$

If the reporter is correct, the temperature at sunrise will be 18°C.

Objective 5

Question 49 (page 109)

- D Correct.** There are 3 pencils and 5 erasers. There are $3 \times 5 = 15$ different combinations of 1 pencil and 1 eraser.

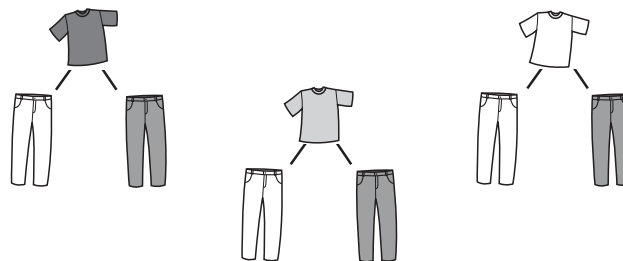
Question 50 (page 110)

The correct answer is 8. There are 4 kinds of pasta and 2 kinds of sauce. There are $4 \times 2 = 8$ different combinations of 1 pasta and 1 sauce.

		8	.
0	0	0	
1	1	1	
2	2	2	
3	3	3	
4	4	4	
5	5	5	
6	6	6	
7	7	7	
8	8	●	
9	9	9	

Question 51 (page 111)

- A Correct.** You can draw a line from each shirt to each pair of pants to find all the possible combinations.



Tyrone can make 6 combinations with these shirts and pants.

Question 52 (page 112)

- C Correct.** Look at the bar for cheeseburgers. It ends halfway between 50 and 60. About 55 cheeseburgers were ordered. Look at the bar for fish sandwiches. It ends at 50. Exactly 50 fish sandwiches were ordered. Subtract to find how many more cheeseburgers than fish sandwiches were ordered: $55 - 50 = 5$. About 5 more cheeseburgers than fish sandwiches were ordered.

Question 53 (page 113)

- D Correct.** The numbers on the graph go from 0 to 80. Each line represents 10 students. Look at the bar for baseball. It ends at the line halfway between 20 and 40. Since each line equals 10 students, 30 students play baseball. Look at the bar for soccer. It ends at 40, so 40 students play soccer.

Use addition to find how many students play either baseball or soccer. The number of students who play baseball or soccer is $30 + 40 = 70$.

Question 54 (page 114)

C Correct. The numbers on the graph go from 0 to 10. Each line represents 1 student. The dark bar represents girls and the light bar represents boys. Look at the bars for math. The bar for girls ends between 6 and 8. There were 7 girls who chose math as their favorite subject. The bar for boys ends between 8 and 10. There were 9 boys who chose math as their favorite subject.

Look at the bars for reading. The bar for girls ends between 4 and 6. There were 5 girls who chose reading as their favorite subject. The bar for boys ends between 6 and 8. There were 7 boys who chose reading as their favorite subject.

Add to find the total number of girls who chose math or reading as their favorite subject.

$$7 + 5 = 12$$

There were 12 girls who chose math or reading as their favorite subject.

Add to find the total number of boys who chose math or reading as their favorite subject.

$$9 + 7 = 16$$

There were 16 boys who chose math or reading as their favorite subject.

Subtract to find out how many more boys than girls chose math or reading as their favorite subject.

$$16 - 12 = 4$$

There were 4 more boys than girls who chose math or reading as their favorite subject.

Question 55 (page 115)

D Correct. The numbers on the graph go from 0 to 24. Each line represents 2 dogs.

The bar for July ends halfway between 20 and 24. The total for July was 22 dogs.

The bar for August ends at 16. The total for August was 16 dogs.

The bar for September ends at 12. The total for September was 12 dogs.

Use addition to find the total number of dogs Pasha walked in July, August, and September: $22 + 16 + 12 = 50$.

The bar for May ends halfway between 12 and 16. The total for May was 14 dogs.

The bar for June ends at 20. The total for June was 20 dogs.

Use addition to find the total number of dogs Pasha walked during May and June:

$$14 + 20 = 34.$$

Use subtraction to find how many more dogs Pasha walked during July, August, and September than she walked in May and June: $50 - 34 = 16$.

Pasha walked 16 more dogs in July, August, and September than she did in May and June.

Objective 6

Question 56 (page 130)

C Correct. To find how many more test tubes the teacher needs to buy, first multiply the number of boxes (7) by the number of test tubes in each box (6): $7 \times 6 = 42$. Then subtract the number of test tubes she bought (42) from the number she needs (63): $63 - 42 = 21$.

Question 57 (page 130)

B Correct. Each player weighs between 95 and 145 pounds. Some players may weigh closer to 95 pounds, and some players may weigh closer to 145 pounds.

Multiply 95 by 10 to find the total weight if all 10 players weighed 95 pounds.

$$95 \times 10 = 950$$

Multiply 145 by 10 to find the total weight if all 10 players weighed 145 pounds.

$$145 \times 10 = 1,450$$

It would be reasonable for all 10 players to weigh between 950 and 1,450 pounds. The most reasonable total weight of all 10 players is 1,200 pounds.

Question 58 (page 130)

D Correct. Guess two numbers whose sum is 9, and then check to see whether one of the numbers is 3 more than the other.

Guess: She rode 8 miles the first day and 1 mile the second day. ($8 + 1 = 9$)

Check: $8 - 1 = 7$

The difference between the first day and the second day is 7. The difference should be 3. These cannot be the numbers. Guess again.

Guess: She rode 7 miles the first day and 2 miles the second day. ($7 + 2 = 9$)

Check: $7 - 2 = 5$

The difference between the first day and the second day is 5. The difference should be 3. These cannot be the numbers. Guess again.

Guess: She rode 6 miles the first day and 3 miles the second day. ($6 + 3 = 9$)

Check: $6 - 3 = 3$

The difference between the first day and the second day is 3. This guess is correct. Maria rode 6 miles on the first day.

Question 59 (page 130)

C Correct. You know that 15 shirts are needed in all. The coach has ordered 4 large shirts and 7 medium shirts. Add 4 and 7 to find how many shirts have already been ordered. To find the number of small shirts, subtract this sum from 15.

Question 60 (page 131)

B Correct. First find the number of stickers Tisha gave away. Multiply the number of friends (5) by the number of stickers each friend received (15): $15 \times 5 = 75$. Tisha gave away 75 stickers.

Next find the number of stickers Tisha has left. Subtract the number given away (75) from the total number of stickers (100): $100 - 75 = 25$. Tisha has 25 stickers left.

Question 61 (page 131)

D Correct. Think about what you know.

- Patty is twice as old as Melissa.
- Melissa is 7 years younger than Patty.

Patty is 14, which is twice as old as Melissa, $7 \times 2 = 14$. Melissa is 7 years younger than Patty, $14 - 7 = 7$.

Question 62 (page 131)

B Correct. Kenji rents the bike for 5 hours. The first hour will cost him \$5. The other 4 hours will cost him \$3 each. Add to find the total cost: $5 + 3 + 3 + 3 + 3 = 17$.

It will cost Kenji \$17 to rent the bike for 5 hours.

Question 63 (page 132)

D Correct. Start at the end of the problem and work backward. Amar has 12 basketball cards. He has twice as many baseball cards as basketball cards. Multiply by 2 to find the number of baseball cards.

$$12 \times 2 = 24$$

Amar has 24 baseball cards.

Amar has 13 more football cards than baseball cards. Add to find 13 more.

$$24 + 13 = 37$$

Amar has 37 football cards.

Question 64 (page 132)

A Correct. There are 4 rows of tomato plants. Plants cost \$2 each. You need to know the number of plants in each row to find the total cost.

Question 65 (page 132)

A Incorrect. The sum of 80 and 10 is 90. If there were 90 students in the fifth grade, there would be more fifth-grade students than fourth-grade students. However, the problem says that there are more students in the fourth grade.

B Incorrect. This number represents the total number of students in the fourth and fifth grades.

C Correct. There are 10 more students in the fourth grade, so the number of students in the fifth grade is less than the number of students in the fourth grade. To find the number of students in the fifth grade, subtract 10 from the number of fourth-grade students.

D Incorrect. The difference between these two numbers tells how many more students are in the fourth grade than in the fifth grade.

Question 66 (page 132)

B Correct. The dates that Carmina runs in June follow a pattern.

$$3, 6, 9, 12, 15, \dots$$

Keep adding 3 to find the next dates Carmina runs: June 18, June 21, and June 24. Carmina did not go running on June 22.

Mathematics Answer Key

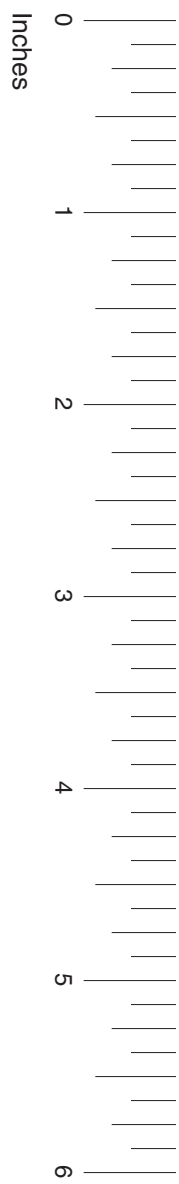
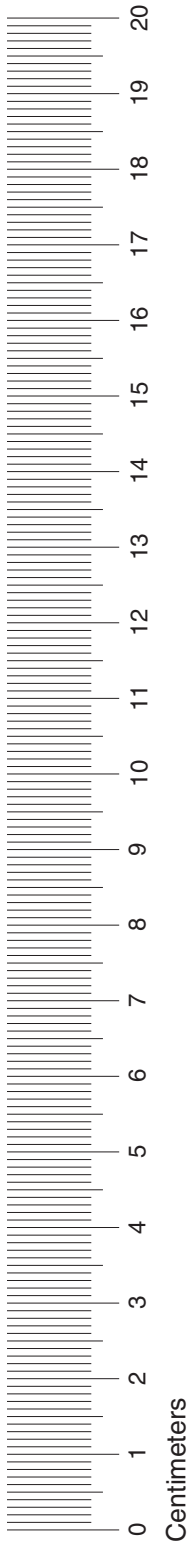
Question 67 (page 132)

- A Incorrect. Only the number 24 is evenly divisible by 4.
- B Incorrect. Only the number 30 is evenly divisible by 5.
- C Incorrect. Only the numbers 18 and 54 are evenly divisible by 9.
- D **Correct.** All the numbers are evenly divisible by 6:
 $18 \div 6 = 3$, $24 \div 6 = 4$, $30 \div 6 = 5$, $54 \div 6 = 9$.

Question 68 (page 133)

- C **Correct.** Only the second circle is divided equally into fourths.

Grade 4 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 fluid ounces
 1 quart = 2 pints
 1 pint = 2 cups
 1 cup = 8 fluid 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

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