

Holt Mathematics

Course 1 Problem Solving Workbook



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CONTENTS

Chapter 1

Lesson 1-1	Comparing and Ordering Whole Numbers	1
Lesson 1-2	Estimating with Whole Numbers	2
Lesson 1-3	Exponents	3
Lesson 1-4	Order of Operations	4
Lesson 1-5	Mental Math	5
Lesson 1-6	Choose the Method of Computation	6
Lesson 1-7	Patterns and Sequences	7

Chapter 2

Lesson 2-1	Variables and Expressions	8
Lesson 2-2	Translate Between Words and Math	9
Lesson 2-3	Translating Between Tables and Expressions	10
Lesson 2-4	Equations and Their Solutions	11
Lesson 2-5	Addition Equations	12
Lesson 2-6	Subtraction Equations	13
Lesson 2-7	Multiplication Equations	14
Lesson 2-8	Division Equations	15

Chapter 3

Lesson 3-1	Representing, Comparing and Ordering Decimals	16
Lesson 3-2	Estimating Decimals	17
Lesson 3-3	Adding and Subtracting Decimals	18
Lesson 3-4	Scientific Notation	19
Lesson 3-5	Multiplying Decimals	20
Lesson 3-6	Dividing Decimals by Whole Numbers	21
Lesson 3-7	Divide by Decimals	22
Lesson 3-8	Interpret the Quotient	23
Lesson 3-9	Solving Decimal Equations	24

Chapter 4

Lesson 4-1	Divisibility	25
Lesson 4-2	Factors and Prime Factorization	26
Lesson 4-3	Greatest Common Factor	27
Lesson 4-4	Decimals and Fractions	28
Lesson 4-5	Equivalent Fractions	29
Lesson 4-6	Mixed Numbers and Improper Fractions	30
Lesson 4-7	Comparing and Ordering Fractions	31
Lesson 4-8	Adding and Subtracting Like Denominators	32
Lesson 4-9	Estimating Fraction Sums and Differences	33

CONTENTS, *CONTINUED*

Chapter 5

Lesson 5-1	Least Common Multiple	34
Lesson 5-2	Adding and Subtracting with Unlike Denominators	35
Lesson 5-3	Adding and Subtracting Mixed Numbers	36
Lesson 5-4	Regrouping to Subtract Mixed Numbers	37
Lesson 5-5	Solving Fraction Equations: Addition and Subtraction	38
Lesson 5-6	Multiplying Fractions by Whole Numbers	39
Lesson 5-7	Multiplying Fractions	40
Lesson 5-8	Multiplying Mixed Numbers	41
Lesson 5-9	Dividing Fractions and Mixed Numbers	42
Lesson 5-10	Solving Fraction Equations: Multiplication and Division	43

Chapter 6

Lesson 6-1	Make a Table	44
Lesson 6-2	Mean, Median, Mode, and Range	45
Lesson 6-3	Additional Data and Outliers	46
Lesson 6-4	Bar Graphs	47
Lesson 6-5	Line Plots, Frequency Tables, and Histograms	48
Lesson 6-6	Ordered Pairs	49
Lesson 6-7	Line Graphs	50
Lesson 6-8	Misleading Graphs	51
Lesson 6-9	Stem-and-Leaf Plots	52
Lesson 6-10	Choosing an Appropriate Display	53

Chapter 7

Lesson 7-1	Ratios and Rates	54
Lesson 7-2	Using Tables to Explore Equivalent Ratios and Rates	55
Lesson 7-3	Proportions	56
Lesson 7-4	Similar Figures	57
Lesson 7-5	Indirect Measurement	58
Lesson 7-6	Scale Drawings and Maps	59
Lesson 7-7	Percents	60
Lesson 7-8	Percents, Decimals, and Fractions	61
Lesson 7-9	Percent Problems	62
Lesson 7-10	Using Percents	63

CONTENTS, *CONTINUED*

Chapter 8

Lesson 8-1	Building Blocks of Geometry	64
Lesson 8-2	Measuring and Classifying Angles	65
Lesson 8-3	Angle Relationships	66
Lesson 8-4	Classifying Lines	67
Lesson 8-5	Triangles	68
Lesson 8-6	Quadrilaterals	69
Lesson 8-7	Polygons	70
Lesson 8-8	Geometric Patterns	71
Lesson 8-9	Congruence	72
Lesson 8-10	Transformations	73
Lesson 8-11	Line Symmetry	74

Chapter 9

Lesson 9-1	Understanding Customary Units of Measure	75
Lesson 9-2	Understanding Metric Units of Measure	76
Lesson 9-3	Converting Customary Units	77
Lesson 9-4	Converting Metric Units	78
Lesson 9-5	Time and Temperature	79
Lesson 9-6	Finding Angle Measures in Polygons	80
Lesson 9-7	Perimeter	81
Lesson 9-8	Circles and Circumference	82

Chapter 10

Lesson 10-1	Estimating and Finding Area	83
Lesson 10-2	Area of Triangles and Trapezoids	84
Lesson 10-3	Area of Composite Figures	85
Lesson 10-4	Comparing Perimeter and Area	86
Lesson 10-5	Area of Circles	87
Lesson 10-6	Three-Dimensional Figures	88
Lesson 10-7	Volume of Prisms	89
Lesson 10-8	Volume of Cylinders	90
Lesson 10-9	Surface Area	91

CONTENTS, *CONTINUED*

Chapter 11

Lesson 11-1	Integers in Real-World Situations	92
Lesson 11-2	Comparing and Ordering Integers	93
Lesson 11-3	The Coordinate Plane	94
Lesson 11-4	Adding Integers	95
Lesson 11-5	Subtracting Integers	96
Lesson 11-6	Multiplying Integers	97
Lesson 11-7	Dividing Integers	98
Lesson 11-8	Solving Integer Equations	99
Lesson 11-9	Tables and Functions	100
Lesson 11-10	Graphing Functions	101

Chapter 12

Lesson 12-1	Introduction to Probability	102
Lesson 12-2	Experimental Probability	103
Lesson 12-3	Counting Methods and Sample Spaces	104
Lesson 12-4	Theoretical Probability	105
Lesson 12-5	Compound Events	106
Lesson 12-6	Making Predictions	107

LESSON **1-1** **Problem Solving**
Comparing and Ordering Whole Numbers

Use the tables below to answer each question.

Most Populated Countries	
Brazil	174,468,575
China	1,273,111,290
India	1,029,991,145
Indonesia	228,437,870
United States	278,058,881

Largest Countries (square mi)	
Brazil	3,265,059
Canada	3,849,646
China	3,705,408
Russia	6,592,812
United States	3,539,224

- Which country has the greatest population?

- Which countries have more than one billion people?

- Which country is the largest in the world?

- What is the error in the following statement? Canada is larger than the United States, but smaller than China.

- Which country has a population less than two hundred million?
 A China C Brazil
 B Indonesia D India
- Which list shows the countries in order by population from greatest to least?
 A China, United States, India, Indonesia, Brazil
 B China, India, Indonesia, Brazil, United States,
 C China, India, Indonesia, United States, Brazil
 D China, India, United States, Indonesia, Brazil
- Which country's area is closest to 4,000,000 square miles?

- Based on population and size, which country do you think is more crowded, Brazil or the United States? Explain.

- Which countries have populations greater than the United States?
 F China and Brazil
 G China and India
 H India and Indonesia
 J Indonesia and China
- Which list shows the countries in order by size from smallest to largest?
 F Brazil, United States, China, Canada, Russia
 G Brazil, United States, Canada, China, Russia
 H Brazil, United States, Canada, Russia, China
 J Brazil, United States, Russia, China, Canada

LESSON **Problem Solving**
1-2 **Estimating with Whole Numbers**

Use the table below to answer each question.

Facts About the World's Oceans

Ocean	Area (square mi)	Greatest Depth (ft)
Arctic	5,108,132	18,456
Atlantic	33,424,006	30,246
Indian	28,351,484	24,460
Pacific	64,185,629	35,837

- If the depths of all the oceans were rounded to the nearest ten thousand, which two oceans would have the same depth?

- In 1960, scientists observed sea creatures living as far down as thirty thousand feet. In which ocean(s) could these creatures have lived?

- If you wanted to compare the depths of the Pacific Ocean and the Atlantic Ocean, which place value would you use to estimate?

- The oceans cover about three-fourths of Earth's surface. Estimate the total area of all the oceans combined by rounding to the nearest million.

Choose the letter for the best answer.

- There are 5,280 feet in a mile. About how many miles deep is the deepest point in the Pacific Ocean?
A about 0.7 mile **C** about 70 miles
B about 7 miles **D** about 700 miles
- Rounding to the greatest place value, about how much larger is the Indian Ocean than the Arctic Ocean?
F about 5 million sq. mi
G about 10 million sq. mi
H about 15 million sq. mi
J about 25 million sq. mi
- The Atlantic Ocean is about 40 times larger than the world's largest island, Greenland. Use this information to estimate the area of Greenland.
A about 800,000 sq. mi
B about 8,000,000 sq. mi
C about 80,000,000 sq. mi
D about 1,200,000,000 sq. mi
- About how much larger would the Pacific Ocean have to be to have more area than the other three oceans combined?
F about 2 hundred sq. mi
G about 2 thousand sq. mi
H about 2 million sq. mi
J about 20 million sq. mi

LESSON
1-3 **Problem Solving**
Exponents

1. The Sun is the center of our solar system. The Sun is the star closest to our planet. The surface temperature of the Sun is close to $10,000^{\circ}\text{F}$. Write 10,000 using exponents.

2. Patty Berg has won 4^2 major women's titles in golf. Write 4^2 in standard form.

3. William has 3^3 baseball cards and 4^3 football cards. Write the number of baseball cards and footballs cards that William has.

4. Michelle recorded the number of miles she ran each day last year. She used the following expression to represent the total number of miles: $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$. Write this expression using exponents. How many miles did Michelle run last year?

Choose the letter for the best answer.

5. In Tyrone's science class he is studying cells. Cell A divides every 30 minutes. If Tyrone starts with two cells, how many cells will he have in 3 hours?
A 6 cells
B 32 cells
C 128 cells
D 512 cells
6. Tanisha's soccer team has a phone tree in case a soccer game is postponed or cancelled. The coach calls 2 families. Then each family calls 2 other families. How many families will be notified during the 4th round of calls?
F 2 families
G 4 families
H 8 families
J 16 families
7. The Akashi-Kaiko Bridge is the longest suspension bridge in the world. It is located in Kobe-Naruto, Japan and was completed in 1998. It is about 3^8 feet long. Write the approximate length of the Akashi-Kaiko Bridge in standard form.
A 6,561 feet
B 2,187 feet
C 512 feet
D 24 feet
8. The Strahov Stadium is the largest sports stadium in the world. It is located in Prague, Czech Republic. Its capacity is about 12^5 people. Write the capacity of the Strahov Stadium in standard form.
F 60 people
G 144 people
H 20,736 people
J 248,832 people

LESSON
1-4 **Problem Solving**
Order of Operations

Evaluate each expression to complete the table.

Mammals with the Longest Tails

	Mammal	Expression	Tail Length
1.	Asian elephant	$2 + 3^2 \times 7 - (10 - 4)$	
2.	Leopard	$5 \times 6 + 5^2$	
3.	African elephant	$6 \times (72 \div 8) - 3$	
4.	African buffalo	$51 + 6^2 \div 9 - 12$	
5.	Giraffe	$4^3 - 3 \times 7$	
6.	Red kangaroo	$11 + 48 \div 6 \times 4$	

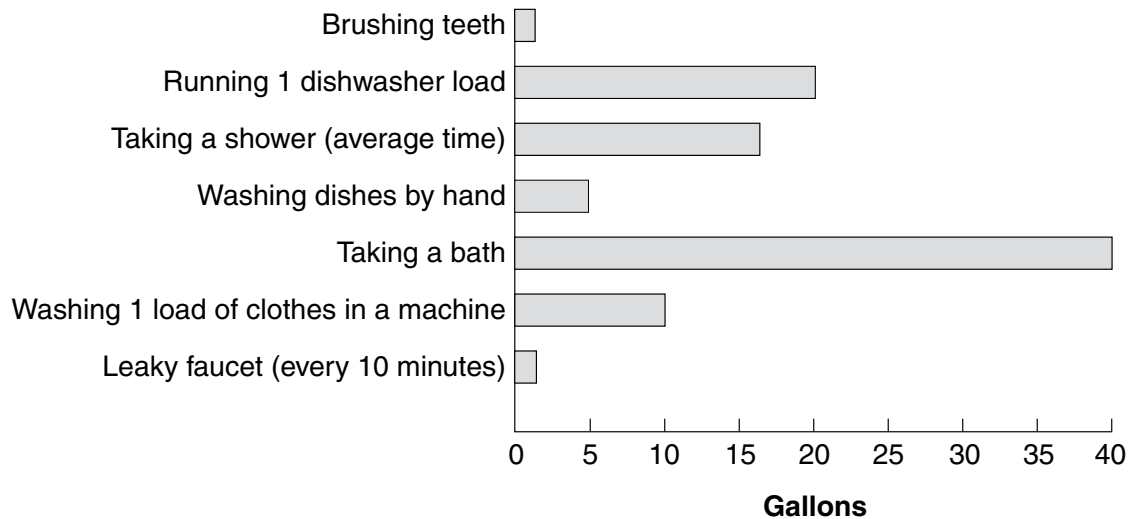
Choose the letter for the best answer.

7. Adam and his two brothers went to the zoo. Each ticket to enter the zoo costs \$7. Adam bought two bags of peanuts for \$4 each, and one of his brothers bought a lion poster for \$12. Which expression shows how much money they spent at the zoo in all?
- A** $7 + 4 + 12$
B $7 \times 3 + 4 + 12$
C $7 \times 3 + 4 \times 2 + 12$
D $(7 \times 3) + (4 \times 12)$
8. An elephant eats about 500 pounds of grass and leaves every day. There are 2 Africa elephants and 3 Asian elephants living in the City Zoo. How many pounds of grass and leaves do the zookeepers need to order each week to feed all the elephants?
- F** 2,500 pounds
G 17,500 pounds
H 3,000 pounds
J 21,000 pounds
9. The average giraffe is 18 feet tall. Which of these expressions shows the height of a giraffe?
- A** $4^2 - 2$
B $3 \times 12 \div 4 + 2$
C $3^3 \div 9 \times 6$
D $20 \div 5 + 5 - 6$
10. Some kangaroos can cover 30 feet in a single jump! If a kangaroo could jump like that 150 times in a row, how much farther would it need to go to cover a mile? (1 mile = 5,280 feet)
- F** 780 feet **H** 176 feet
G 26 feet **J** 5,100 feet

LESSON **Problem Solving**
1-5 **Mental Math**

The bar graph below shows the average amounts of water used during some daily activities. Use the bar graph and mental math to answer the questions.

How Much Water?



- Most people brush their teeth three times a day. How much water do they use for this activity every week?
- How much water is wasted in a day by a leaky faucet?

- The average American uses 124 gallons of water a day. Name a combination of activities listed in the table that would equal that daily total.

Choose the letter for the best answer.

- Kenya used 24 gallons of water doing three of the activities listed in the table once. Which activities did she do?
 - A taking a bath, brushing teeth, washing dishes by hand
 - B taking a bath, brushing teeth, running 1 dishwasher load
 - C taking a shower, brushing teeth, washing dishes by hand
 - D taking a shower, brushing teeth, running 1 dishwasher load
- If you wash two loads of dishes by hand instead of using a dishwasher, how much water do you save?
 - F 30 gallons
 - G 15 gallons
 - H 10 gallons
 - J 1 gallon

LESSON
1-6 **Problem Solving**
Choose the Method of Computation

Use the table below to answer questions 1–6. For each question, write the method of computation you should use to solve it. Then write the solution.

1. How many bones are in an average person’s arms and hands altogether?

2. How many more bones are in an average person’s head than chest?

3. Which part of the body has twice as many bones as the spine?

4. How many bones are in the body altogether?

5. A newborn baby has 350 bones. How many more bones does a newborn baby have than an adult?

Bones in the Human Body

Body Part	Number of Bones
Head	28
Throat	1
Spine	26
Chest	25
Shoulders	4
Arms	6
Hands	54
Legs	10
Feet	52

6. How many bones are in each of an average person’s feet, hands, legs, and arms?

Choose the letter for the best answer.

7. The body’s longest bones—thighbones and shinbones—are in the legs. The average thighbone is about 20 inches long, and the average shinbone is about 17 inches long. What is the total length of those four bones?

- A paper and pencil; 74 inches
- B paper and pencil; 37 inches
- C mental math; 20 inches
- D calculator; 17 inches

8. The body has 650 muscles. Seventeen of those muscles are used to smile and 42 muscles are used to frown. How many more muscles are used to frown than to smile?

- F mental math; 35 muscles
- G mental math; 25 muscles
- H paper and pencil; 608 muscles
- J calculator; 633 muscles

LESSON
1-7 **Problem Solving**
Patterns and Sequences

1. A giant bamboo plant was 5 inches tall on Monday, 23 inches tall on Tuesday, 41 inches tall on Wednesday, and 59 inches tall on Thursday. Describe the pattern. If the pattern continues, how tall will the giant bamboo plant be on Friday, Saturday, and Sunday?

2. A scientist was studying a cell. After the second hour there were two cells. After the third hour there were four cells. After the fourth hour there were eight cells. Describe the pattern. If the pattern continues, how many cells will there be after the fifth, sixth, and seventh hour?

Choose the letter for the best answer.

3. The first place prize for a sweepstakes is \$8,000. The third place prize is \$2,000. The fourth place prize is \$1,000. The fifth place prize is \$500. What is the second place prize?
- A** \$7,000 **C** \$4,000
B \$6,000 **D** \$3,000
4. The temperature was 59°F at 3:00 A.M., 62°F at 5:00 A.M., and 65°F at 7:00 A.M. If the pattern continues, what will the temperature be at 9:00 A.M., 11:00 A.M., and 1:00 P.M.?
- F** 66°F at 9:00 A.M., 67°F at 11:00 A.M., 68°F at 1:00 P.M.
G 68°F at 9:00 A.M., 70°F at 11:00 A.M., 72°F at 1:00 P.M.
H 68°F at 9:00 A.M., 71°F at 11:00 A.M., 74°F at 1:00 P.M.
J 70°F at 9:00 A.M., 75°F at 11:00 A.M., 80°F at 1:00 P.M.

LESSON
2-1 **Problem Solving**
Variables and Expressions

Write the correct answer.

- To cook 4 cups of rice, you use 8 cups of water. To cook 10 cups of rice, you use 20 cups of water. Write an expression to show how many cups of water you should use if you want to cook c cups of rice. How many cups of water should you use to cook 5 cups of rice?

- Sue earns the same amount of money for each hour that she tutors students in math. In 3 hours, she earns \$27. In 8 hours, she earns \$72. Write an expression to show how much money Sue earns working h hours. At this rate, how much money will Sue earn if she works 12 hours?

- Bees are one of the fastest insects on Earth. They can fly 22 miles in 2 hours, and 55 miles in 5 hours. Write an expression to show how many miles a bee can fly in h hours. If a bee flies 4 hours at this speed, how many miles will it travel?

- A friend asks you to think of a number, triple it, and then subtract 2. Write an algebraic expression using the variable x to describe your friend's directions. Then find the value of the expression if the number you think of is 5.

Circle the letter of the correct answer.

- The ruble is the currency in Russia. In 2005, 1 United States dollar was worth 28 rubles. How many rubles were equivalent to 10 United States dollars?
A 28
B 38
C 280
D 2,800
- The peso is the currency in Mexico. In 2005, 1 United States dollar was worth 10 pesos. How many pesos were equivalent to 5 United States dollars?
F 1
G 10
H 15
J 50

LESSON

2-2

Problem Solving**Translate Between Words and Math**

Write the correct answer.

- Holly bought 10 comic books. She gave a few of them to Kyle. Let c represent the number of comic books she gave to Kyle. Write an expression for the number of comic books Holly has left.

- Last week, Peter worked 40 hours for \$15 an hour. Write a numerical expression for the total amount Peter earned last week. Write an algebraic expression to show how much Peter earns in h hours at that rate.

- The temperature dropped 5°F , and then it went up 3°F . Let t represent the beginning temperature. Write an expression to show the ending temperature.

- Teri baked 48 cookies and divided them evenly into bags. Let n represent the number of cookies Teri put in each bag. Write an expression for the number of bags she filled.

Circle the letter of the correct answer.

- Marisa purchased canned soft drinks for a family reunion. She purchased 1 case of 24 cans and several packages containing 6 cans each. If p represents the number of 6-can packages she purchased, which of the following expressions represents the total number of cans Marisa purchased for the reunion?
A $24 + 6p$
B $24 - 6p$
C $6 + 24p$
D $6 - 24p$
- Mei bought several CDs for \$12 each. Which of the following expressions could you use to find the total amount she spent on the CDs?
A $12 + x$
B $12 - x$
C $12x$
D $12 \div x$
- Becky has the addresses of many people listed in her e-mail address book. She forwarded a copy of an article to all but 5 of those people. If a represents the number of addresses, which of the following expressions represents how many people she sent the article to?
F $a + 5$
G $5a$
H $a - 5$
J $a \div 5$
- Tony bought 2 packs of 50 plates and 1 pack of 30 plates. Which of the following expressions could you use to find the total number of plates Tony bought?
F $2 + 50 + 30$
G $(2 \cdot 50) + 30$
H $(2 \cdot 30) + 50$
J $2(30 + 50)$

LESSON **Problem Solving**
2-3 *Translating Between Tables and Expressions*

Use the table to write an expression for the missing value.
 Then use your expression to answer the questions.

1. How many cars are produced on average each year?

2. How many cars will be produced in 6 years?

3. After how many years will there be an average production of 3,750 cars?

Cars Produced By Company X

Number of Years	Average Number of Cars Produced
2	2,500
5	6,250
7	8,750
10	12,500
12	15,000
14	17,500
n	

Circle the letter of the correct answer.

Company Y produces twice as many cars as Company X.

4. How many cars does Company Y produce on average in 8 years?
 - A 1,250
 - B 10,000
 - C 11,250
 - D 20,000
5. How many more cars on average does Company Y produce in 4 years than Company X?
 - F 2,500
 - G 5,000
 - H 6,125
 - J 7,500
6. Which company produces an average of 11,250 cars in 9 years?
 - A Company X
 - B Company Y
 - C both companies
 - D neither company
7. How many cars are produced on average by both companies in 20 years?
 - F 3,750
 - G 12,500
 - H 25,000
 - J 37,500

LESSON
2-4 **Problem Solving**
Equations and Their Solutions

Use the table to write and solve an equation to answer each question. Then use your answers to complete the table.

1. A hippopotamus can stay underwater 3 times as long as a sea otter can. How long can a sea otter stay underwater?

2. A seal can stay underwater 10 minutes longer than a muskrat can. How long can a muskrat stay underwater?

3. A sperm whale can stay underwater 7 times longer than a sea cow can. How long can a sperm whale stay underwater?

How Many Minutes Can Mammals Stay Underwater?	
Hippopotamus	15
Human	
Muskrat	
Platypus	10
Polar bear	
Sea cow	16
Sea otter	
Seal	22
Sperm whale	

Circle the letter of the correct answer.

4. The difference between the time a platypus and a polar bear can stay underwater is 8 minutes. How long can a polar bear stay underwater?

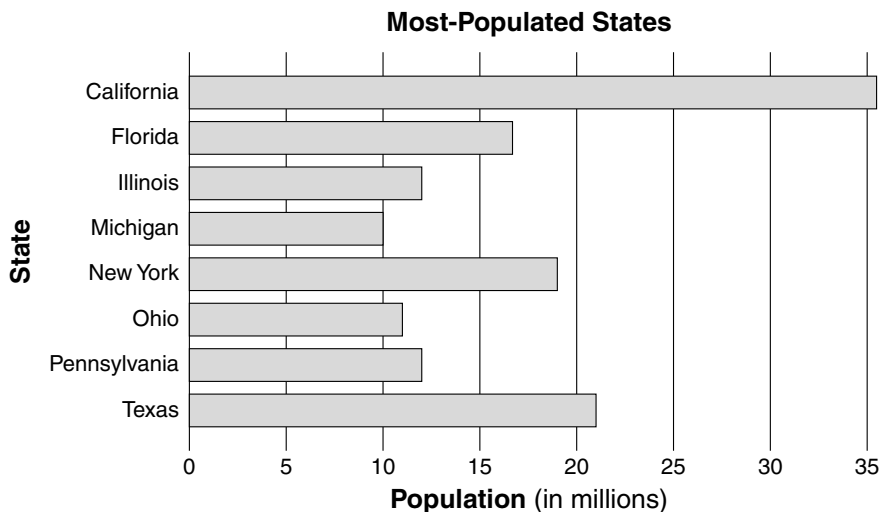
- A** 1 minute
- B** 2 minutes
- C** 3 minutes
- D** 5 minutes

5. When you divide the amount of time any of the animals in the table can stay underwater by itself, the answer is always the amount of time the average human can stay underwater. How long can the average human stay underwater?

- F** 6 minutes
- G** 4 minutes
- H** 2 minutes
- J** 1 minute

LESSON **Problem Solving**
2-5 **Addition Equations**

Use the bar graph and addition equations to answer the questions.



1. How many more people live in California than in New York?

2. How many more people live in Ohio than in Michigan?

3. How many more people live in Florida than in Illinois?

4. How many more people live in Texas than in Pennsylvania?

Circle the letter of the correct answer.

5. Which two states' populations are used in the equation $12 + x = 12$?

- A Pennsylvania and Texas
- B Ohio and Florida
- C Michigan and Illinois
- D Illinois and Pennsylvania

7. In 2003, the total population of the United States was 292 million. How many of those people did not live in one of the states shown on the graph?

- A 416 million
- B 73 million
- C 154 million
- D 292 million

6. What is the value of x in the equation in Exercise 5?

- F 0
- G 1
- H 12
- J 24

8. The combined population of Ohio and one other state is the same as the population of Texas. What is that state?

- F California
- G Florida
- H Michigan
- J Pennsylvania

LESSON
2-6 **Problem Solving**
Subtraction Equations

Write and solve subtraction equations to answer the questions.

1. Dr. Felix Hoffman invented aspirin in 1899. That was 29 years before Alexander Fleming invented penicillin. When was penicillin invented?

2. Kimberly was born on February 2. That is 10 days earlier than Kent's birthday. When is Kent's birthday?

3. Kansas and North Dakota are the top wheat-producing states. In 2000, North Dakota produced 314 million bushels of wheat, which was 34 million bushels less than Kansas produced. How much wheat did Kansas farmers grow in 2000?

4. Scientists assign every element an atomic number, which is the number of protons in the nucleus of that element. The atomic number of silver is 47, which is 32 less than the atomic number of gold. How many protons are in the nucleus of gold?

Circle the letter of the correct answer.

5. The spine-tailed swift and the frigate bird are the two fastest birds on earth. A frigate bird can fly 95 miles per hour, which is 11 miles per hour slower than a spine-tailed swift. How fast can a spine-tailed swift fly?
A 84 miles per hour
B 101 miles per hour
C 106 miles per hour
D 116 miles per hour
6. The Green Bay Packers and the Kansas City Chiefs played in the first Super Bowl in 1967. The Chiefs lost by 25 points, with a final score of 10. How many points did the Packers score in the first Super Bowl?
F 35
G 25
H 15
J 0
7. The Rocky Mountains extend 3,750 miles across North America. That is 750 miles shorter than the Andes Mountains in South America. How long are the Andes Mountains?
A 3,000 miles **C** 180 miles
B 5 miles **D** 4,500 miles
8. When the United States took its first census in 1790, only 4 million people lived here. That was 288 million fewer people than the population in 2003. What was the population of the United States in 2003?
F 292 million **H** 69 million
G 284 million **J** 1,108 million

LESSON
2-7 **Problem Solving**
Multiplication Equations

Write and solve a multiplication equation to answer each question.

- In 1975, a person earning minimum wage made \$80 for a 40-hour work week. What was the minimum wage per hour in 1975?

- If an ostrich could maintain its maximum speed for 5 hours, it could run 225 miles. How fast can an ostrich run?

- About 2,000,000 people live in Paris, the capital of France. That is 80 times larger than the population of Paris, Texas. How many people live in Paris, Texas?

- The average person in China goes to the movies 12 times per year. That is 3 times more than the average American goes to the movies. How many times per year does the average American go to the movies?

Circle the letter of the correct answer.

- Recycling just 1 ton of paper saves 17 trees! If a city recycled enough paper to save 136 trees, how many tons of paper did it recycle?
A 7 tons
B 8 tons
C 9 tons
D 119 tons
- Seaweed found along the coast of California, called giant kelp, grows up to 18 inches per day. If a giant kelp plant has grown 162 inches at this rate, for how many days has it been growing?
F 180 days **H** 9 days
G 144 days **J** 8 days
- The distance between Atlanta, Georgia, and Denver, Colorado, is 1,398 miles. That is twice the distance between Atlanta and Detroit, Michigan. How many miles would you have to drive to get from Atlanta to Detroit?
A 2,796 miles
B 349.5 miles
C 699 miles
D 1,400 miles
- Jupiter has 2 times more moons than Neptune has, and 8 times more moons than Mars has. Jupiter has 16 moons. How many moons do Neptune and Mars each have?
F 8 moons, 2 moons
G 2 moons, 8 moons
H 128 moons, 32 moons
J 32 moons, 128 moons

LESSON **Problem Solving**
2-8 **Division Equations**

Use the table to write and solve a division equation to answer each question.

1. How many total people signed up to play soccer in Bakersville this year?

2. How many people signed up to play lacrosse this year?

3. What was the total number of people who signed up to play baseball this year?

4. Which two sports in the league have the same number of people signed up to play this year? How many people are signed up to play each of those sports?

Bakersville Sports League

Sport	Number of Teams	Players on Each Team
Baseball	7	20
Soccer	11	15
Football	8	24
Volleyball	12	9
Lacrosse	6	17
Basketball	10	10
Tennis	18	6

Circle the letter of the correct answer.

5. Which sport has a higher total number of players, football or tennis? How many more players?

- A** football; 10 players
- B** tennis; 144 players
- C** football; 84 players
- D** tennis; 18 players

6. Only one sport this year has the same number of players on each team as its number of teams. Which sport is that?

- F** basketball
- G** football
- H** soccer
- J** tennis

LESSON **Problem Solving**

3-1 *Representing, Comparing, and Ordering Decimals*

Use the table to answer the questions.

1. What is the heaviest marine mammal on Earth?

2. Which mammal in the table has the shortest length?

3. Which mammal in the table is longer than a humpback whale, but shorter than a sperm whale?

Largest Marine Mammals

Mammal	Length (ft)	Weight (T)
Blue whale	110.0	127.95
Fin whale	82.0	44.29
Gray whale	46.0	32.18
Humpback whale	49.2	26.08
Right whale	57.4	39.37
Sperm whale	59.0	35.43

Circle the letter of the correct answer.

4. Which mammal measures forty-nine and two tenths feet long?

- A** blue whale
- B** gray whale
- C** sperm whale
- D** humpback whale

5. Which mammal weighs thirty-five and forty-three hundredths tons?

- F** right whale
- G** sperm whale
- H** gray whale
- J** fin whale

6. Which of the following lists shows mammals in order from the least weight to the greatest weight?

- A** sperm whale, right whale, fin whale, gray whale
- B** fin whale, sperm whale, gray whale, blue whale
- C** fin whale, right whale, sperm whale, gray whale
- D** gray whale, sperm whale, right whale, fin whale

7. Which of the following lists shows mammals in order from the greatest length to the least length?

- F** sperm whale, right whale, humpback whale, gray whale
- G** gray whale, humpback whale, right whale, sperm whale
- H** right whale, sperm whale, gray whale, humpback whale
- J** humpback whale, gray whale, sperm whale, right whale

LESSON
3-2 **Problem Solving**
Estimating Decimals

Write the correct answer.

- Men in Iceland have the highest average life expectancy in the world—76.8 years. The average life expectancy for a man in the United States is 73.1 years. About how much higher is a man's average life expectancy in Iceland? Round your answer to the nearest whole year.

- The average life expectancy for a woman in the United States is 79.1 years. Women in Japan have the highest average life expectancy—3.4 years higher than the United States. Estimate the average life expectancy of women in Japan. Round your answer to the nearest whole year.

- There are about 1.6093 kilometers in one mile. There are 26.2 miles in a marathon race. About how many kilometers are there in a marathon race? Round your answer to the nearest tenths.

- At top speed, a hornet can fly 13.39 miles per hour. About how many hours would it take a hornet to fly 65 miles? Round your answer to the nearest whole number.

Circle the letter of the correct answer.

- The average male human brain weighs 49.7 ounces. The average female human brain weighs 44.6 ounces. What is the difference in their weights?
A about 95 ounces
B about 7 ounces
C about 5 ounces
D about 3 ounces
- Lydia earned \$9.75 per hour as a lifeguard last summer. She worked 25 hours a week. About how much did she earn in 8 weeks?
A about \$250.00
B about \$2,000.00
C about \$2,500.00
D about \$200.00
- An official hockey puck is 2.54 centimeters thick. About how thick are two hockey pucks when one is placed on top of the other?
F about 4 centimeters
G about 4.2 centimeters
H about 5 centimeters
J about 5.2 centimeters
- Brent mixed 4.5 gallons of blue paint with 1.7 gallons of white paint and 2.4 gallons of red paint to make a light purple paint. About how many gallons of purple paint did he make?
F about 9 gallons
G about 8 gallons
H about 10 gallons
J about 7 gallons

LESSON **Problem Solving**
3-3 **Adding and Subtracting Decimals**

Use the table to answer the questions.

Busiest Ports in the United States

Port	Imports Per Year (millions of tons)	Exports Per Year (millions of tons)
South Louisiana, LA	30.6	57.42
Houston, TX	75.12	33.43
New York, NY & NJ	53.52	8.03
New Orleans, LA	26.38	21.73
Corpus Christi, TX	52.6	7.64

- How many more tons of imports than exports does the Port of New Orleans handle each year?

- How many tons of imports and exports are shipped through the port of Houston, Texas, each year in all?

Circle the letter of the correct answer.

- Which port ships 0.39 more tons of exports each year than the port at Corpus Christi, Texas?
A Houston
B NY & NJ
C New Orleans
D South Louisiana
- What is the difference between the imports and exports shipped in and out of Corpus Christi's port each year?
F 45.04 million tons
G 44.94 million tons
H 44.96 million tons
J 44.06 million tons
- What is the total amount of imports shipped into the nation's 5 busiest ports each year?
A 238.22 million tons
B 366.47 million tons
C 128.25 million tons
D 109.97 million tons
- What is the total amount of exports shipped out of the nation's 5 busiest ports each year?
F 366.47 million tons
G 128.25 million tons
H 109.97 million tons
J 238.22 million tons

LESSON
3-4 **Problem Solving**
Scientific Notation

Write the correct answer.

- The closest comet to approach Earth was called Lexell. On July 1, 1770, Lexell was observed about 874,200 miles from Earth's surface. Write this distance in scientific notation.

- Scientists estimate that it would take $1.4 \cdot 10^{10}$ years for light from the edge of our universe to reach Earth. How many years is that written in standard form?

- In the United States, about 229,000,000 people speak English. About 18,000,000 people speak English in Canada. Write in scientific notation the total number of English speaking people in the United States and Canada.

- South Africa is the top gold-producing country in the world. Each year it produces $4.688 \cdot 10^8$ tons of gold! Written in standard form, how many tons of gold does South African produce each year?

Circle the letter of the correct answer.

- About $3.012 \cdot 10^6$ people visit Yellowstone National Park each year. What is that figure written in standard form?
A 30,120,000 people
B 3,012,000 people
C 301,200 people
D 30,120 people
- In 2000, farmers in Iowa grew 1,740,000 bushels of corn. What is this amount written in scientific notation?
F $1.7 \cdot 10^5$
G $1.74 \cdot 10^5$
H $1.74 \cdot 10^6$
J $1.74 \cdot 10^7$
- The temperature at the core of the Sun reaches $27,720,000^\circ\text{F}$. What is this temperature written in scientific notation?
A $2.7 \cdot 10^7$
B $2.72 \cdot 10^7$
C $2.772 \cdot 10^6$
D $2.772 \cdot 10^7$
- Your body is constantly producing red blood cells—about $1.73 \cdot 10^{11}$ cells a day. How many blood cells is that written in standard form?
F 173,000,000 cells
G 17,300,000,000 cells
H 173,000,000,000 cells
J 1,730,000,000,000 cells

LESSON
3-5 **Problem Solving**
Multiplying Decimals

Use the table to answer the questions.

1. At the minimum wage, how much did a person earn for a 40-hour workweek in 1950?
- _____

2. At the minimum wage, how much did a person earn for working 25 hours in 1970?
- _____

3. If you had a minimum-wage job in 1990, and worked 15 hours a week, how much would you have earned each week?
- _____

United States Minimum Wage

Year	Hourly Rate
1940	\$0.30
1950	\$0.75
1960	\$1.00
1970	\$1.60
1980	\$3.10
1990	\$3.80
2000	\$5.15

4. About how many times higher was the minimum wage in 1960 than in 1940?
- _____

Circle the letter for the correct answer.

5. Ted's grandfather had a minimum-wage job in 1940. He worked 40 hours a week for the entire year. How much did Ted's grandfather earn in 1940?

A \$12.00
B \$624.00
C \$642.00
D \$6,240.00

7. Having one dollar in 1960 is equivalent to having \$5.82 today. If you worked 40 hours a week in 1960 at minimum wage, how much would your weekly earnings be worth today?

A \$40.00
B \$5.82
C \$232.80
D \$2,328.00

6. Marci's mother had a minimum-wage job in 1980. She worked 12 hours a week. How much did Marci's mother earn each week?

F \$3.72
G \$37.00
H \$37.10
J \$37.20

8. In 2000, Cindy had a part-time job at a florist, where she earned minimum wage. She worked 18 hours each week for the whole year. How much did she earn from this job in 2000?

F \$927.00
G \$4,820.40
H \$10,712.00
J \$2,142.40

LESSON
3-6 **Problem Solving**
Dividing Decimals by Whole Numbers

Write the correct answer.

- Four friends had lunch together. The total bill for lunch came to \$33.40, including tip. If they shared the bill equally, how much did they each pay?

- There are 7.2 milligrams of iron in a dozen eggs. Because there are 12 eggs in a dozen, how many milligrams of iron are in 1 egg?

- Kyle bought a sheet of lumber 8.7 feet long to build fence rails. He cut the strip into 3 equal pieces. How long is each piece?

- An albatross has a wingspan greater than the length of a car—3.7 meters! Wingspan is the length from the tip of one wing to the tip of the other wing. What is the length of each albatross wing (assuming wing goes from center of body)?

Circle the letter of the correct answer.

- The City Zoo feeds its three giant pandas 181.5 pounds of bamboo shoots every day. Each panda is fed the same amount of bamboo. How many pounds of bamboo does each panda eat every day?
A 6.05 pounds
B 60.5 pounds
C 61.5 pounds
D 605 pounds
- Emma bought 22.5 yards of cloth to make curtains for two windows in her apartment. She used the same amount of cloth on each window. How much cloth did she use to make each set of curtains?
F 1.125 yards
G 10.25 yards
H 11.25 yards
J 11.52 yards
- Aerobics classes cost \$153.86 for 14 sessions. What is the fee for one session?
A \$10.99
B \$1.99
C about \$25.00
D about \$20.00
- An entire apple pie has 36.8 grams of saturated fat. If the pie is cut into 8 slices, how many grams of saturated fat are in each slice?
F 4.1 grams
G 0.46 grams
H 4.6 grams
J 4.11 grams

LESSON

Problem Solving**3-7** *Dividing by Decimals*

Write the correct answer.

1. Jamal spent \$6.75 on wire to build a rabbit hutch. Wire costs \$0.45 per foot. How many feet of wire did Jamal buy?

2. Peter drove 195.3 miles in 3.5 hours. On average, how many miles per hour did he drive?

3. Lisa's family drove 830.76 miles to visit her grandparents. Lisa calculated that they used 30.1 gallons of gas. How many miles per gallon did the car average?

4. A chef bought 84.5 pounds of ground beef. He uses 0.5 pound of ground beef for each hamburger. How many hamburgers can he make?

Circle the letter of the correct answer.

5. Mark earned \$276.36 for working 23.5 hours last week. He earned the same amount of money for each hour that he worked. What is Mark's hourly rate of pay?
A \$1.17
B \$10.76
C \$11.76
D \$117.60
6. Alicia wants to cover a section of her wall that is 2 feet wide and 12 feet long with mirrors. Each mirror tile is 2 feet wide and 1.5 feet long. How many mirror tiles does she need to cover that section?
F 4 tiles
G 6 tiles
H 8 tiles
J 12 tiles
7. John ran the city marathon in 196.5 minutes. The marathon is 26.2 miles long. On average, how many miles per hour did John run the race?
A 7 miles per hour
B 6.2 miles per hour
C 8 miles per hour
D 8.5 miles per hour
8. Shaneeka is saving \$5.75 of her allowance each week to buy a new camera that costs \$51.75. How many weeks will she have to save to have enough money to buy it?
F 9 weeks
G 9.5 weeks
H 8.1 weeks
J 8 weeks

LESSON
3-8 **Problem Solving**
Interpret the Quotient

Write the correct answer.

- Five friends split a pizza that costs \$16.75. If they shared the bill equally, how much did they each pay?

- There are 45 choir members going to the recital. Each van can carry 8 people. How many vans are needed?

- Tara bought 150 beads. She needs 27 beads to make each necklace. How many necklaces can she make?

- Cat food costs \$2.85 for five cans. Ben only wants to buy one can. How much will it cost?

Circle the letter of the correct answer.

- Tennis balls come in cans of 3. The coach needs 50 tennis balls for practice. How many cans should he order?
A 16 cans
B 17 cans
C 18 cans
D 20 cans
- Tom has \$15.86 to buy marbles that cost \$1.25 each. He wants to know how many marbles he can buy. What should he do after he divides?
A Drop the decimal part of the quotient when he divides.
B Drop the decimal part of the dividend when he divides.
C Round the quotient up to the next highest whole number to divide.
D Use the entire quotient of his division as the answer.
- The rainfall for three months was 4.6 inches, 3.5 inches, and 4.2 inches. What was the average monthly rainfall during that time?
F 41 inches
G 12.3 inches
H 4.3 inches
J 4.1 inches
- Mei needs 135 hot dog rolls for the class picnic. The rolls come in packs of 10. She wants to know how many packs to buy. What should she do after she divides?
F Drop the decimal part of the quotient when she divides.
G Drop the decimal part of the dividend when she divides.
H Round the quotient up to the next highest whole number.
J Use the entire quotient of her division as the answer.

LESSON
3-9 **Problem Solving**
Solving Decimal Equations

Write the correct answer.

1. Bee hummingbirds weigh only 0.0056 ounces. They have to eat half their body weight every day to survive. How much food does a bee hummingbird have to eat each day?

2. The desert locust, a type of grasshopper, can jump 10 times the length of its body. The locust is 1.956 inches long. How far can it jump in one leap?

3. In 1900, there were about 1.49 million people living in California. In 2000, the population was 33.872 million. How much did the population grow between 1900 and 2000?

4. Juanita has \$567.89 in her checking account. After she deposited her paycheck and paid her rent of \$450.00, she had \$513.82 left in the account. How much was her paycheck?

Circle the letter of the correct answer.

5. The average body temperature for people is 98.6°F . The average body temperature for most dogs is 3.4°F higher than for people. The average body temperature for cats is 0.5°F lower than for dogs. What is the normal body temperature for dogs and cats?
A dogs: 101.5°F ; cats 102°F
B dogs: 102°F ; cats 101.5°F
C dogs: 102.5°F ; cats 103°F
D dogs: 102.5°F ; cats 102.5°F
6. Seattle, Washington, is famous for its rainy climate. Winter is the rainiest season there. From November through December the city gets an average of 5.85 inches of rain each month. Seattle usually gets 6 inches of rain in December. What is the city's average rainfall in November?
F 6 inches
G 5.925 inches
H 5.8 inches
J 5.7 inches
7. The equation to convert from Celsius to Kelvin degrees is $K = 273.16 + C$. If it is 303.66°K outside, what is the temperature in Celsius degrees?
A 576.82°C
B 30.5°C
C 305°C
D 257.68°C
8. The distance around a square mirror is 6.8 feet. Which of the following equations finds the length of each side of the mirror?
F $6.8 - x = 4$
G $x \div 4 = 6.8$
H $4x = 6.8$
J $6.8 + 4 = x$

LESSON **Problem Solving**
4-1 **Divisibility**

Use the table to answer the questions.

1. Which city's subway has a length that is a prime number of miles?

2. Which subway could be evenly broken into sections of 2 miles each?

3. Which subways could be evenly broken into sections of 5 miles each?

Subways Around the World

City, Country	Length (mi)
New York, U.S.	247
Mexico City, Mexico	111
Paris, France	125
Moscow, Russia	152
Seoul, South Korea	83
Tokyo, Japan	105

Circle the letter of the correct answer.

4. Which subway's length is divisible by 4 miles?
A New York, United States
B Paris, France
C Tokyo, Japan
D Moscow, Russia
5. Which subway's length is not a prime number, but is also not divisible by 2, 3, 4, 5, 6, or 9?
F Mexico City, Mexico
G New York, United States
H Seoul, South Korea
J Paris, France
6. The subway in Hong Kong, China, has a length that is a prime number of miles. Which of the following is its length?
A 260 miles
B 268 miles
C 269 miles
D 265 miles
7. The subway in St. Petersburg, Russia, has a length that is divisible by 3 miles. Which of the following is its length?
F 57 miles
G 56 miles
H 55 miles
J 58 miles

LESSON
4-2 **Problem Solving**
Factors and Prime Factorization

Write the correct answer.

- The area of a rectangle is the product of its length and width. If a rectangular board has an area of 30 square feet, what are the possible measurements of its length and width?

- The first-floor apartments in Jenna's building are numbered 100 to 110. How many apartments on that floor are a prime number? What are those apartment numbers?

- A Russian mathematician named Christian Goldbach came up with a theory that every even number greater than 4 can be written as the sum of two odd primes. Test Goldbach's theory with the numbers 6 and 50.

- Mr. Samuels has 24 students in his math class. He wants to divide the students into equal groups, and he wants the number of students in each group to be prime. What are his choices for group sizes? How many groups can he make?

Circle the letter of the correct answer.

- Why is 2 the only even prime number?
A It is the smallest prime number.
B All other even numbers are divisible by 2.
C It only has 1 and 2 as factors.
D All odd numbers are prime.
- If a composite number has the first five prime numbers as factors, what is the smallest number it could be? Write that number's prime factorization.
A 30
B 210
C 2,310
D 30,030
- What prime numbers are factors of both 60 and 105?
F 2 and 3
G 2 and 5
H 3 and 5
J 5 and 7
- Tim's younger brother, Bryant, just had a birthday. Bryant's age only has one factor, and is not a prime number. How old is Bryant?
F 10 years old
G 7 years old
H 3 years old
J 1 year old

LESSON
4-3 **Problem Solving**
Greatest Common Factor

Write the correct answer.

- | | |
|---|---|
| <p>1. Carolyn has 24 bottles of shampoo, 36 tubes of hand lotion, and 60 bars of lavender soap to make gift baskets. She wants to have the same number of each item in every basket. What is the greatest number of baskets she can make without having any of the items left over?</p> <p>_____</p> <p>_____</p> | <p>2. There are 40 girls and 32 boys who want to participate in the relay race. If each team must have the same number of girls and boys, what is the greatest number of teams that can race? How many boys and girls will be on each team?</p> <p>_____</p> <p>_____</p> |
|---|---|

- | | |
|--|---|
| <p>3. Ming has 15 quarters, 30 dimes, and 48 nickels. He wants to group his money so that each group has the same number of each coin. What is the greatest number of groups he can make? How many of each coin will be in each group? How much money will each group be worth?</p> <p>_____</p> <p>_____</p> <p>_____</p> | <p>4. A gardener has 27 tulip bulbs, 45 tomato plants, 108 rose bushes, and 126 herb seedlings to plant in the city garden. He wants each row of the garden to have the same number of each kind of plant. What is the greatest number of rows that the gardener can make if he uses all the plants?</p> <p>_____</p> <p>_____</p> <p>_____</p> |
|--|---|

Circle the letter of the correct answer.

- | | |
|--|--|
| <p>5. Kim packed 6 boxes with identical supplies. It was the greatest number she could pack and use all the supplies. Which of these is her supply list?</p> <p>A 24 pencils, 36 pens, 10 rulers</p> <p>B 12 rulers, 30 pencils, 45 pens</p> <p>C 42 pencils, 18 rulers, 72 pens</p> <p>D 60 pens, 54 pencils, 32 rulers</p> | <p>6. The sum of three numbers is 60. Their greatest common factor is 4. Which of the following lists shows those three numbers?</p> <p>F 4, 16, 36</p> <p>G 8, 20, 32</p> <p>H 14, 16, 30</p> <p>J 10, 18, 32</p> |
|--|--|

LESSON
4-4 **Problem Solving**
Decimals and Fractions

Electricity is measured in amperes, or the rate electrical currents flow. A high ampere measurement means that a lot of electricity is being used. The table below shows the average amount of electricity some household appliances use per hour. Use the table to answer the questions.

1. How much electricity does an average 25-inch television use each hour? Write your answer as a decimal.

2. Which appliance uses an average of 2.5 amps per hour?

3. Which appliance uses the most electricity per hour? Write its ampere measurement as a decimal.

Electricity Use in the Home

Appliance	Amps per Hour
Blender	$2\frac{1}{2}$
Coffeemaker	$6\frac{2}{3}$
Computer and printer	$1\frac{5}{6}$
Microwave oven	$12\frac{1}{2}$
Popcorn popper	$2\frac{1}{12}$
25-inch television	$1\frac{1}{4}$
VCR	$\frac{1}{3}$

Circle the letter of the correct answer.

4. How much electricity do most computers and printers use in an hour?

- A** 1.38 amperes
B 1.8 amperes
C 1.83 amperes
D 1.88 amperes

6. In most years, 39.7 percent of the world's energy comes from burning oil. What is this percent written as a fraction?

- A** $\frac{39}{7}$ percent
B $39\frac{1}{7}$ percent
C $3\frac{9}{7}$ percent
D $39\frac{7}{10}$ percent

5. Which of the appliances has an hourly ampere measurement that is a repeating decimal?

- F** blender
G coffee maker
H microwave oven
J 25-inch television

7. The United States produces about 13.2 percent of the world's hydroelectric power. What fraction of hydroelectric power does the United States produce?

- F** $13\frac{1}{5}$ percent
G $\frac{13}{2}$ percent
H $1\frac{3}{2}$ percent
J $13\frac{1}{2}$ percent

LESSON **Problem Solving**
4-5 **Equivalent Fractions**

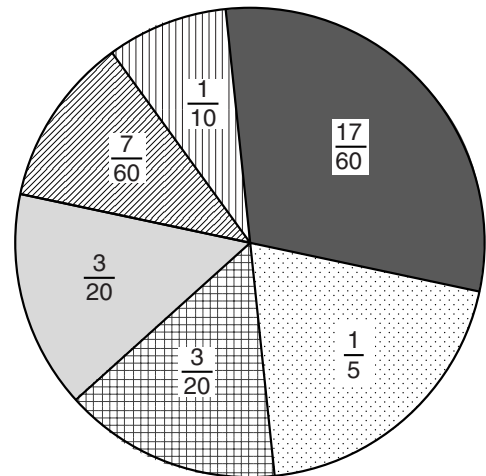
About 60 million Americans exercise 100 times or more each year. Their top activities and the fraction of those 60 million people who did them are shown on the circle graph. Use the graph to answer the questions.

1. Which two activities did the same number of people use to keep in shape?

2. Which activity had the most participants? Write an equivalent fraction for that activity's participants.

3. Which activity had the fewest participants? Write two equivalent fractions for that activity's participants.

Exercise in the U.S.



Circle the letter of the correct answer.

4. Which activity did $\frac{3}{15}$ of the people use to exercise?

- A** free weights
- B** treadmill
- C** fitness walking
- D** stationary bike

6. An average-sized person can burn about $6\frac{1}{2}$ calories a minute while riding a bike. Which of the following is equivalent to that amount?

- A** $1\frac{2}{2}$
- B** $5\frac{6}{2}$
- C** $6\frac{2}{4}$
- D** $6\frac{2}{6}$

5. Which activity did $\frac{35}{300}$ of the people use to stay healthy?

- F** running/jogging
- G** resistance machines
- H** free weights
- J** treadmill

7. An average-sized person can burn about 11.25 calories a minute while jogging. Which of the following is not equivalent to that amount?

- F** $11\frac{1}{4}$
- G** $11\frac{1}{2}$
- H** $11\frac{2}{8}$
- J** $11\frac{3}{12}$

LESSON
4-6 **Problem Solving**
Mixed Numbers and Improper Fractions

Write the correct answer.

- If stretched end-to-end, the total length of the blood vessels inside your body could wrap around Earth's equator $\frac{5}{2}$ times! Write this fact as a mixed number.

- In 2000, the average 12-year-old child in the United States earned an allowance of 9 dollars and $\frac{7}{25}$ cents a week. Write this amount as an improper fraction and a decimal.

- The normal body temperature for a rattlesnake is between $53\frac{3}{5}^{\circ}\text{F}$ and $64\frac{2}{5}^{\circ}\text{F}$. Write this range as improper fractions.

- A professional baseball can weigh no less than $\frac{45}{9}$ ounces and no more than $\frac{21}{4}$ ounces. Write this range as mixed numbers.

Circle the letter of the correct answer.

- Betty needs a piece of lumber that is $\frac{14}{3}$ feet long. Which size should she look for at the hardware store?
A $3\frac{1}{3}$ feet
B $3\frac{1}{4}$ feet
C $4\frac{2}{3}$ feet
D $4\frac{1}{4}$ feet
- What operations are used to change a mixed number to an improper fraction?
F multiplication and addition
G division and subtraction
H division and addition
J multiplication and subtraction
- Adult bees only eat nectar, the substance in flowers used to make honey. A bee could fly 4 million miles on the energy it would get from eating $\frac{9}{2}$ liters of nectar. What is this amount of nectar written as a mixed number.
A $9\frac{1}{2}$ liters **C** $4\frac{1}{9}$ liters
B $4\frac{1}{2}$ liters **D** $2\frac{1}{2}$ liters
- An astronaut who weighs 250 pounds on Earth would weigh $41\frac{1}{2}$ pounds on the moon. What is the astronaut's moon weight written as an improper fraction?
F $\frac{41}{2}$ pounds **H** $\frac{82}{2}$ pounds
G $\frac{42}{2}$ pounds **J** $\frac{83}{2}$ pounds

LESSON
4-7 **Problem Solving**
Comparing and Ordering Fractions

The table shows what fraction of Earth's total land area each of the continents makes up. Use the table to answer the questions.

1. Which continent makes up most of Earth's land?

2. Which continent makes up the least part of Earth's land?

3. Explain how you would compare the part of Earth's total land area that Australia and Europe make up.

Earth's Land	
Continent	Fraction of Earth's Land
Africa	$\frac{1}{5}$
Antarctica	$\frac{1}{10}$
Asia	$\frac{3}{10}$
Australia	$\frac{1}{20}$
Europe	$\frac{7}{100}$
North America	$\frac{4}{25}$
South America	$\frac{6}{50}$

Circle the letter of the correct answer.

4. Which of these continents covers the greatest part of Earth's total land area?
A North America
B South America
C Europe
D Australia
5. Which of these continents covers the least part of Earth's total land area?
F Africa
G Antarctica
H Asia
J Australia
6. Which of the following lists shows the continents written in order from the greatest part of Earth's total land they cover to the least part?
A Asia, Africa, North America
B Africa, Asia, North America
C Asia, South America, North America
D North America, Asia, South America
7. Which of the following lists shows the continents written in order from the least part of Earth's total land they cover to the greatest part?
F Antarctica, Europe, South America
G South America, Antarctica, Europe
H Australia, Europe, Antarctica
J Antarctica, Europe, Australia

LESSON **Problem Solving****4-8** **Adding and Subtracting with Like Denominators**

Write the answers in simplest form.

1. About $\frac{3}{10}$ of Earth's surface is covered by land, and the rest is water. What fraction of Earth's surface is covered by water?

2. A recipe for cookies calls for $\frac{3}{8}$ cup of chocolate chips. Tameeka wants to double the recipe. How much chocolate chips will she use?

3. In Mr. Chesterfield's science class, $\frac{2}{9}$ of the boys like his class. Three times as many girls like his science class. How many girls like Mr. Chesterfield's science class?

4. In the United States, $\frac{6}{50}$ of the population is left-handed men and $\frac{5}{50}$ of the population is left-handed women. What part of the population is left-handed?

Circle the letter of the correct answer.

5. In the United States, about $\frac{1}{10}$ of the population is born with black hair, and $\frac{7}{10}$ of the population is born with brown hair. What fraction of the total population in the U.S. is born with brown or black hair?
A $\frac{1}{10}$ **C** $\frac{3}{5}$
B $\frac{1}{5}$ **D** $\frac{4}{5}$
6. In the United States, about $\frac{3}{20}$ of the population is born with blond hair, and $\frac{1}{20}$ of the population is born with red hair. What fraction of the total population in the U.S. is born with blond or red hair?
F $\frac{1}{10}$ **H** $\frac{3}{5}$
G $\frac{1}{5}$ **J** $\frac{4}{5}$
7. The average height for men in the United States is $5\frac{2}{3}$ feet tall. Bill is $\frac{1}{3}$ foot shorter than average. How tall is Bill?
A $5\frac{1}{3}$ feet **C** 6 feet
B $5\frac{3}{6}$ feet **D** $5\frac{1}{6}$ feet
8. The average height for women in the United States is $5\frac{1}{3}$ feet tall. Katie is $\frac{2}{3}$ foot taller than average. How tall is Katie?
F $5\frac{1}{3}$ feet **H** 6 feet
G $5\frac{3}{6}$ feet **J** $5\frac{1}{6}$ feet

LESSON
4-9 **Problem Solving**
Estimating Fraction Sums and Differences

Use the table to answer the questions.

Portland, Oregon, Average Monthly Rainfall

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rain (in.)	$5\frac{2}{5}$	$3\frac{9}{10}$	$3\frac{3}{5}$	$2\frac{2}{5}$	$2\frac{1}{10}$	$1\frac{1}{2}$	$\frac{3}{5}$	$1\frac{1}{10}$	$1\frac{4}{5}$	$2\frac{7}{10}$	$5\frac{3}{10}$	$6\frac{1}{10}$

- | | |
|--|---|
| <p>1. About how much does it rain in Portland in January and February combined?</p> <p>_____</p> | <p>2. About how much more does it rain in Portland in October than in September?</p> <p>_____</p> |
| <p>3. In most years, about how much rain does Portland receive from May through July?</p> <p>_____</p> | <p>4. What is the difference between Portland's average rainfall in March and May?</p> <p>_____</p> |

Circle the letter of the correct answer.

- | | |
|---|---|
| <p>5. What is the difference in rainfall between Portland's rainiest and driest months?</p> <p>A about $2\frac{1}{2}$ inches</p> <p>B about 5 inches</p> <p>C about $6\frac{1}{2}$ inches</p> <p>D about $7\frac{1}{2}$ inches</p> | <p>6. About how much rain does Portland receive in most years all together?</p> <p>F about $25\frac{1}{2}$ inches</p> <p>G about $30\frac{1}{2}$ inches</p> <p>H about $32\frac{1}{2}$ inches</p> <p>J about $36\frac{1}{2}$ inches</p> |
| <p>7. About how much rain does Portland receive during its three rainiest months all together?</p> <p>A about 17 inches</p> <p>B about 16 inches</p> <p>C about 18 inches</p> <p>D about 15 inches</p> | <p>8. In which month in Portland can you expect about $\frac{1}{2}$ inch less rainfall than in June?</p> <p>F May</p> <p>G July</p> <p>H September</p> <p>J August</p> |

LESSON **Problem Solving**
5-1 *Least Common Multiple*

Use the table to answer the questions.

1. You want to have an equal number of plastic cups and paper plates. What is the least number of packs of each you can buy?

2. You want to invite 48 people to a party. What is the least number of packs of invitations and napkins you should buy to have one for each person and none left over?

Party Supplies

Item	Number per Pack
Invitations	12
Balloons	30
Paper plates	10
Paper napkins	24
Plastic cups	15
Noise makers	5

Circle the letter of the correct answer.

3. You want to have an equal number of noisemakers and balloons at your party. What is the least number of packs of each you can buy?

- A** 1 pack of balloons and 1 pack of noise makers
- B** 1 pack of balloons and 2 packs of noise makers
- C** 1 pack of balloons and 6 packs of noise makers
- D** 6 packs of balloons and 1 pack of noise makers

5. The LCM for three items listed in the table is 60 packs. Which of the following are those three items?

- A** balloons, plates, noise makers
- B** noise makers, invitations, balloons
- C** napkins, cups, plates
- D** balloons, napkins, plates

4. You bought an equal number of packs of plates and cups so that each of your 20 guests would have 3 cups and 2 plates. How many packs of each item did you buy?

- F** 1 pack of cups and 1 pack of plates
- G** 3 packs of cups and 4 packs of plates
- H** 4 packs of cups and 3 packs of plates
- J** 4 packs of cups and 4 packs of plates

6. To have one of each item for 120 party guests, you buy 10 packs of one item and 24 packs of the other. What are those two items?

- F** plates and invitations
- G** balloons and cups
- H** napkins and plates
- J** invitations and noise makers

LESSON **Problem Solving**
5-2 **Adding and Subtracting with Unlike Denominators**

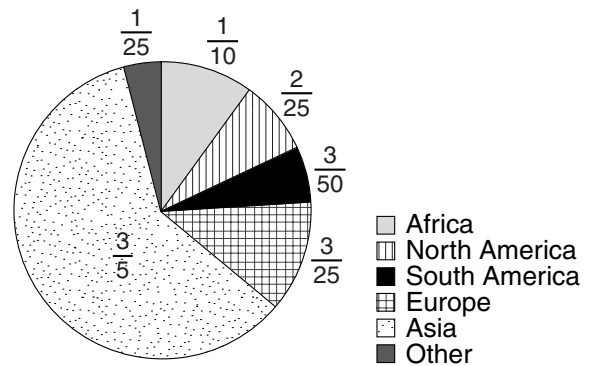
Use the circle graph to answer the questions. Write each answer in simplest form.

1. On which two continents do most people live? How much of the total population do they make up together?

2. How much of the world's population live in either North America or South America?

3. How much more of the world's total population lives in Asia than in Africa?

World Population, 2001



Circle the letter of the correct answer.

4. How much of Earth's total population do people in Asia and Africa make up all together?

- A $\frac{3}{10}$ of the population
- B $\frac{2}{5}$ of the population
- C $\frac{7}{10}$ of the population
- D $\frac{7}{5}$ of the population

6. How much more of the population lives in Europe than in North America?

- A $\frac{1}{25}$ of the population
- B $\frac{1}{5}$ of the population
- C $\frac{1}{15}$ of the population
- D $\frac{1}{10}$ of the population

5. What is the difference between North America's part of the total population and Africa's part?

- F Africa has $\frac{1}{50}$ more.
- G Africa has $\frac{1}{50}$ less.
- H Africa has $\frac{9}{50}$ more.
- J Africa has $\frac{9}{50}$ less.

7. How much of the world's population lives in North America and Europe?

- F $\frac{1}{25}$ of the population
- G $\frac{1}{15}$ of the population
- H $\frac{1}{5}$ of the population
- J $\frac{1}{20}$ of the population

LESSON **Problem Solving**
5-3 **Adding and Subtracting Mixed Numbers**

Write the correct answer in simplest form.

- Of the planets in our solar system, Jupiter and Neptune have the greatest surface gravity. Jupiter's gravitational pull is $2\frac{16}{25}$ stronger than Earth's, and Neptune's is $1\frac{1}{5}$ stronger. What is the difference between Jupiter's and Neptune's surface gravity levels?

- Escape velocity is the speed a rocket must attain to overcome a planet's gravitational pull. Earth's escape velocity is $6\frac{9}{10}$ miles per second! The Moon's escape velocity is $5\frac{2}{5}$ miles per second slower. How fast does a rocket have to launch to escape the moon's gravity?

- The two longest total solar eclipses occurred in 1991 and 1992. The first one lasted $6\frac{5}{6}$ minutes. The eclipse of 1992 lasted $5\frac{1}{3}$ minutes. How much longer was 1991's eclipse?

- The two largest meteorites found in the U.S. landed in Canyon Diablo, Arizona, and Willamette, Oregon. The Arizona meteorite weighs $33\frac{1}{10}$ tons! Oregon's weighs $16\frac{1}{2}$ tons. How much do the two meteorites weigh in all?

Circle the letter of the correct answer.

- Not including the Sun, Proxima Centauri is the closest star to Earth. It is $4\frac{11}{50}$ light years away! The next closest star is Alpha Centauri. It is $\frac{13}{100}$ light years farther than Proxima. How far is Alpha Centauri from Earth?
 A $4\frac{7}{20}$ light years
 B $4\frac{13}{100}$ light years
 C $4\frac{6}{25}$ light years
 D $4\frac{1}{50}$ light years
- It takes about $5\frac{1}{3}$ minutes for light from the Sun to reach Earth. The Moon is closer to Earth, so its light reaches Earth faster—about $5\frac{19}{60}$ minutes faster than from the Sun. How long does light from the Moon take to reach Earth?
 F $\frac{3}{10}$ of a minute
 G $\frac{1}{60}$ of a minute
 H $\frac{1}{3}$ of a minute
 J $\frac{4}{15}$ of a minute

LESSON
5-4 **Problem Solving**
Regrouping to Subtract Mixed Numbers

Write the correct answer in simplest form.

- The average person in the United States eats $6\frac{13}{16}$ pounds of potato chips each year. The average person in Ireland eats $5\frac{15}{16}$ pounds. How much more potato chips do Americans eat a year than people in Ireland?

- The average person in the United States eats $270\frac{1}{16}$ pounds of meat each year. The average person in Australia eats $238\frac{1}{2}$ pounds. How much more meat do Americans eat a year than people in Australia?

- The average Americans eats $24\frac{1}{2}$ pounds of ice cream every year. The average person in Israel eats $15\frac{4}{5}$ pounds. How much more ice cream do Americans eat each year?

- People in Switzerland eat the most chocolate—26 pounds a year per person. Most Americans eat $12\frac{9}{16}$ pounds each year. How much more chocolate do the Swiss eat?

- The average person in the United States chews $1\frac{9}{16}$ pounds of gum each year. The average person in Japan chews $\frac{7}{8}$ pound. How much more gum do Americans chew?

- Norwegians eat the most frozen foods— $78\frac{1}{2}$ pounds per person each year. Most Americans eat $35\frac{15}{16}$ pounds. How much more frozen foods do people in Norway eat?

Circle the letter of the correct answer.

- Most people around the world eat $41\frac{7}{8}$ pounds of sugar each year. Most Americans eat $66\frac{3}{4}$ pounds. How much more sugar do Americans eat than the world's average?
A $25\frac{7}{8}$ pounds more
B $25\frac{1}{8}$ pounds more
C $24\frac{7}{8}$ pounds more
D $24\frac{1}{8}$ pounds more
- The average person eats 208 pounds of vegetables and $125\frac{5}{8}$ pounds of fruit each year. How much more vegetables do most people eat than fruit?
F $83\frac{5}{8}$ pounds more
G $82\frac{3}{8}$ pounds more
H $123\frac{5}{8}$ pounds more
J $83\frac{3}{8}$ pounds more

LESSON **Problem Solving****5-5 Solving Fraction Equations: Addition and Subtraction**

Write the correct answer in simplest form.

- It usually takes Brian $1\frac{1}{2}$ hours to get to work from the time he gets out of bed. His drive to the office takes $\frac{3}{4}$ hour. How much time does he spend getting ready for work?
- Before she went to the hairdresser, Sheila's hair was $7\frac{1}{4}$ inches long. When she left the salon, it was $5\frac{1}{2}$ inches long. How much of her hair did Sheila get cut off?
- One lap around the gym is $\frac{1}{3}$ mile long. Kim has already run 5 times around. If she wants to run 2 miles total, how much farther does she have to go?
- Darius timed his speech at $5\frac{1}{6}$ minutes. His time limit for the speech is $4\frac{1}{2}$ minutes. How much does he need to cut from his speech?

Circle the letter of the correct answer.

- Mei and Alex bought the same amount of food at the deli. Mei bought $1\frac{1}{4}$ pounds of turkey and $1\frac{1}{3}$ pounds of cheese. Alex bought $1\frac{1}{2}$ pounds of turkey. How much cheese did Alex buy?
A $1\frac{1}{12}$ pounds **C** $1\frac{1}{4}$ pounds
B $1\frac{1}{6}$ pounds **D** $4\frac{1}{12}$ pounds
- When Lynn got her dog, Max, he weighed $10\frac{1}{2}$ pounds. During the next 6 months, he gained $8\frac{4}{5}$ pounds. At his one-year check-up he had gained another $4\frac{1}{3}$ pounds. How much did Max weigh when he was 1 year old?
F $22\frac{19}{30}$ pounds **H** $23\frac{29}{30}$ pounds
G $23\frac{19}{30}$ pounds **J** $23\frac{49}{50}$ pounds
- Charlie picked up 2 planks of wood at the hardware store. One is $6\frac{1}{4}$ feet long and the other is $5\frac{5}{8}$ feet long. How much should he cut from the first plank to make them the same length?
A $\frac{5}{8}$ foot **C** $1\frac{3}{8}$ feet
B $\frac{1}{2}$ foot **D** $1\frac{5}{8}$ feet
- Carmen used $3\frac{3}{4}$ cups of flour to make a cake. She had $\frac{1}{2}$ cup of flour left over. Which equation can you use to find how much flour she had before baking the cake?
F $x + \frac{1}{2} = 3\frac{3}{4}$ **H** $3\frac{3}{4} - \frac{1}{2} = x$
G $x - 3\frac{3}{4} = \frac{1}{2}$ **J** $3\frac{3}{4} - x = \frac{1}{2}$

LESSON

Problem Solving**5-6*****Multiplying Fractions by Whole Numbers***

Write the answers in simplest form.

1. Did you know that some people have more bones than the rest of the population? About $\frac{1}{20}$ of all people have an extra rib bone. In a crowd of 60 people, about how many people are likely have an extra rib bone?

2. The Appalachian National Scenic Trail is the longest marked walking path in the United States. It extends through 14 states for about 2,000 miles. Last year, Carla hiked $\frac{1}{5}$ of the trail. How many miles of the trail did she hike?

3. Human fingernails can grow up to $\frac{1}{10}$ of a millimeter each day. How much can fingernails grow in one week?

4. Most people dream about $\frac{1}{4}$ of the time they sleep. How long will you probably dream tonight if you sleep for 8 hours?

Circle the letter of the correct answer.

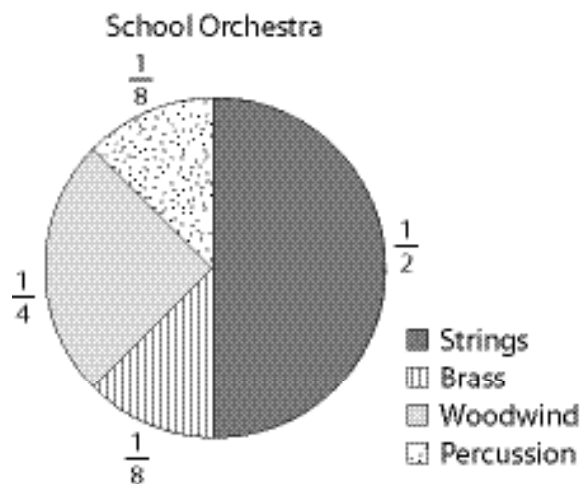
5. Today, the United States flag has 50 stars—one for each state. The first official U.S. flag was approved in 1795. It had $\frac{3}{10}$ as many stars as today's flag. How many stars were on the first official U.S. flag?
A 5 stars
B 10 stars
C 15 stars
D 35 stars
6. The Statue of Liberty is about 305 feet tall from the ground to the tip of her torch. The statue's pedestal makes up about $\frac{1}{2}$ of its height. About how tall is the pedestal of the Statue of Liberty?
F 610 feet
G 152 $\frac{1}{2}$ feet
H 150 $\frac{1}{2}$ feet
J 102 $\frac{1}{2}$ feet
7. The Caldwells own a 60-acre farm. They planted $\frac{3}{5}$ of the land with corn. How many acres of corn did they plant?
A 12 acres
B 36 acres
C 20 acres
D 18 acres
8. Objects on Uranus weigh about $\frac{4}{5}$ of their weight on Earth. If a dog weighs 40 pounds on Earth, how much would it weigh on Uranus?
F 32 pounds
G 10 pounds
H 8 pounds
J 30 pounds

LESSON **Problem Solving**
5-7 **Multiplying Fractions**

Use the circle graph to answer the questions. Write each answer in simplest form.

1. Of the students playing stringed instruments, $\frac{3}{4}$ play the violin. What fraction of the whole orchestra is violin players?
- _____

2. Of the students playing woodwind instruments, $\frac{1}{2}$ play the clarinet. What fraction of the whole orchestra is clarinet players?
- _____



Circle the letter of the correct answer.

3. Two-thirds of the students who play a percussion instrument are boys. What fraction of the musicians in the orchestra is boys who play percussion?

- A $\frac{1}{24}$ of the orchestra
- B $\frac{1}{12}$ of the orchestra
- C $\frac{1}{4}$ of the orchestra
- D $\frac{2}{3}$ of the orchestra

5. There are 40 students in the orchestra. How many students play either percussion or brass instruments?

- A 5 students
- B 10 students
- C 8 students
- D 16 students

4. The brass section is evenly divided into horns, trumpets, trombones, and tubas. What fraction of the whole orchestra do players of each of those brass instruments make up?

- F $\frac{1}{32}$ of the orchestra
- G $\frac{1}{8}$ of the orchestra
- H $\frac{1}{4}$ of the orchestra
- J $\frac{1}{2}$ of the orchestra

6. If 2 more violinists join the orchestra, what fraction of all the musicians would play a stringed instrument?

- F $\frac{11}{21}$
- G $\frac{11}{20}$
- H $\frac{1}{20}$
- J $\frac{1}{26}$

LESSON **Problem Solving**
5-8 **Multiplying Mixed Numbers**

Use the recipe to answer the questions.

- If you want to make $2\frac{1}{2}$ batches, how much flour would you need?

- If you want to make only $1\frac{1}{2}$ batches, how much chocolate chips would you need?

- You want to bake $3\frac{1}{4}$ batches. How much vanilla do you need in all?

CHOCOLATE CHIP COOKIES	
Servings: 1 batch	
	1 $\frac{2}{3}$ cups flour
	$\frac{3}{4}$ teaspoon baking soda
	$\frac{1}{2}$ cup white sugar
	$2\frac{1}{3}$ cups semisweet chocolate chips
	$\frac{1}{2}$ cup brown sugar
	$\frac{3}{4}$ cup butter
	1 egg
	$1\frac{1}{4}$ teaspoons vanilla

Choose the letter for the best answer.

- If you make $1\frac{1}{4}$ batches, how much baking soda would you need?
A $\frac{3}{16}$ teaspoon **C** $\frac{3}{5}$ teaspoon
B $\frac{5}{16}$ teaspoon **D** $\frac{15}{16}$ teaspoon
- Dan used $2\frac{1}{4}$ cups of butter to make chocolate chip cookies using the above recipe. How many batches of cookies did he make?
A 3 batches **C** 5 batches
B 4 batches **D** 6 batches
- How many cups of white sugar do you need to make $3\frac{1}{2}$ batches of cookies?
F $3\frac{1}{2}$ cups **H** $1\frac{1}{2}$ cups
G $1\frac{3}{4}$ cups **J** $1\frac{1}{4}$ cups
- One bag of chocolate chips holds 2 cups. If you buy five bags, how many cups of chips will you have left over after baking $2\frac{1}{2}$ batches of cookies?
F $4\frac{1}{6}$ cups **H** $2\frac{1}{3}$ cups
G $5\frac{5}{6}$ cups **J** $\frac{1}{3}$ cup

LESSON **Problem Solving****5-9** **Dividing Fractions and Mixed Numbers****Write the correct answer in simplest form.**

1. Horses are measured in units called *hands*. One inch equals $\frac{1}{4}$ hand. The average Clydesdale horse is $17\frac{1}{5}$ hands high. What is the horse's height in inches? in feet?
2. Cloth manufacturers use a unit of measurement called a *finger*. One finger is equal to $4\frac{1}{2}$ inches. If 25 inches are cut off a bolt of cloth, how many fingers of cloth were cut?

3. People in England measure weights in units called *stones*. One pound equals $\frac{1}{14}$ of a stone. If a cat weighs $\frac{3}{4}$ stone, how many pounds does it weigh?
4. The hiking trail is $\frac{9}{10}$ mile long. There are 6 markers evenly posted along the trail to direct hikers. How far apart are the markers placed?

Choose the letter for the best answer.

5. A cake recipe calls for $1\frac{1}{2}$ cups of butter. One tablespoon equals $\frac{1}{16}$ cup. How many tablespoons of butter do you need to make the cake?
- A 24 tablespoons
B 8 tablespoons
C $\frac{3}{32}$ tablespoon
D 9 tablespoons
6. Printed letters are measured in units called *points*. One point equals $\frac{1}{72}$ inch. If you want the title of a paper you are typing on a computer to be $\frac{1}{2}$ inch tall, what type point size should you use?
- F 144 point
G 36 point
H $\frac{1}{36}$ point
J $\frac{1}{144}$ point
7. Phyllis bought 14 yards of material to make chair cushions. She cut the material into pieces $1\frac{3}{4}$ yards long to make each cushion. How many cushions did Phyllis make?
- A 4 cushions C 8 cushions
B 6 cushions D $24\frac{1}{2}$ cushions
8. Dry goods are sold in units called *pecks* and *bushels*. One peck equals $\frac{1}{4}$ bushel. If Peter picks $5\frac{1}{2}$ bushels of peppers, how many pecks of peppers did Peter pick?
- F $1\frac{3}{8}$ pecks H 20 pecks
G 11 pecks J 22 pecks

LESSON
5-10 **Problem Solving**
Solving Fraction Equations: Multiplication and Division**Solve.**

1. The number of T-shirts is multiplied by $\frac{1}{2}$ and the product is 18. Write and solve an equation for the number of T-shirts, where t represents the number of T-shirts.

2. The number of students is divided by 18 and the quotient is $\frac{1}{6}$. Write and solve an equation for the number of students, where s represents the number of students.

3. The number of players is multiplied by $2\frac{1}{2}$ and the product is 25. Write and solve an equation for the number of players, where p represents the number of players.

4. The number of chairs is divided by $\frac{1}{4}$ and the quotient is 12. Write and solve an equation for the number of chairs, where c represents the number of chairs.

Circle the letter of the correct answer.

5. Paco bought 10 feet of rope. He cut it into several $\frac{5}{6}$ -foot pieces. Which equation can you use to find how many pieces of rope Paco cut?
A $\frac{5}{6} \div 10 = x$
B $\frac{5}{6} \div x = 10$
C $10 \div x = \frac{5}{6}$
D $10x = \frac{5}{6}$
6. Each square on the graph paper has an area of $\frac{4}{9}$ square inch. What is the length and width of each square?
F $\frac{1}{9}$ inch
G $\frac{2}{3}$ inch
H $\frac{2}{9}$ inch
J $\frac{1}{3}$ inch
7. Which operation should you use to solve the equation $6x = \frac{3}{8}$?
A addition
B subtraction
C multiplication
D division
8. A fraction divided by $\frac{2}{3}$ is equal to $1\frac{1}{4}$. What is that fraction?
F $\frac{1}{3}$
G $\frac{5}{6}$
H $\frac{1}{4}$
J $\frac{1}{2}$

LESSON

Problem Solving

6-1

Make a Table

Complete each activity and answer each question.

1. In January, the normal temperature in Atlanta, Georgia, is 41°F . In February, the normal temperature in Atlanta is 45°F . In March, the normal temperature in Atlanta is 54°F , and in April, it is 62°F . Atlanta's normal temperature in May is 69°F . Use this data to complete the table at right.

2. Use your table from Exercise 1 to find a pattern in the data and draw a conclusion about the temperature in June.

3. In what other ways could you organize the data in a table?

Circle the letter of the correct answer.

- | | |
|---|--|
| <p>4. In which month given does Atlanta have the highest temperature?</p> <p>A February</p> <p>B March</p> <p>C April</p> <p>D May</p> | <p>5. In which month given does Atlanta have the lowest temperature?</p> <p>F January</p> <p>G February</p> <p>H March</p> <p>J April</p> |
| <p>6. Which of these statements about Atlanta's temperature data from January to May is true?</p> <p>A It is always higher than 40°F.</p> <p>B It is always lower than 60°F.</p> <p>C It is hotter in March than in April.</p> <p>D It is cooler in February than in January.</p> | <p>7. Between which two months in Atlanta does the normal temperature change the most?</p> <p>F January and February</p> <p>G February and March</p> <p>H March and April</p> <p>J April and May</p> |

LESSON **Problem Solving**
6-2 *Mean, Median, Mode, and Range*

Write the correct answer.

1. Use the table at right to find the mean, median, mode, and range of the data set.

2. When you use the data for only 2 of the teams in the table, the mean, median, and mode for the data are the same. Which teams are they?

World Series Winners

Team	Number of Wins
Baltimore Orioles	3
Boston Red Sox	5
Detroit Tigers	4
Minnesota Twins	3
Pittsburgh Pirates	5

Circle the letter of the correct answer.

3. The states that border the Gulf of Mexico are Alabama, Florida, Louisiana, Mississippi, and Texas. What is the mean for the number of letters in those states' names?

- A** 7 letters
- B** 7.8 letters
- C** 8 letters
- D** 8.7 letters

5. If the mean of two numbers is 2.5, what is true about the data?
- A** Both numbers are greater than 5.
 - B** One of the numbers is less than 2.
 - C** One of the numbers is 2.5.
 - D** The sum of the data is not divisible by 2.

4. There are 5 whole numbers in a data set. The mean of the data is 10. The median and mode are both 9. The least number in the data set is 7, and the greatest is 14. What are the numbers in the data set?

- F** 7, 7, 9, 11, and 14
- G** 7, 7, 9, 9, and 14
- H** 7, 9, 9, 11, and 14
- J** 7, 9, 9, 14, and 14

6. Tom wants to find the average height of the students in his class. Which measurement should he find?

- F** the range
- G** the mean
- H** the median
- J** the mode

LESSON **Problem Solving**
6-3 **Additional Data and Outliers**

Use the table to answer the questions.

1. Find the mean, median, and mode of the earnings data.

2. *Titanic* earned more money in the United States than any other film—a total of \$600 million! Add this figure to the data and find the mean, median, and mode. Round your answer for the mean to the nearest whole million.

Successful Films in the U.S.

Film	U.S. Earnings for first release (million \$)
<i>E.T. the Extra-Terrestrial</i>	400
<i>Forrest Gump</i>	330
<i>Independence Day</i>	305
<i>Jurassic Park</i>	357
<i>The Lion King</i>	313

Circle the letter of the correct answer.

3. In Canada, people watch TV an average of 74 minutes each day. In Germany, people watch an average of 68 minutes a day. In France it is 67 minutes a day, in Spain it is 91 minutes a day, and in Ireland it is 74 minutes a day. Find the mean, median, and mode of the data.

- A** mean: 74 min.; median: 74 min.; mode: 74 min.
B mean: 74 min.; median: 74.8 min.; mode: 74 min.
C mean: 74.8 min.; median: 74 min.; mode: 24 min.
D mean: 74.8 min.; median: 74 min.; mode: 74 min.

5. In Exercise 2, which data measurement changed the least with the addition of *Titanic's* earnings?

- A** the range **C** the median
B the mean **D** the upper extreme

4. People in the United States watch more television than in any other country. Americans watch an average of 118 minutes a day! Add this number to the data and find the mean, median, and mode.

- F** mean: 82 min.; median: 74 min.; mode: 74 min.
G mean: 82 min.; median: 74 min.; mode: 118 min.
H mean: 82 min.; median: 91 min.; mode: 74 min.
J mean: 74.8 min.; median: 82 min.; mode: 74 min.

6. In Exercise 4, which measurements best describe the data?

- F** mean and median
G range and mean
H median and mode
J range and mode

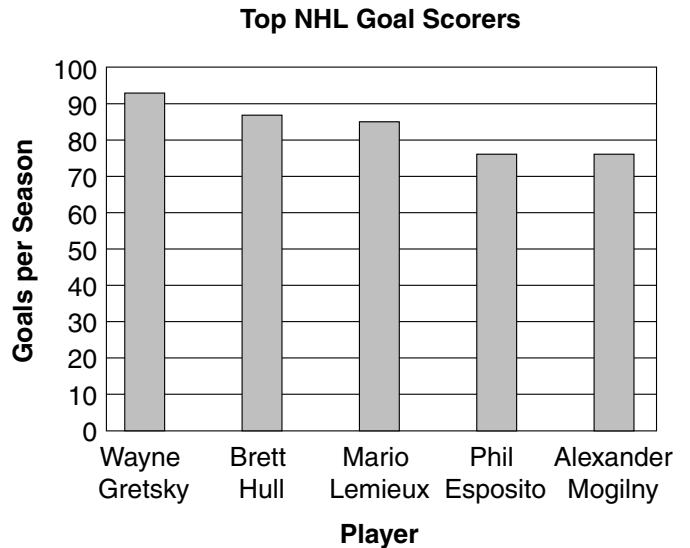
LESSON **Problem Solving**
6-4 **Bar Graphs**

Use the bar graph for Exercises 1–4.

1. What is the range of the goals the hockey players scored per season?

2. What is the mode of the goals scored?

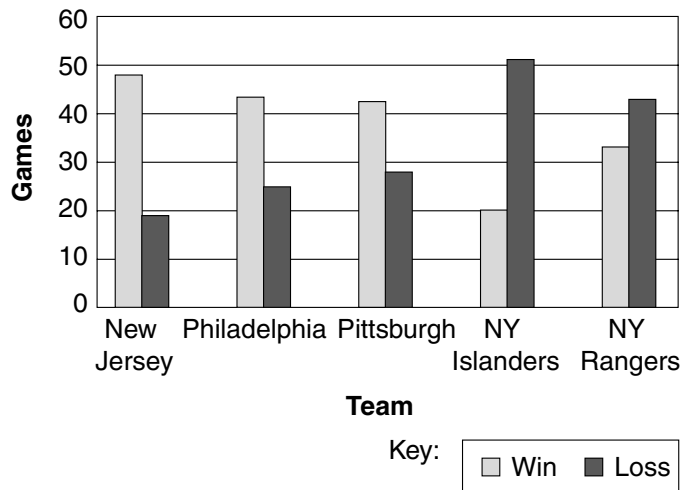
3. What is the mean number of goals the players scored?



Use the bar graph for Exercises 5–8.

4. Which team won the most games that season? _____
5. Which team lost the most games that season? _____
6. What was the mean number of games won? _____
7. What was the mean number of games lost? _____

NHL Eastern Conference Final Standings, 2000–2001



Circle the letter of the correct answer.

8. Which hockey team had the greatest difference between the number of games won and lost?
A New Jersey
B New York Islanders
C Philadelphia
D Pittsburgh

9. How do you know the mode of a data set by looking at a bar graph?
F The mode has two or more bars on the graph with the same height.
G The mode has the tallest bar.
H The mode has the lowest bar.
J The bar for the mode is in the middle of the graph.

LESSON **Problem Solving**
6-5 *Line Plots, Frequency Tables, and Histograms*

The sixth grade class voted on their favorite ice cream flavors.
 The results of the vote are shown below.

chocolate	vanilla	strawberry	vanilla	vanilla
vanilla	chocolate	vanilla	chocolate	strawberry
chocolate	strawberry	vanilla	vanilla	chocolate

1. Use the data to make a tally table.
 How many students voted in all?

2. Which flavor got the most votes?

Ice Cream Flavor Votes

Flavor	Number of Votes

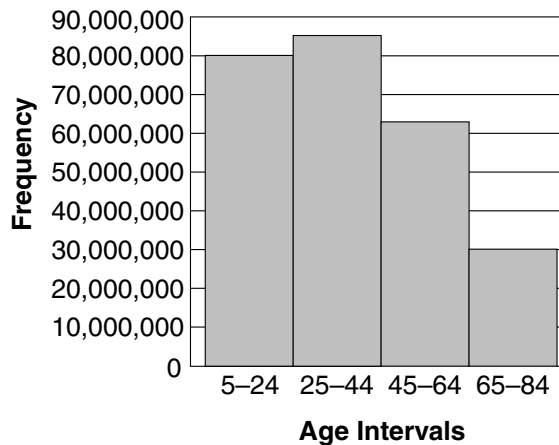
Use the histogram for Exercises 3–5.

3. How many years make up each age interval on the histogram?

4. Which range of ages on the histogram has the highest population?

5. Which range of ages has the lowest population?

U.S. Population (By Age)



Circle the letter of the correct answer.

6. Which of the following cannot be used to make a frequency table with intervals?

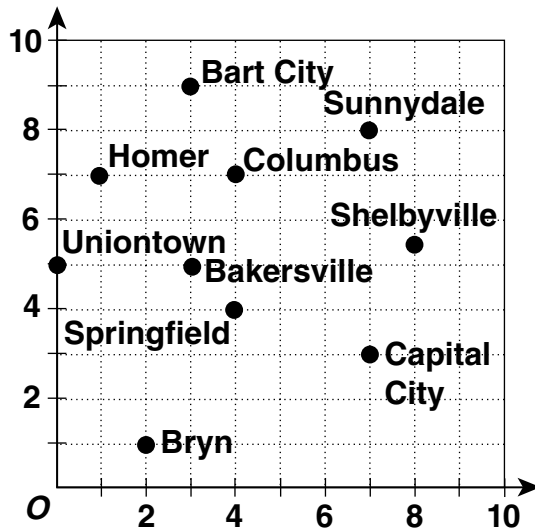
- A histogram
- B tally table
- C line plot
- D double-bar graph

7. Which question can be answered by using the histogram above?

- A How many people in the United States are younger than 5 years?
- B What is the mean age of all people in the United States?
- C How many people in the United States are older than 84 years old?
- D How many people in the United States are age 25 to 64?

LESSON **Problem Solving**
6-6 **Ordered Pairs**

Use the coordinate grid to answer each question.



- | | |
|--|---|
| <p>1. What city is located at point (4, 4) on the map?</p> <p>_____</p> | <p>2. Which city is located at point $(8, 5\frac{1}{2})$ on the map?</p> <p>_____</p> |
| <p>3. Which city's location is given by an ordered pair that includes a 0?</p> <p>_____</p> | <p>4. What ordered pair describes the location of Capital City?</p> <p>_____</p> |
| <p>5. If you started at (0, 0) and moved 1 unit north and 2 units east, which city would you reach?</p> <p>_____</p> | <p>6. Which two cities on the map are both located 4 units to the right of (0, 0)?</p> <p>_____</p> |

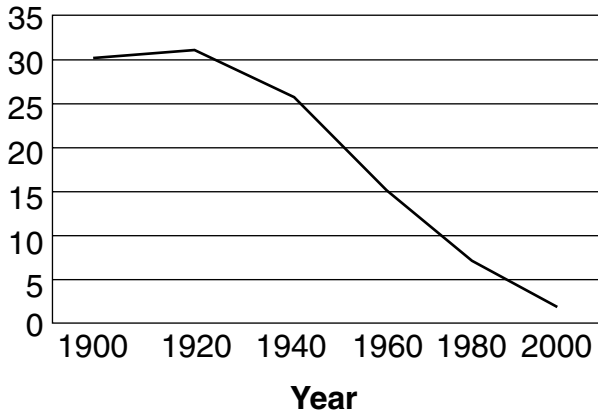
Circle the letter of the correct answer.

- | | |
|--|--|
| <p>7. If you started in Bart City and moved 2 units south and 2 units west, which city would you reach?</p> <p>A Columbus</p> <p>B Sunnydale</p> <p>C Homer</p> <p>D Bakersville</p> | <p>8. Starting at (0, 0), which of the following directions would lead you to Capital City?</p> <p>F Go 7 units east and 3 units north.</p> <p>G Go 5 units north and 3 units east.</p> <p>H Go 3 unit east and 7 units north.</p> <p>J Go 8 units east and 6 units north.</p> |
|--|--|

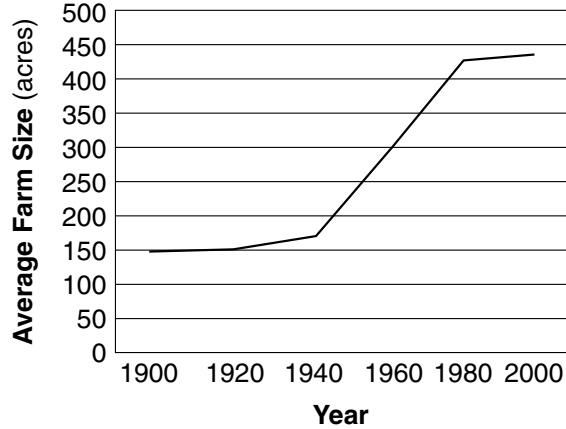
LESSON **Problem Solving**
6-7 **Line Graphs**

Use the line graphs to answer each question.

U.S. Farm Population



Size of U.S. Farms



1. In which year was the U.S. farm population the highest? the lowest?

2. In which year was the size of the average U.S. farm the largest? the smallest?

3. In general, how has the U.S. farm population changed in the last 100 years?

4. In general, how has the size of the average U.S. farm changed in the last 100 years?

Circle the letter of the correct answer.

5. How many people lived on farms in the United States in 1940?

- A 31 million
- B 30 million
- C 26 million
- D 15 million

6. How many acres did the average farm in the United States cover in 1980?

- F 150 acres
- G 300 acres
- H 400 acres
- J 426 acres

7. Between which two years did the U.S. farm population increase?

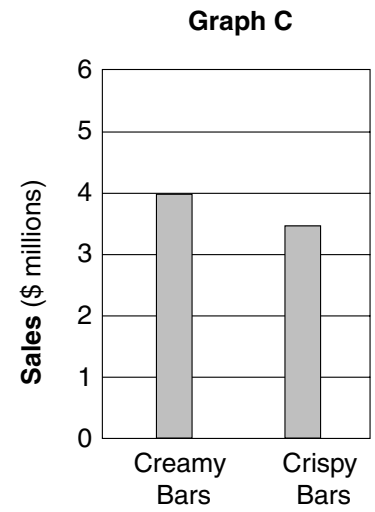
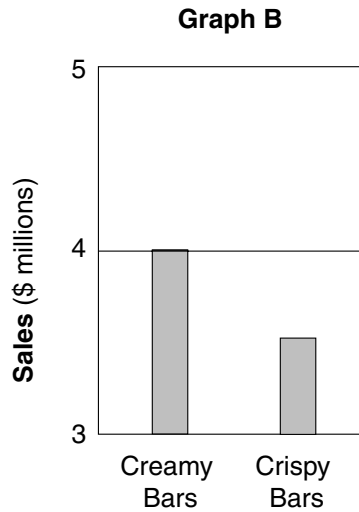
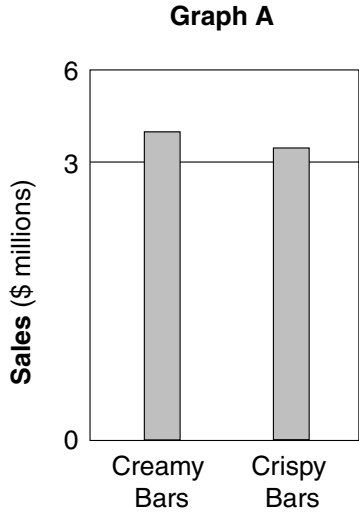
- A 1900 and 1920
- B 1920 and 1940
- C 1940 and 1960
- D 1960 and 1980

8. Between which two years did the average size of farms in the United States change the least?

- F 1900 and 1920
- G 1920 and 1940
- H 1960 and 1980
- J 1980 and 2000

LESSON **Problem Solving**
6-8 **Misleading Graphs**

Use the graphs to answer each question.



1. Why is Graph A misleading?

2. Why is Graph B misleading?

3. What might people believe from reading Graph A?

4. What might people believe from reading Graph B?

Circle the letter of the correct answer.

5. Which of the following information is different on all three graphs above?

- A** the vertical scale
- B** the Crispy Bars sales data
- C** the Creamy Bars sales data
- D** the horizontal scale

7. Which graph do you think was made by the company that sells Crispy Bars?

- A** Graph A
- B** Graph B
- C** Graph C
- D** all of the graphs

6. Which of the following is a way that graphs can be misleading?

- F** breaks in scales
- G** uneven scales
- H** missing parts of scales
- J** all of the above

8. If you were writing a newspaper article about candy bar sales, which graph would be best to use?

- F** Graph A
- G** Graph B
- H** Graph C
- J** all of the above

LESSON **Problem Solving**
6-9 **Stem-and-Leaf Plots**

Use the Texas stem-and-leaf plots to answer each question.

Dallas Normal Monthly Temperatures

Stem	Leaves
4	3 7 8
5	6 7
6	6 7
7	3 7
8	1 5 5

Key: 4 | 3 = 43°F

Houston Normal Monthly Temperatures

Stem	Leaves
5	0 4 4
6	1 1 8
7	0 5 8
8	0 2 3

Key: 5 | 0 = 50°F

- | | |
|--|---|
| <p>1. Which city's temperature data has a mode of 85°F?</p> <p>_____</p> | <p>2. Which city's temperature data has a range of 33°F?</p> <p>_____</p> |
| <p>3. Which city has the lowest data value? What is that value?</p> <p>_____</p> | <p>4. Which city has the highest data value? What is that value?</p> <p>_____</p> |

Circle the letter of the correct answer.

- | | |
|---|--|
| <p>5. Which city's temperature data has a mean of 68°F?</p> <p>A Dallas</p> <p>B Houston</p> <p>C both Dallas and Houston</p> <p>D neither Dallas nor Houston</p> | <p>6. Which city's temperature data has a median of 69°F?</p> <p>F Dallas</p> <p>G Houston</p> <p>H both Dallas and Houston</p> <p>J neither Dallas nor Houston</p> |
| <p>7. What do the data values 54°F and 61°F represent for the plots above?</p> <p>A the ranges of normal temperatures in Dallas and Houston</p> <p>B the mode of normal temperatures for Houston</p> <p>C the mean and median normal temperatures for Dallas</p> <p>D the lowest normal temperatures for Dallas and Houston</p> | <p>8. Which of the following would be the best way to display the Dallas and Houston temperature data?</p> <p>F on a line graph</p> <p>G in a tally table</p> <p>H on a bar graph</p> <p>J on a coordinate plane</p> |

LESSON

6-10**Problem Solving****Choosing an Appropriate Display**

1. Write *line plot*, *stem-and-leaf plot*, *line graph*, or *bar graph* to describe the most appropriate way to show the height of a sunflower plant every week for one month.

2. Write *line plot*, *stem-and-leaf plot*, *line graph*, or *bar graph* to describe the most appropriate way to show the number of votes received by each candidate running for class president

3. Write *line plot*, *stem-and-leaf plot*, *line graph*, or *bar graph* to describe the most appropriate way to show the test scores each student received on a math quiz.

4. Write *line plot*, *stem-and-leaf plot*, *line graph*, or *bar graph* to describe the most appropriate way to show the average time spent sleeping per day by 30 sixth-grade students.

Circle the letter of the correct answer.

5. People leaving a restaurant were asked how much they spent for lunch. Here are the results of the survey to the nearest dollar: \$8, \$7, \$9, \$7, \$10, \$5, \$8, \$8, \$12, \$8. Which type of graph would be most appropriate to show the data?
A bar graph
B line graph
C line plot
D stem-and-leaf plot
6. People leaving a movie theater were asked their age. Here are the results of the survey to the nearest year: 12, 11, 13, 15, 22, 31, 40, 12, 17, 20, 33, 16, 12, 24, 19. Which type of graph would be most appropriate to show the data?
F bar graph
G line graph
H line plot
J stem-and-leaf plot
7. What is the median amount of money spent on lunch in Exercise 5?
A \$7
B \$8
C \$9
D \$12
8. What is the median age of the movie-goers in Exercise 6?
F 15
G 16
H 17
J 19

LESSON **Problem Solving**
7-1 Ratios and Rates

Use the table to answer each question.

Atomic Particles of Elements

Element	Protons	Neutrons	Electrons
Gold	79	118	79
Iron	26	30	26
Neon	10	10	10
Platinum	78	117	78
Silver	47	61	47
Tin	50	69	50

- | | |
|--|--|
| <p>1. What is the ratio of gold protons to silver protons?</p> <p>_____</p> | <p>2. What is the ratio of gold neutrons to platinum protons?</p> <p>_____</p> |
| <p>3. What are two equivalent ratios of the ratio of neon protons to tin protons?</p> <p>_____</p> | <p>4. What are two equivalent ratios of the ratio of iron protons to iron neutrons?</p> <p>_____</p> |

Circle the letter of the correct answer.

- | | |
|---|---|
| <p>5. A ratio of one element's neutrons to another element's electrons is equivalent to 3 to 5. What are those two elements?</p> <p>A iron neutrons to tin electrons
 B gold neutrons to tin electrons
 C tin neutrons to gold electrons
 D neon neutrons to iron electrons</p> | <p>6. The ratio of two elements' protons is equivalent to 3 to 1. What are those two elements?</p> <p>F gold to tin
 G neon to tin
 H platinum to iron
 J silver to gold</p> |
| <p>7. Which element in the table has a ratio of 1 to 1, no matter what parts you are comparing in the ratio?</p> <p>A iron C tin
 B neon D silver</p> | <p>8. If the ratio for any element is 1:1, which two parts is the ratio comparing?</p> <p>F protons to neutrons
 G electrons to neutrons
 H protons to electrons
 J neutrons to electrons</p> |

LESSON **Problem Solving**
7-2 *Using Tables to Explore Equivalent Ratios and Rates*

Use the table to answer the questions.

School Outing Student-to-Parent Ratios

Number of Students	8	16	24	32	40	48	56	64	72
Number of Parents	2	4	6	8	10	12	14	16	18

- Each time some students go on a school outing, their teachers invite students' parents to accompany them. Predict how many parents will accompany 88 students.

- Next week 112 students will go to the Science Museum. Their teachers invited some of the students' parents to go with them. How many parents do you predict will go with the students to the Science Museum?

Circle the letter of the correct answer.

- Tanya's class of 28 students will be going to the Nature Center. How many parents do you predict Tanya's teacher will invite to accompany them?
 A 5 parents
 B 7 parents
 C 9 parents
 D 11 parents
- In June, all of the students in the school will be going on their annual picnic. If there are 416 students in the school, what do you predict the number of parents accompanying them on the picnic will be?
 A 52 parents
 B 78 parents
 C 104 parents
 D 156 parents
- Some students will be going on an outing to the local police station. Their teachers invited 13 parents to accompany them. How many students do you predict will be going on the outing?
 F 49 students
 G 50 students
 H 51 students
 J 52 students
- On Tuesday, all of the sixth-grade students will be going to the Space Museum. Their teachers invited 21 parents to accompany them. How many sixth graders do you predict will be going to the Space Museum?
 F 80 sixth graders
 G 82 sixth graders
 H 84 sixth graders
 J 86 sixth graders

LESSON
7-3 **Problem Solving**
Proportions

Write the correct answer.

- For most people, the ratio of the length of their head to their total height is 1:7. Use proportions to test your measurements and see if they match this ratio.

- The ratio of an object's weight on Earth to its weight on the Moon is 6:1. The first person to walk on the Moon was Neil Armstrong. He weighed 165 pounds on Earth. How much did he weigh on the Moon?

- It has been found that the distance from a person's eye to the end of the fingers of his outstretched hand is proportional to the distance between his eyes at a 10:1 ratio. If the distance between your eyes is 2.3 inches, what should the distance from your eye to your outstretched fingers be?

- Chemists write the formula of ordinary sugar as $C_{12}H_{22}O_{11}$, which means that the ratios of 1 molecule of sugar are always 12 carbon atoms to 22 hydrogen atoms to 11 oxygen atoms. If there are 4 sugar molecules, how many atoms of each element will there be?

Circle the letter of the correct answer.

- A healthy diet follows the ratio for meat to vegetables of 2.5 servings to 4 servings. If you eat 7 servings of meat a week, how many servings of vegetables should you eat?
A 28 servings **C** 14 servings
B 17.5 servings **D** 11.2 servings
- Recently, 1 U.S. dollar was worth 1.58 in euros. If you exchanged \$25 at that rate, how many euros would you get?
A 39.50 euros
B 15.82 euros
C 26.58 euros
D 23.42 euros
- A 150-pound person will burn 100 calories while sitting still for 1 hour. Following this ratio, how many calories will a 100-pound person burn while sitting still for 1 hour?
F $66\frac{2}{3}$ calories **H** $6\frac{2}{3}$ calories
G $66\frac{2}{3}$ calories **J** 6 calories
- Recently, 1 U.S. dollar was worth 0.69 English pound. If you exchanged 500 English pounds, how many dollars would you get?
F 345 U.S. dollars
G 725 U.S. dollars
H 500.69 U.S. dollars
J 499.31 U.S. dollars

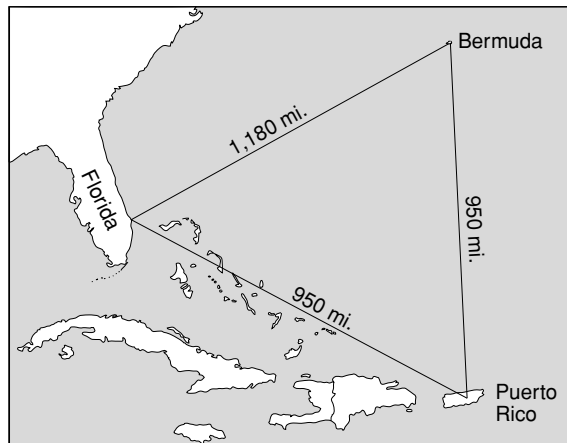
LESSON

7-4

Problem Solving**Similar Figures**

Write the correct answer.

1. The map at right shows the dimensions of the Bermuda Triangle, a region of the Atlantic Ocean where many ships and airplanes have disappeared. If a theme park makes a swimming pool in a similar figure, and the longest side of the pool is 0.5 mile long, about how long would the other sides of the pool have to be?



2. Completed in 1883, *The Battle of Gettysburg* is 410 feet long and 70 feet tall. A museum shop sells a print of the painting that is similar to the original. The print is 2.05 feet long. How tall is the print?
3. *Panorama of the Mississippi* was 12 feet tall and 5,000 feet long! If you wanted to make a copy similar to the original that was 2 feet tall, how many feet long would the copy have to be?

Circle the letter of the correct answer.

4. Two tables shaped like triangles are similar. The measure of one of the larger table's angles is 38° , and another angle is half that size. What are the measures of all the angles in the smaller table?
- A** 19° , 9.5° , and 61.5°
B 38° , 19° , and 123°
C 38° , 38° , and 104°
D 76° , 38° , and 246°
5. Two rectangular gardens are similar. The area of the larger garden is 8.28 m^2 , and its length is 6.9 m. The smaller garden is 0.6 m wide. What is the smaller garden's length and area?
- F** length = 6.9 m; area = 2.07 m^2
G length = 3.45 m; area = 4.14 m^2
H length = 3.45 m; area = 1.97 m^2
J length = 3.45 m; area = 2.07 m^2
6. Which of the following is not always true if two figures are similar?
- A** They have the same shape.
B They have the same size.
C Their corresponding sides have proportional lengths.
D Corresponding angles are congruent.
7. Which of the following figures are always similar?
- F** two rectangles
G two triangles
H two squares
J two pentagons

LESSON

Problem Solving**7-5 Indirect Measurement**

Write the correct answer.

1. The Petronas Towers in Malaysia are the tallest buildings in the world. On a sunny day, the Petronas Towers cast shadows that are 4,428 feet long. A 6-foot-tall person standing by one building casts an 18-foot-long shadow. How tall are the Petronas Towers?

2. The Sears Tower in Chicago is the tallest building in the United States. On a sunny day, the Sears Tower casts a shadow that is 2,908 feet long. A 5-foot-tall person standing by the building casts a 10-foot-long shadow. How tall is the Sears Tower?

3. The world's tallest man cast a shadow that was 535 inches long. At the same time, a woman who was 5 feet 4 inches tall cast a shadow that was 320 inches long. How tall was the world's tallest man in feet and inches?

4. Hoover Dam on the Colorado River casts a shadow that is 2,904 feet long. At the same time, an 18-foot-tall flagpole next to the dam casts a shadow that is 72 feet long. How tall is Hoover Dam?

Circle the letter of the correct answer.

5. An NFL goalpost casts a shadow that is 170 feet long. At the same time, a yardstick casts a shadow that is 51 feet long. How tall is an NFL goalpost?
A 100 feet
B $56 \frac{2}{3}$ feet
C 10 feet
D 1 foot
6. A gorilla casts a shadow that is 600 centimeters long. A 92-centimeter-tall chimpanzee casts a shadow that is 276 centimeters long. What is the height of the gorilla in meters?
F 0.2 meter
G 2 meters
H 20 meters
J 200 meters
7. A 6-foot-tall man casts a shadow that is 30 feet long. If a boy standing next to the man casts a shadow that is 12 feet long, how tall is the boy?
A 2.2 feet **C** 2.4 feet
B 5 feet **D** 2 feet
8. An ostrich is 108 inches tall. If its shadow is 162 inches, and an emu standing next to it casts a 90-inch shadow, how tall is the emu?
F 162 inches **H** 60 inches
G 90 inches **J** 194.4 inches

LESSON
7-6 **Problem Solving**
Scale Drawings and Maps

Write the correct answer.

1. About how many kilometers long is the northern border of California along Oregon?

2. What is the distance in kilometers from Los Angeles to San Francisco?

3. How many kilometers would you have to drive to get from San Diego to Sacramento?

4. At its longest point, about how many kilometers long is Death Valley National Park?

5. Approximately what is the distance, in kilometers, between Redwood National Park and Yosemite National Park?



Circle the letter of the correct answer.

6. Which of the following two cities in California are about 200 kilometers apart?

- A San Diego and Los Angeles
- B Monterey and Los Angeles
- C San Francisco and Fresno
- D Palm Springs and Bakersfield

7. Joshua Tree National Park is about 200 kilometers from Sequoia National Park. How many centimeters should separate those parks on this map?

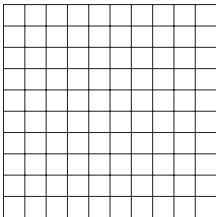
- F 110 cm
- G 11 cm
- H 1 cm
- J 0.11 cm

LESSON **Problem Solving**
7-7 Percents

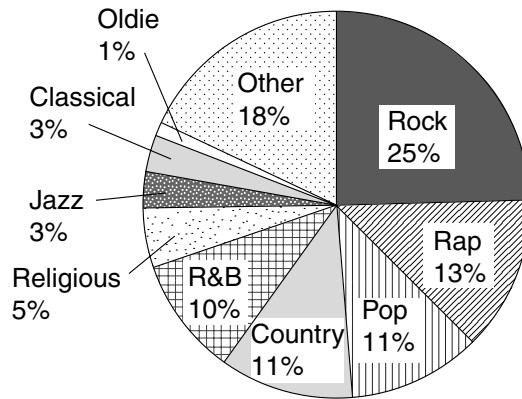
Use the circle graph to answer each question. Write fractions in simplest form.

1. What fraction of the total 2000 music sales in the United States were rock recordings?

2. On this grid, model the percent of total United States music sales that were rap recordings. Then write that percent as a decimal.



U.S. Recorded Music Sales, 2000



Circle the letter of the correct answer.

3. What kind of music made up $\frac{1}{20}$ of the total U.S. music recording sales?

- A Oldie C Jazz
B Classical D Religious

5. What fraction of all United States recording sales did jazz and classical music make up together?

- A $\frac{6}{10}$ C $\frac{1}{5}$
B $\frac{3}{50}$ D $\frac{11}{100}$

4. What fraction of the United States music sales were country recordings?

- F $\frac{110}{100}$ H $\frac{1}{10}$
G $\frac{11}{100}$ J $\frac{1}{100}$

6. What kind of music made up $\frac{1}{10}$ of the total music recording sales in the United States in 2000?

- F Pop H R&B
G Jazz J Oldies

LESSON
7-8 **Problem Solving**
Percents, Decimals, and Fractions

Write the correct answer.

- Deserts cover about $\frac{1}{7}$ of all the land on Earth. About what percent of Earth's land is made up of deserts?

- The Sahara is the largest desert in the world. It covers about 3% of the total area of Africa. What decimal expresses this percent?

- Cactus plants survive in deserts by storing water in their thick stems. In fact, water makes up $\frac{3}{4}$ of the saguaro cactus's total weight. What percent of its weight is water?

- Daytime temperatures in the Sahara can reach 130°F! At night, however, the temperature can drop by 62%. What decimal expresses this percent?

Circle the letter of the correct answer.

- The desert nation of Saudi Arabia is the world's largest oil producer. About $\frac{1}{4}$ of all the oil imported to the United States is shipped from Saudi Arabia. What percent of our nation's oil is that?
A 20%
B 22%
C 25%
D 40%
- About $\frac{3}{25}$ of all the freshwater in the United States is used for drinking, washing, and other domestic purposes. What percent of our fresh water resources is that?
A 3%
B 25%
C 12%
D $\frac{1}{5}$
- About $\frac{2}{5}$ of all the food produced on Earth is grown on irrigated cropland. What percent of the world's food production relies on irrigation? What is the percent written as a decimal?
F 40%; 40.0
G 40%; 4.0
H 40%; 0.4
J 40%; 0.04
- Factories and other industrial users account for about $\frac{23}{50}$ of the total water usage in the United States. Which of the following show that amount as a percent and decimal?
F 46% and 0.46
G 23% and 0.23
H 50% and 0.5
J 46% and 4.6

LESSON
7-9 **Problem Solving**
Percent Problems

In 2000, the population of the United States was about 280 million people.

Use this information to answer each question.

- | | |
|--|---|
| <p>1. About 20% of the total United States population is 14 years old or younger. How many people is that?</p> <p>_____</p> | <p>2. About 6% of the total United States population is 75 years old or older. How many people is that?</p> <p>_____</p> |
| <p>3. About 50% of Americans live in states that border the Atlantic or Pacific Ocean. How many people is that?</p> <p>_____</p> | <p>4. About 12% of all Americans live in California. What is the population of California?</p> <p>_____</p> |
| <p>5. About 7.5% of all Americans live in the New York City metropolitan area. What is the population of that region?</p> <p>_____</p> | <p>6. About 12.3% of all Americans have Hispanic ancestors. What is the Hispanic American population here?</p> <p>_____</p> |

Circle the letter of the correct answer.

- | | |
|--|--|
| <p>7. Males make up about 49% of the total population of the United States. How many males live here?</p> <p>A 1,372 million C 13.72 million
B 137.2 million D 1.372 million</p> | <p>8. About 75% of all Americans live in urban areas. How many Americans live in or near large cities?</p> <p>F 70 million H 210 million
G 200 million J 420 million</p> |
| <p>9. About 7.4% of all Americans live in Texas. What is the population of Texas?</p> <p>A 74 million C 7.4 million
B 20.72 million D 2.072 million</p> | <p>10. Between 1990 and 2000, the population of the United States grew by about 12%. What was the U.S. population in 1990?</p> <p>F 250 million H 313.6 million
G 33.6 million J 268 million</p> |

LESSON **Problem Solving**
7-10 **Using Percents**

Use the table to answer each question.

Federal Income Tax Rates, 2001

Single Income	Tax Rate	Married Joint Income	Tax Rate
\$0 to \$27,050	15%	\$0 to \$45,200	15%
\$27,051 to \$65,550	27.5%	\$45,201 to \$109,250	27.5%
\$65,551 to \$136,740	30.5%	\$109,251 to \$166,500	30.5%
\$136,741 to \$297,350	35.5%	\$166,501 to \$297,350	35.5%
More than \$297,350	39.1%	More than \$297,350	31.5%

- If a single person makes \$25,000 a year, how much federal income tax will he or she have to pay?

- If a married couple makes \$148,000 together, how much federal income tax will they have to pay?

- The average salary for a public school teacher in the United States is \$42,898. If two teachers are married, what is the average amount of federal income taxes they have to pay together?

- In 2002 President George W. Bush received an annual salary of \$400,000. Vice President Dick Cheney got \$186,300. How much federal income tax do they each have to pay on their salary if they are married and filing jointly?

Circle the letter of the correct answer.

- Members of the U.S. Congress each earn \$145,100 a year. How much federal income tax does each pay on their salary?
A \$51,510.50 **C** \$21,765
B \$44,255.50 **D** \$39,902.50
- The average American with a college degree earns \$33,365 a year. About how much federal income tax does he or she have to pay at a single rate?
A \$5,004.75 **C** \$10,176.33
B \$9,175.38 **D** \$11,844.58
- A married couple each working a minimum-wage job will earn an average of \$21,424 together a year. How much income tax will they pay?
F \$5,891.60 **H** \$321.36
G \$3,213.60 **J** \$6,534.32
- The governor of New York makes \$179,000 a year. How much federal income tax does that governor have to pay at a single rate?
F \$63,545 **H** \$49,225
G \$54,595 **J** \$26,850

LESSON **Problem Solving****8-1** **Building Blocks of Geometry**

Place your hand down flat on a sheet of paper. Draw a point at the tip of your thumb, the tip of your middle finger, and the tip of your pinky.

- | | |
|--|---|
| <p>1. Label the thumb point A, the middle finger point B, and the pinky point C.</p> <p>_____</p> | <p>2. Name all the planes you possibly can with points A, B, and C.</p> <p>_____</p> |
| <p>3. Draw and name all the lines you can make with points A, B, and C.</p> <p>_____</p> | <p>4. Name all the line segments possible using points A, B, and C.</p> <p>_____</p> |
| <p>5. Name all the rays possible using points A, B, and C.</p> <p>_____</p> <p>_____</p> | <p>6. Choose one line that you drew. Give all the different possible names for that line.</p> <p>_____</p> <p>_____</p> |

Circle the letter of the correct answer.

- | | |
|--|---|
| <p>7. Which of the following has exactly one endpoint?</p> <p>A \overleftrightarrow{OP}</p> <p>B \overline{AB}</p> <p>C \overleftrightarrow{TR}</p> <p>D \overrightarrow{SM}</p> | <p>8. Which of the following is a straight path that extends without end in opposite directions?</p> <p>F a point</p> <p>G a line</p> <p>H a ray</p> <p>J a line segment</p> |
| <p>9. Which statement is false?</p> <p>A An infinite number of lines can be drawn through one point.</p> <p>B Exactly one line can be drawn between two points.</p> <p>C A line contains exactly one ray.</p> <p>D If points A and B are on a line, then line segment AB and line segment BA are the same.</p> | <p>10. Why is the false statement in Exercise 9 not true?</p> <p>F Any point on a line defines another ray on the line.</p> <p>G A line contains exactly two rays.</p> <p>H A line contains exactly five rays.</p> <p>J A line does not contain any rays.</p> |

LESSON

8-2

Problem Solving**Measuring and Classifying Angles**

Write the correct answer.

1. When a patient is lying flat in a hospital bed, what type of angle does the patient's body form? What is the measurement of that angle?

2. When a patient is sitting straight up in a hospital bed, the upper body has been raised to what angle? What type of angle is that?

3. Most hospital beds have a setting for the Fowler position. In this position, the patient's upper body is raised to form a 60° to 70° angle from a flat position. What types of angles are these?

4. What are the greatest and least differences between the straight-up position and the Fowler position in a hospital bed?

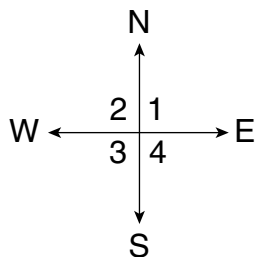
Circle the letter of the correct answer.

5. Medical technicians often set the handles of crutches so that the patient's elbow is at a 30° angle. What type of angle is this?
A acute angle
B right angle
C obtuse angle
D straight angle
6. By law, wheelchair ramps in public places cannot be greater than 5 degrees. Which type of angle does a wheelchair ramp in public form with the ground?
F acute angle
G right angle
H obtuse angle
J straight angle
7. Physical therapists use a goniometer to measure the extension of a sitting patient's knee. Resting is 90° , and full extension is 180° . What angle does the goniometer measure if the patient's knee is at $\frac{1}{2}$ extension?
A 45°
B 90°
C 135°
D 0°
8. The Q-angle is measured between two points on a patient's hip joint and one point on the knee joint. A normal Q-measure for men is 14° plus or minus 3 degrees. What type of angle is any normal Q-angle for men?
F straight
G obtuse
H right
J acute

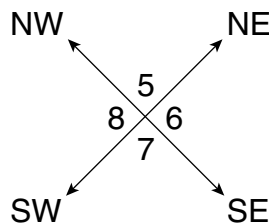
LESSON **Problem Solving**
8-3 **Angle Relationships**

Use the two compass roses to answer questions 1-6.

Cardinal Directions



Intermediate Directions



1. Which angles formed by the cardinal directions are vertical angles?

3. Draw the northwest directional ray on the cardinal compass rose. Describe the adjacent angles formed by the new ray.

2. Which angles formed by the intermediate directions are vertical angles?

4. North on a compass is 0° , and east is 90° . Use this information to label the degrees for each direction on the two compass roses above.

Circle the letter of the correct answer.

5. Which angles formed by the cardinal directions are supplementary to $\angle 2$?

- A $\angle 1$
- B $\angle 1$ and $\angle 3$
- C $\angle 3$ and $\angle 4$
- D $\angle 1, \angle 3$ and $\angle 4$

7. Angles A and B are complementary. $\angle B$ is twice as large as $\angle A$. What are the measurements for each angle?

- A $\angle A = 45^\circ; \angle B = 90^\circ$
- B $\angle A = 30^\circ; \angle B = 60^\circ$
- C $\angle A = 60^\circ; \angle B = 120^\circ$
- D $\angle A = 90^\circ; \angle B = 180^\circ$

6. Which angles formed by the intermediate directions are supplementary to $\angle 6$?

- F $\angle 5$
- G $\angle 5$ and $\angle 7$
- H $\angle 7$ and $\angle 8$
- J $\angle 5, \angle 7$ and $\angle 8$

8. $\angle 1$ and $\angle 2$ are complementary. $\angle 2$ and $\angle 3$ are supplementary. The measure of $\angle 1$ is 45° . What is the measure of $\angle 3$?

- F 45°
- G 270°
- H 90°
- J 135°

LESSON **Problem Solving**
8-4 **Classifying Lines**

Use the map to answer each question.

1. The area where the borders of Utah, Colorado, Arizona, and New Mexico meet is sometimes called the Four Corners. What kind of lines are formed where the borders meet?

2. Which borderlines on the map are skew lines?

3. What kinds of lines are suggested by the eastern and western borders of New Mexico?



Circle the letter of the correct answer.

4. Which three states' borderlines intersect near the Grand Canyon?

- A Utah, Arizona, and Idaho
- B Idaho, Arizona, and Oregon
- C Nevada, Utah, and Arizona
- D Utah, Wyoming, and Idaho

5. Which two western states seem to have congruent borderlines?

- F Colorado and Wyoming
- G Oregon and Nevada
- H New Mexico and Nevada
- J Utah and Idaho

6. Which of the following do not appear to be parallel to the western borderline of Nevada?

- A the western borderline of California
- B the western borderline of Wyoming
- C the eastern borderline of Montana
- D the eastern borderline of Arizona

7. Which of these western states do not have borderlines that intersect near Great Salt Lake?

- F Utah and Nevada
- G Utah and Idaho
- H Utah and Wyoming
- J Utah and Colorado

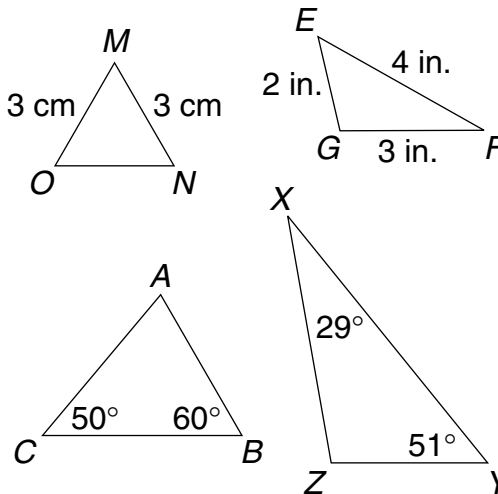
LESSON **Problem Solving**
8-5 **Triangles**

Use the triangle diagram to answer each question.

1. Classify triangle ABC . What is the measure of the missing angle?

2. Classify triangle XYZ . What is the measure of the missing angle?

3. If triangle MNO is an equilateral triangle, what is the measure of the missing side?



Circle the letter of the correct answer.

4. What is the complement of $\angle XYZ$?

- A 39°
- B 51°
- C 129°
- D 309°

5. Classify triangle EFG .

- F scalene triangle
- G isosceles triangle
- H equilateral triangle
- J right triangle

6. Which of the following statements is always true?

- A A right triangle is a scalene triangle.
- B An equilateral triangle is an isosceles triangle.
- C An isosceles triangle is an obtuse triangle.
- D A right triangle is an acute triangle.

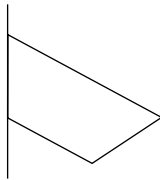
7. Which of the following is not true of all right triangles?

- F The sum of the measures of the angles is 180° .
- G Two of its angles are supplementary angles.
- H At least two of its angles are acute.
- J The side with the greatest length is opposite the right angle.

LESSON **Problem Solving**
8-6 **Quadrilaterals**

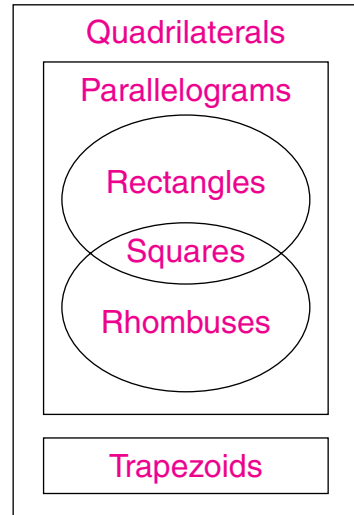
Write the correct answer.

- Fill in this Venn diagram using the terms quadrilaterals, squares, rectangles, rhombuses, parallelograms, and trapezoids.
- Part of this quadrilateral is hidden. What could it possibly be?



- How could you make a trapezoid from a rectangle using only one cut?





- An engineer wants to build a building with a parallelogram base. He wants the four corners to be right angles and the four sides congruent. What type of base does the engineer want?

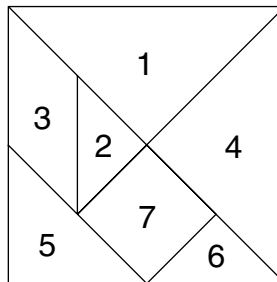
Circle the letter of the correct answer.

- Each side of a quadrilateral-shaped picture frame has the same length. Which of the following is not a possible shape for the frame?
A a rhombus
B a square
C a trapezoid
D a parallelogram
- The total length of the four sides of the picture frame from Exercise 5 is 4 feet, 8 inches. What is the length of each of its sides?
F 14 inches
G 1 foot, 3 inches
H 12 inches
J 2 inches

LESSON **Problem Solving**
8-7 **Polygons**

Write the correct answer.

1. Name each polygon in this figure.



2. How could you use the sum of the angles inside a triangle to find the sum of the angles inside a heptagon?

3. How could you use the sum of the angles inside a triangle to find the sum of the angles inside a decagon?

4. In the space below, draw a rectangle and a parallelogram with side lengths congruent to the rectangle's. Now draw the diagonals for each of those polygons. What new polygons are formed by the diagonals in each quadrilateral?

5. In Exercise 4, what is true of the diagonals in the rectangle that isn't true of the diagonals of the parallelogram?

Circle the letter of the correct answer.

6. The perimeter of a regular hexagon is $13\frac{1}{2}$ inches. What is the length of each side?


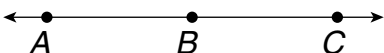
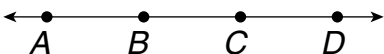
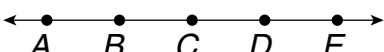
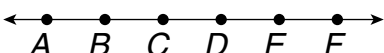
- A** $2\frac{7}{10}$ inches **C** $3\frac{3}{4}$ inches
B $2\frac{1}{4}$ inches **D** $1\frac{11}{16}$ inches

7. Which of the following statements is sometimes false?

- F** A plane figure is a polygon.
G Each side of a polygon intersects exactly two other sides.
H A polygon is a closed figure.
J A polygon has straight sides.

LESSON **Problem Solving**
8-8 **Geometric Patterns**

Complete this chart and look for patterns. Then answer the questions.

Number of Points on the Line	Draw and Label the Line and Points	Number of Different Line Segments in the Line
2		1
3		
4		
5		
6		

Circle the letter of the correct answer.

5. If $n =$ the number of points on a line, which of the following expressions shows the number of different line segments on that line?
- A $2n - 3$
 - B $(n^2 - n) \div 2$
 - C $(n \div 2) \cdot 5$
 - D $10n \div 2$
6. Using the pattern in the table and your answer to Exercise 5, how many different line segments will be on a line if there are 10 points on the line?
- F 17 line segments
 - G 25 line segments
 - H 45 line segments
 - J 50 line segments

LESSON **Problem Solving**
8-9 **Congruence**

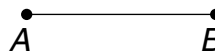
Write the correct answer.

1. Similar figures have the same shape but may have different sizes. How are similar figures different from congruent figures?

3. Is the following statement always true, sometimes true, or never true? Two congruent figures are similar figures. Explain.

2. Pentagon A and Pentagon B are congruent regular polygons. If the total length of the sides of Pentagon B is 68.5 feet, what is the length of each side of Pentagon A?

4. Draw a figure congruent to this line segment. Explain how you drew your congruent figure.



Circle the letter of the correct answer.

5. Which word makes this statement true? Corresponding parts of congruent figures are _____.
- A not regular
 - B congruent
 - C polygons
 - D horizontal
7. Which of the following polygons do not always have all congruent sides?
- A a square
 - B an equilateral triangle
 - C a rhombus
 - D a pentagon

6. If two angles of a right triangle are congruent, what are the measures of each angle in the triangle?
- F 35°, 55°, and 90°
 - G 45°, 45°, and 90°
 - H 50°, 50°, and 90°
 - J 55°, 55°, and 90°
8. If $\angle A$ of rectangle $ABCD$ is congruent to $\angle X$ of triangle XYZ , which of these statements is true?
- F Rectangle $ABCD$ is also a square.
 - G Triangle XYZ is a right triangle.
 - H Rectangle $ABCD$ is a regular polygon.
 - J Triangle XYZ is an acute triangle.

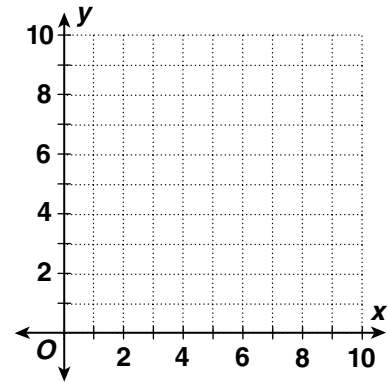
LESSON
8-10 **Problem Solving**
Transformations

Write the correct answer.

- If the rotation point of a circle is its center, how will all rotations affect the circle?
- What transformation could make an arrow pointing east become an arrow pointing north?

- What transformation could make the number 9 become the number 6?
- What transformation could make the letter P look like the letter b?

- On the coordinate plane at right, graph Triangle A with vertices (3, 1), (6, 1), and (3, 5). Then graph Triangle B with vertices (3, 6), (6, 6), and (3, 10). What transformation best describes the change from Triangle A to Triangle B?



Circle the letter of the correct answer.

- Which transformation best describes the figure on the right?
- Which transformation best describes the figure on the left?



- 90° clockwise rotation
- horizontal reflection
- 90° counterclockwise rotation
- horizontal translation

- horizontal reflection
- 180° counterclockwise rotation
- 90° counterclockwise rotation
- horizontal translation

LESSON
8-11 **Problem Solving**
Line Symmetry

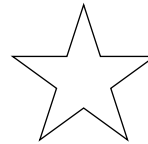
Write the correct answer.

1. Do your body and face appear to have a vertical line of symmetry or a horizontal line of symmetry?
2. Which letter of the alphabet has an infinite, or endless, number of lines of symmetry?

3. Ted says the diagonals of a rectangle are also its lines of symmetry. Do you agree? Explain.
4. Using the digits 0 through 9 and not repeating any digits, write a 3-digit number that has a horizontal line of symmetry.

5. Draw a line of symmetry for this word.
6. Draw the lines of symmetry for this star.

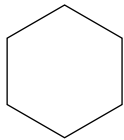
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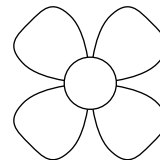
Circle the letter of the correct answer.

7. How many lines of symmetry does this hexagon have?
8. How many lines of symmetry does this flower have?

- A 4
- B 8
- C 6
- D 2



- F 3
- G 4
- H 5
- J 6



9. How many lines of symmetry does a square have?
10. How many lines of symmetry does a regular pentagon have?

- A 0
- B 2
- C 4
- D 6

- F 1
- G 2
- H 4
- J 5

LESSON **9-1** **Problem Solving**
Understanding Customary Units of Measure

Use customary units of measure to answer each question.

- | | |
|--|--|
| <p>1. Which unit of measure would be most appropriate to use for the capacity of a swimming pool?</p> <p>_____</p> | <p>2. Which unit of measure would be most appropriate to use for the length of an insect?</p> <p>_____</p> |
| <p>3. Which unit of measure would be most appropriate to use for the weight of a television set?</p> <p>_____</p> | <p>4. Which unit of measure would be most appropriate to use for the weight of a feather?</p> <p>_____</p> |
| <p>5. Which unit of measure would be most appropriate to use for the distance between two cities?</p> <p>_____</p> | <p>6. Which unit of measure would be most appropriate to use for the capacity of a can of soup?</p> <p>_____</p> |

Circle the letter of the correct answer.

- | | |
|--|--|
| <p>7. How long is a desk?</p> <p>A about 4 in.</p> <p>B about 4 ft</p> <p>C about 4 yd</p> <p>D about 4 mi</p> | <p>8. How much does a bird weigh?</p> <p>F about 3 oz</p> <p>G about 3 lb</p> <p>H about 3 T</p> <p>J about 30 T</p> |
| <p>9. How much does a can of soda hold?</p> <p>A about 1 glass of juice</p> <p>B about 4 small bottles of salad dressing</p> <p>C about 8 large containers of milk</p> <p>D about 10 spoonfuls</p> | <p>10. How long is your math book?</p> <p>F about 3 times the distance from your shoulder to your elbow</p> <p>G about 5 times the width of a classroom door</p> <p>H about 8 times the total length of 18 football fields</p> <p>J about 12 times the width of your thumb</p> |

LESSON **Problem Solving**
9-2 *Understanding Metric Units of Measure*

Use metric units of measure to answer each question.

1. Which unit of measure would be most appropriate to use for the capacity of a swimming pool?

2. Which unit of measure would be most appropriate to use for the length of an insect?

3. Which unit of measure would be most appropriate to use for the weight of a television set?

4. Which unit of measure would be most appropriate to use for the weight of a feather?

5. Which unit of measure would be most appropriate to use for the distance between two cities?

6. Which unit of measure would be most appropriate to use for the capacity of a can of soup?

Circle the letter of the correct answer.

7. How long is a desk?
A about 1.5 mm
B about 1.5 cm
C about 1.5 m
D about 1.5 km
8. What is the mass of a bird?
F about 9 mg
G about 90 mg
H about 90 g
J about 90 kg
9. What is the capacity of a can of soda?
A about 5 mL
B about 500 mL
C about 5 L
D about 500 L
10. How long is your math book?
F about 30 times the width of a fingernail
G about 10 times as thick as a dime
H about 5 times as wide as a single bed
J about 2 times the distance around a city block

LESSON

9-3

Problem Solving**Converting Customary Units**

Write the correct answer.

- Each side of a professional baseball base must measure 15 inches. What is the base's side length in feet?

- In the NBA, any shot made from 22 feet or more from the basket is worth 3 points. How many yards from the basket is that?

- The maximum weight for a professional bowling ball is 16 pounds. What is the maximum weight in ounces?

- A professional hockey goal is 6 feet wide and 4 feet high. What is the area of the goal in square yards?

- An NFL football field is 120 yards long. How many times would you have to run across the field to run 1 mile?

- The official length for a marathon race is 26.2 miles. How many yards long is a marathon? How many feet?

Circle the letter of the correct answer.

- The distance between bases in a professional baseball game is 90 feet. What is the distance between bases in inches?
A 1,000 inches C 1,100 inches
B 1,080 inches D 10,800 inches
- What is the area of a baseball diamond in square yards?
F 300 square yards
G 600 square yards
H 900 square yards
J 8,100 square yards
- An NFL football can be no less than $\frac{87}{96}$ feet long. What is the minimum length for an official football in inches?
A $10\frac{7}{8}$ inches C $\frac{87}{1152}$ inches
B $1\frac{3}{32}$ inches D $2\frac{69}{96}$ inches
- An official Olympic-sized swimming pool holds 880,000 gallons of water! How many fluid ounces of water is that?
F 1,4080,000 fluid ounces
G 7,040,000 fluid ounces
H 112,640,000 fluid ounces
J 1,760,000 fluid ounces

LESSON

9-4

Problem Solving**Converting Metric Units**

Write the correct answer.

1. The St. Gotthard Tunnel in Switzerland is the world's longest tunnel. It is 16.3 kilometers long. What is the tunnel's length in meters?

2. Ostriches are the world's heaviest birds. On average, they weigh 156,500 grams. How many kilograms does the average ostrich weigh?

3. The huge flower of the titam arum plant of Sumatra only lives for one day. During that time it grows 75 millimeters. What is the flower's height in centimeters?

4. The average male elephant drinks about 120,000 milliliters of water each day. How many liters of water do most male elephants drink each day?

Circle the letter of the correct answer.

5. The first successful steam locomotive pulled 10,886.4 kilograms of iron. How many grams of iron did the locomotive pull?
A 10.89 grams
B 108.86 grams
C 10,886,400 grams
D 108,864,000 grams
6. The track used by the first successful steam locomotive was 15.3 kilometers long. How many meters long was the track?
F 0.153 meter
G 1.53 meters
H 153 meters
J 15,300 meters
7. About 2.03 meters of rain fall each year in a tropical rain forest. About how many centimeters of rainfall are there each year in a tropical rain forest?
A 20.3 centimeters
B 203 centimeters
C 2,030 centimeters
D 20,300 centimeters
8. The top layer of trees in a tropical forest has trees that can reach 6,096 centimeters in height. How many meters tall are these trees?
F 6.096 meters
G 60.96 meters
H 609.6 meters
J 609,600 meters

LESSON **Problem Solving**
9-5 **Time and Temperature**

Use the schedule to answer the questions.

1. Which bus from New York to Atlantic City would you take to spend the least amount of time on the bus?

2. Which bus would you take to spend the greatest amount of time on the bus?

3. Bus 231 took the same amount of time as Bus 230 to travel from New York to Atlantic City. If bus 231 left New York at 7:10 P.M., at what time did it arrive in Atlantic City?

New York to Atlantic City Schedule		
Bus	Depart	Arrive
225	7:30 A.M.	10:00 A.M.
226	9:50 A.M.	12:10 P.M.
227	11:00 A.M.	1:35 P.M.
228	1:45 P.M.	4:40 P.M.
229	3:10 P.M.	5:40 P.M.
230	6:00 P.M.	8:35 P.M.

Circle the letter of the correct answer.

4. Which measure is equivalent to 2 weeks?

- A 10 days
- B 336 hours
- C 2,016 minutes
- D 120,000 seconds

6. Which is the best estimate?

- A 36°F is about 30°C.
- B 36°F is about 24°C.
- C 36°F is about 13°C.
- D 36°F is about 3°C.

5. Which measure is NOT equivalent to the others?

- F $\frac{1}{4}$ day
- G 6 hours
- H 350 minutes
- J 21,600 seconds

7. Which is the best estimate?

- F 18°C is about 36°F.
- G 11°C is about 20°F.
- H 8°C is about 46°F.
- G 3°C is about 0°F.

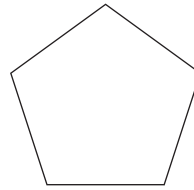
LESSON **Problem Solving**
9-6 *Finding Angle Measures in Polygons*

Write the correct answer.

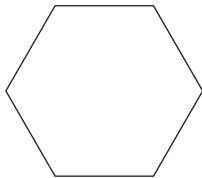
1. Most of the windows in a building are in the shape of a rectangle. What is the measure of one angle in each of those windows? What type of angle is it?



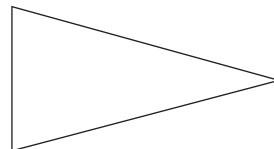
2. The Pentagon Building in Washington, D.C. is in the shape of a regular pentagon. What is the measure of one angle in the Pentagon Building? What type of angle is it?



3. Most cells in a honeycomb are in the shape of a regular hexagon. What is the measure of one angle in each of those cells? What type of angle is it?



4. Most sports pennants are in the shape of an isosceles triangle. What is the measure of the smaller angle in this sports pennant? What type of angle is it?



Circle the letter of the correct answer.

5. What is the measure of a corner of a square piece of note paper?
A 45°
B 90°
C 145°
D 180°

6. What type of angle is the corner of a square piece of note paper?
F acute angle
G right angle
H obtuse angle
J straight angle

LESSON
9-7 **Problem Solving**
Perimeter

Write the correct answer.

1. Use a ruler to find the perimeter of your math textbook in inches.

2. Use a ruler to find the perimeter of your desk in feet and inches.

3. The world's largest flag weighs 3,000 pounds and requires at least 500 people to set up! This United States flag is 505 feet long and 255 feet wide. What is the perimeter of this United States flag?

4. Students in Lisbon, Ohio, built the world's largest mousetrap in 1998. The mousetrap is 9 feet 10 inches long and 4 feet 5 inches wide—and it actually works! What is the perimeter of the mousetrap in feet and inches?

Circle the letter of the correct answer.

5. The giant ball dropped every New Year's Eve in New York City is covered with 504 crystal equilateral triangles. The average perimeter of each triangle is $15\frac{3}{4}$ inches. What is the average side length of each crystal triangle on the ball?
A 5 inches
B $5\frac{1}{8}$ inch
C $5\frac{1}{4}$ inch
D $5\frac{1}{2}$ inch
6. United States dollar bills are 2.61 inches wide and 6.14 inches long. Larger notes in circulation before 1919 measured 3.125 inches wide by 7.4218 inches long. What is the difference between the old and new dollar bill perimeters?
F 3.5936 inches
G 3.9536 inches
H 4.0956 inches
J 4.5936 inches
7. The perimeter of regular octagon-shaped swimming pool is 42 feet. What is the length of each side of the pool?
A 5 feet
B 5 feet 3 inches
C 5 feet 2 inches
D 5.2 feet
8. Each Scrabble® tile is 1.8 centimeters wide and 2.1 centimeters tall. If the tiles spell the word LOVE, what is the perimeter of the entire word?
F 7.8 cm
G 18.6 cm
H 12 cm
J 31.2 cm

LESSON **Problem Solving**
9-8 **Circles and Circumference**

Use the table to answer each question. Use 3.14 for π .

1. Which coin has the smallest radius?
 How long is that coin's radius?

2. What is the circumference of a nickel?

3. What is the circumference of a quarter?

4. Which coin has a greater circumference, a dollar or half dollar?
 What is the difference in their circumferences?

5. If you rolled a dollar coin on its edge, how far would it go with each complete turn?

Official U.S. Coin Sizes

Coin	Diameter (rounded to nearest mm)
Penny	19
Nickel	21
Dime	18
Quarter	24
Half Dollar	31
Dollar	27

6. Which U.S. coins will fit in a vending machine coin slot that is 2 centimeters wide?

Circle the letter of the correct answer.

7. A dime has 118 ridges evenly spaced along its circumference. About how wide is each ridge?
- A** about 0.24 mm
B about 0.48 mm
C about 0.15 mm
D about 0.08 mm

8. The engraved words "United States of America" run about one-half the circumference of all U.S. coins. On which coin will the words run about 38 mm?

- F** penny **H** quarter
G dime **J** half dollar

9. You have two coins with a total circumference of 116.18 mm. How much money do you have?
- A** \$0.02 **C** \$0.11
B \$0.06 **D** \$0.35

10. You have three coins with a total circumference of 216.66 mm. How much money do you have?
- F** \$0.15 **H** \$0.30
G \$0.25 **J** \$0.55

LESSON **Problem Solving**
10-1 *Estimating and Finding Area*

Use the table to answer each question.

State Information

State	Approx. Width (mi)	Approx. length (mi)	Water Area (mi ²)
Colorado	280	380	376
Kansas	210	400	462
New Mexico	343	370	234
North Dakota	211	340	1,724
Pennsylvania	160	283	1,239

- | | |
|--|---|
| <p>1. New Mexico is the 5th largest state in the United States. What is its approximate total area?</p> <p>_____</p> | <p>2. Kansas is the 15th largest state in the United States. What is its approximate total area?</p> <p>_____</p> |
| <p>3. What is the difference between North Dakota's land area and water area?</p> <p>_____</p> | <p>4. What is Pennsylvania's approximate land area?</p> <p>_____</p> |

Circle the letter of the correct answer.

- | | |
|---|--|
| <p>5. What is the difference between Colorado's land area and Pennsylvania's land area?</p> <p>A 106,400 mi²
 B 61,120 mi²
 C 60,120 mi²
 D 45,280 mi²</p> | <p>6. About what percent of the total area of Pennsylvania is covered by land?</p> <p>F about 3%
 G about 30%
 H about 67%
 J about 97%</p> |
| <p>7. Rhode Island is the smallest state. Its total land area is approximately 1,200 mi². Rhode Island is approximately 40 miles long. About how wide is Rhode Island?</p> <p>A about 20 mi
 B about 40 mi
 C about 50 mi
 D about 30 mi</p> | <p>8. The entire United States covers 3,794,085 square miles of North America. About how much of that area is not made up of the 5 states in the chart?</p> <p>F 2,537,470 mi²
 G 3,359,755 mi²
 H 3,686,525 mi²
 J 3,1310,818 mi²</p> |

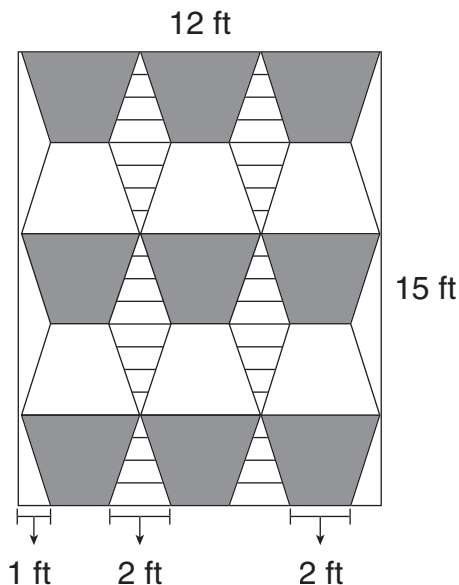
LESSON **10-2** **Problem Solving**
Area of Triangles and Trapezoids

Use the quilt design to answer the questions.

1. What are the lengths of the bases of each trapezoid?

2. What is the height of each trapezoid?

3. What is the area of each trapezoid?



Circle the letter of the correct answer.

4. What is the length of the base of each striped triangle?

- A 1 ft
- B 2 ft
- C 3 ft
- D 4 ft

5. What is the height of each striped triangle?

- F 1 ft
- G 2 ft
- H 3 ft
- J 5 ft

6. What is the area of each striped triangle?

- A 3 ft^2
- B 1 ft^2
- C $\frac{3}{4} \text{ ft}^2$
- D $\frac{1}{4} \text{ ft}^2$

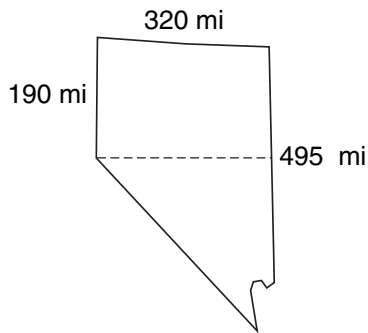
7. What is the area of the quilt?

- F 36 ft^2
- G 90 ft^2
- H 96 ft^2
- J 180 ft^2

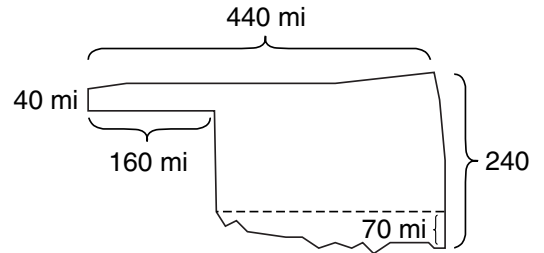
LESSON **10-3** **Problem Solving**
Area of Composite Figures

Write the correct answer.

1. The shape of Nevada can almost be divided into a perfect rectangle and a perfect triangle. About how many square miles does Nevada cover?



2. The shape of Oklahoma can almost be divided into 2 perfect rectangles and 1 triangle. About how many square miles does Oklahoma cover?



3. The front side of an apartment building is a rectangle 60 feet tall and 25 feet wide. Bricks cover its surface, except for a door and 10 windows. The door is 7 feet tall and 3 feet wide. Each window is 4 feet tall and 2 feet wide. How many square feet of bricks cover the front side of the building?

4. Each side of a square garden is 12 meters long. A hedge wall 1 meter wide surrounds the garden. What is the area of the entire garden including the hedge wall? How many square meters of land does the hedge wall cover alone?

Circle the letter of the correct answer.

5. A figure is formed by a square and a triangle. Its total area is 32.5 m^2 . The area of the triangle is 7.5 m^2 . What is the length of each side of the square?
- A** 5 meters **C** 15 meters
B 25 meters **D** 16.25 meters

6. A rectangle is formed by two congruent right triangles. The area of each triangle is 6 in^2 . If each side of the rectangle is a whole number of inches, which of these could not be its perimeter?
- F** 26 inches **H** 24 inches
G 16 inches **J** 14 inches

LESSON

10-4

Problem Solving

Comparing Perimeter and Area

Write the correct answer.

- 1. Fiona’s school photograph is 6 inches long and 5 inches wide. If she orders a triple enlargement how would this affect the area of the photo? How would the enlargement affect the frame she would need for the photo?
- 2. The Whitman’s kitchen is 8 feet long and 6 feet wide. They are planning on renovating the kitchen to have more space. If they double just the width, how will it affect the area of the room? If they double just the length? If they double both measurements?

Circle the letter of the correct answer.

- 3. Kent saw a table in a magazine that was 3 feet wide and 4 feet long. If he wants to make a similar version of the table with an area 4 times larger, what dimensions should he use?
 - A 4 ft wide and 5 ft long
 - B 6 ft wide and 8 ft long
 - C 9 ft wide and 12 ft long
 - D 12 ft wide and 16 ft long
- 4. The triangular sail on Shakeera’s boat is 8 meters wide and 10 meters tall. She wants to make a model of the boat that is $\frac{1}{20}$ of its actual size. How much canvas will Shakeera use for the model boat’s sail?
 - F 10 m² of canvas
 - G 1 m² of canvas
 - H 0.1 m² of canvas
 - J 0.01 m² of canvas
- 5. A triangle is 6.4 cm long and 8.2 cm tall. If you triple its dimensions, what would be the area of the enlarged triangle?
 - A 78.72 cm² C 236.16 cm²
 - B 157.44 cm² D 472.32 cm²
- 6. The dimensions of a regular pentagon are doubled. The perimeter of the enlarged pentagon is 25 yards. What was the length of each side of the original pentagon?
 - F 2.5 yards H 5 yards
 - G 12 yards J 16.25 yards

LESSON **Problem Solving**
10-5 **Area of Circles**

Use the table to answer each question. Use 3.14 for π .

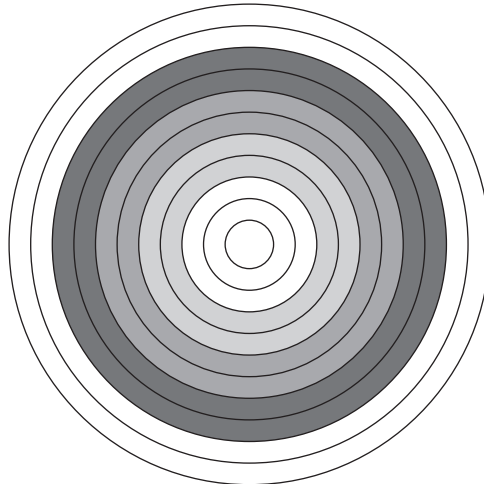
1. Which ring is the largest? What area does it enclose?

2. What is the area of the center circle, or the inner 10 scoring ring, on the target?

3. What area does Ring 5 enclose?

Official Archery Target Ring Diameters

Scoring Ring	Diameter (cm)
1	80
2	72
3	64
4	56
5	48
6	40
7	32
8	24
9	16
10	8
Inner 10	4



Circle the letter of the correct answer.

4. Which ring encloses an area of 4069.44 cm^2 ?

- A Ring 2
- B Ring 3
- C Ring 6
- D Ring 8

5. How much greater is the area enclosed by Ring 10 than the area enclosed by Ring 9?

- F 50.24 cm^2
- G 150.72 cm^2
- H 200.96 cm^2
- J 251.2 cm^2

6. What is the area enclosed by Ring 6?

- A $5,024 \text{ cm}^2$
- B $1,600 \text{ cm}^2$
- C $1,256 \text{ cm}^2$
- D 62.8 cm^2

7. What is the area enclosed by Ring 1?

- F 10 times the area of Ring 10
- G 20 times the area of Ring 10
- H 100 times the area of Ring 10
- J 1,000 times the area of Ring 10

LESSON

10-6

Problem Solving

Three-Dimensional Figures

Write the correct answer.

- 1. Pamela folded an origami figure that has 5 faces, 8 edges, and 5 vertices. What kind of three-dimensional figure could Pamela have created?
- 2. Look at your classroom chalkboard. What kind of three-dimensional figure is the board eraser? What kind of three-dimensional figure is the chalk?

- 3. If you cut a cylinder in half between its two bases, what two three-dimensional figures are formed?
- 4. You have two hexagons. How many rectangles do you need to create a hexagonal prism?

- 5. All four of the faces of a paperweight are triangles. Is this enough information to classify this three-dimensional figure? Explain.
- 6. Paulo says that if you know the number of faces a pyramid has, you also know how many vertices it has. Do you agree? Explain.

Circle the letter of the correct answer.

- 7. How is a triangular prism different from a triangular pyramid?
 - A The prism has 2 bases.
 - B The pyramid has 2 bases.
 - C All of the prism's faces are triangles.
 - D The pyramid has 5 faces.
- 8. Which of these statements is not true about a cylinder?
 - F It has 2 circular bases.
 - G It has a curved lateral surface.
 - H It is a solid figure.
 - J It is a polyhedron.
- 9. A museum needs to ship a sculpture that has a curved lateral surface and one flat circular base. In what shape box should they mail the sculpture?
 - A cone
 - B cube
 - C cylinder
 - D triangular prism
- 10. A glass prism reflects white light as a multicolored band of light called a spectrum. The prism has 5 glass faces with 9 edges and 6 vertices. What kind of prism is it?
 - F cube
 - G cone
 - H triangular pyramid
 - J triangular prism

LESSON
10-7 **Problem Solving**
Volume of Prisms

Write the correct answer.

- At 726 feet tall, Hoover Dam is one of the world's largest concrete dams. In fact, it holds enough concrete to pave a two-lane highway from New York City to San Francisco! The dam is shaped like a rectangular prism with a base 1,224 feet long and 660 feet wide. About how much concrete forms Hoover Dam?

- The Vietnam Veterans Memorial in Washington, D.C., is a 493.5-foot-long wall made of polished black granite engraved with the names of soldiers who died in the war. The wall is 0.25 feet thick and has an average height of 9 feet. About how many cubic feet of black granite was used in the Vietnam Veterans Memorial?

- Benitoite, a triangular prism crystal, is the official state gem of California. One benitoite crystal found in California is 1.2 cm tall, with a base width of 2 cm and a base height of 1.3 cm. How many cubic centimeters of benitoite are in that crystal?

- The Flatiron Building in New York City is a triangular prism. A solid bronze souvenir model of the building is 5 inches tall, with a base height of 1.5 inches and a base width of 2.5 inches. How much bronze was used to make the model?

Circle the letter of the correct answer.

- Individual slices of pizza are sold in 2-inch-tall triangular prism boxes. The box base is 8 inches wide, with a 7-inch height. How many cubic inches of pizza will fit in each box?
A 112 in³ **C** 60 in³
B 102 in³ **D** 56 in³
- The world's largest chocolate bar is a huge rectangular prism weighing more than a ton! The bar is 9 feet long, 4 feet tall, and 1 foot wide. How many cubic feet of chocolate does it have?
F 13 ft³ **H** 36 ft³
G 14 ft³ **J** 72 ft³
- A box can hold 175 cubic inches of cereal. If the box is 7 inches long and 2.5 inches wide, how tall is it?
A 25 in.
B 10 in.
C 17.5 in.
D 9.5 in.
- A triangular prism used to reflect light is made of 120 cm³ of glass. If the prism is 5 centimeters tall, what is the area of each of its triangular bases?
F 24 cm
G 12 cm
H 12 cm²
J 24 cm²

LESSON

10-8

Problem Solving**Volume of Cylinders**

Write the correct answer.

1. The Hubble Space Telescope was launched into space in 1990. Shaped like a cylinder, the telescope is 15.9 meters long, with a diameter of 4.2 meters. To the nearest whole cubic meter, what is the volume of the Hubble Space Telescope?

2. The Living Color aquarium in Bermuda is the largest freestanding cylindrical aquarium in the Western Hemisphere. With a 10-foot diameter and an 18-foot height, the aquarium holds 10,400 gallons of water! What is the aquarium's volume in cubic feet?

3. In 1902 an American music company built the world's largest music recording cylinder. Nicknamed "Brutus," the cylinder is 5 feet tall, with a 2-foot diameter. What is the volume of the "Brutus" cylinder?

4. The world's largest glass of orange juice was filled in Florida in 1998. At 8 feet tall and with a 2-foot radius, the glass held about 700 gallons of orange juice. What was the volume of that huge glass of orange juice?

Circle the letter of the correct answer.

5. A large can of soda is 7.5 inches tall and has a 3-inch diameter. A small can of soda is 5 inches tall with a 2.5-inch diameter. To the nearest cubic inch, how much more soda does the large can hold?
A 53 in³ more soda
B 28 in³ more soda
C 25 in³ more soda
D 20 in³ more soda
6. A cylindrical candle is tightly packed in a rectangular box with a volume of 144 in³. Which of these could be the dimensions of the candle?
F $h = 6$ in.; $r = 3$ in.
G $h = 2$ in.; $r = 5$ in.
H $h = 4$ in.; $r = 3$ in.
J $h = 3$ in.; $r = 4$ in.
7. The maximum length for an official professional baseball bat is 36 inches. Its maximum diameter is 2.6 inches. To the nearest cubic inch, what is the maximum volume of a professional baseball bat?
A 21 in³ **C** 191 in³
B 119 in³ **D** 764 in³
8. A can of tennis balls is 21 centimeters tall and has a diameter of 8 centimeters. What is the volume of the tennis ball can?
F 17,408.16 cm³ **H** 527.52 cm³
G 1,055.04 cm³ **J** 263.76 cm³

LESSON

10-9

Problem Solving**Surface Area**

Write the correct answer.

1. The world's largest cookie was baked in Wisconsin in 1992. Its diameter was 34 feet and contained about 4 million chocolate chips! If the cookie was a cylinder 1 foot tall, and you wanted to cover it with icing, how many square inches would you have to ice? Use 3.14 for π .

2. The top of the Washington Monument is a square pyramid covered with white marble. Each triangular face is 58 feet tall and 34 feet wide. About how many square feet of marble covers the top of the monument? (The base is hollow.)

3. The Parthenon, a famous temple in Greece, is surrounded by large stone columns. Each column is 10.4 meters tall and has a diameter of 1.9 meters. To the nearest whole square meter, what is the surface area of each column (not including the top and bottom)?

4. The tablet that the Statue of Liberty holds is 7.2 meters long, 4.1 meters wide, and 0.6 meters thick. The tablet is covered with thin copper sheeting. If the tablet was freestanding, how many square meters of copper covers the statue's tablet?

Circle the letter of the correct answer.

5. The largest Egyptian pyramid is called the Great Pyramid of Khufu. It has a 756-foot square base and a slant height of 481 feet. What is the total surface area of the faces of the Pyramid of Khufu?
A 727,272 ft² **C** 727,727 ft²
B 727,722 ft² **D** 772,272 ft²
6. A glass triangular prism for a telescope is 5.5 inches tall. Each side of the triangular base is 4 inches long, with a 3-inch height. How much glass covers the surface of the prism?
F 6 in² **H** 39 in²
G 12 in² **J** 78 in²
7. A can of frozen orange juice is 7.5 inches tall, and its base diameter is 3.5 inches. What size strip of paper is used for its label?
A 82.43 in² **C** 576.98 in²
B 26.25 in² **D** 101.66 in²
8. Tara made fuzzy cubes to hang in her car. Each side of the 2 cubes is 4 inches long. How much fuzzy material did Tara use to make both cubes?
F 96 in² **H** 16 in²
G 192 in² **J** 128 in²

LESSON
11-1 **Problem Solving**
Integers in Real-World Situations

Write the correct answer.

- The element mercury is used in thermometers because it expands as it is heated. Mercury melts at 38°F below zero. Write this temperature as an integer.

- Denver, Colorado, earned the nickname "Mile High City" because of its elevation of 5,280 feet above sea level. Write Denver's elevation as an integer in feet and miles.

- The lowest temperature recorded in San Francisco was 20°F . Buffalo's lowest recorded temperature was the opposite of San Francisco's. What was Buffalo's record temperature?

- Greenland holds the record for the lowest temperature recorded on Earth. That temperature in degrees Fahrenheit is 65 degrees below zero. What is Earth's lowest recorded temperature written as an integer?

- In 1960, explorers on the submarine *Trieste 2* set the world record for the deepest dive. The ship reached 35,814 feet below sea level. Write this depth as an integer.

- In 1960, Joseph W. Kittinger, Jr., set the record for the highest parachute jump. He jumped from an air balloon at 102,800 feet above sea level. Write this altitude as an integer.

Circle the letter of the correct answer.

- Which situation cannot be represented by the integer -10 ?
A an elevation of 10 feet below sea level
B a temperature increase of 10°F
C a golf score of 10 under par
D a bank withdrawal of \$10
- Paper was invented in China one thousand, nine hundred years ago. Which integer represents this date?
F 1,900
G 900
H $-1,900$
J $-1,000$
- The elevation of the Dead Sea is about 1,310 feet below sea level. Which integer represents this elevation?
A $-1,310$
B -131
C 131
D 1,310
- The quarterback had a 10-yard loss and then a 25-yard gain. Which integer represents a 25-yard gain?
F -25
G -10
H 25
J 10

LESSON **Problem Solving**
11-2 **Comparing and Ordering Integers**

Use the table below to answer each question.

Continental Elevation Facts

Continent	Highest Point	Elevation (ft) above sea level	Lowest Point	Elevation (ft) below sea level
Africa	Mount Kilimanjaro	19,340	Lake Assal	-512
Antarctica	Vinson Massif	16,066	Bentley Subglacial Trench	-8,327
Asia	Mount Everest	29,035	Dead Sea	-1,349
Australia	Mount Kosciusko	7,310	Lake Eyre	-52
Europe	Mount Elbrus	18,510	Caspian Sea	-92
North America	Mount McKinley	20,320	Death Valley	-282
South America	Mount Aconcagua	22,834	Valdes Peninsula	-131

1. What is the highest point on Earth?
What is its elevation?
2. What is the lowest point on Earth?
What is its elevation?

3. Which point on Earth is higher, Mount Elbrus or Mount Kilimanjaro?
4. Which point on Earth is lower, the Caspian Sea or Lake Eyre?

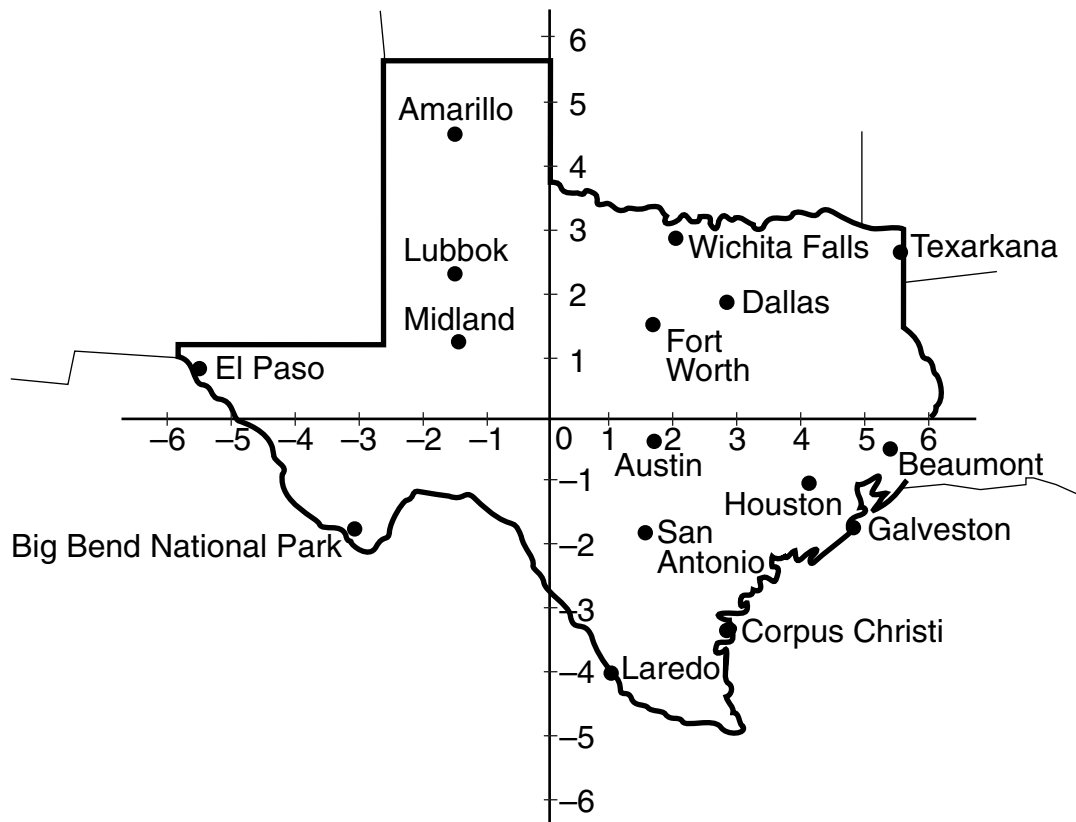
Circle the letter of the correct answer.

5. Which continent has a higher elevation than North America?
A Antarctica
B South America
C Europe
D Australia
6. Which continent has a lower elevation than Africa?
F Australia
G Europe
H Asia
J South America

7. Write the continents in order by their highest points, from highest elevation to lowest elevation.

LESSON **Problem Solving**
11-3 *The Coordinate Plane*

Use the coordinate plane on the map of Texas below to answer each question.



- | | |
|---|--|
| <p>1. Which location in Texas is closest to the ordered pair $(5, -2)$?</p> <p>_____</p> | <p>2. What ordered pair best describes the location of Dallas, Texas?</p> <p>_____</p> |
| <p>3. Which location in Texas is closest to the ordered pair $(-6, 1)$?</p> <p>_____</p> | <p>4. Which location in Texas is located in Quadrant III of this coordinate plane?</p> <p>_____</p> |
| <p>5. Which three locations in Texas all have positive y-coordinates and nearly the same x-coordinate?</p> <p>_____</p> | <p>6. Which cities on this map of Texas have locations with y-coordinates less than -3?</p> <p>_____</p> |

LESSON

Problem Solving**11-4 Adding Integers**

In 1997, Tiger Woods became the youngest golfer ever to win the Masters Tournament. There are four rounds of 18 holes in the Masters Tournament. Use Woods's scorecard to answer questions 1–6.

Tiger Woods																		
Hole	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Rd. 1	1	0	0	1	0	0	0	1	1	-1	0	-1	-1	0	-2	0	-1	0
Rd. 2	0	-1	1	0	-1	0	0	-1	0	0	0	0	-2	-1	-1	0	0	0
Rd. 3	0	-1	0	0	-1	0	-1	-1	0	0	-1	0	0	0	-1	0	0	-1
Rd. 4	0	-1	0	0	1	0	1	-1	0	0	-1	0	-1	-1	0	0	0	0

1. What was Woods's total score for round 1 of the tournament?

2. What was his total score for the second round of the tournament?

3. What was his total score for the third round of the tournament?

4. What was his total score for the fourth round of the tournament?

Circle the letter of the correct answer.

5. Woods's final score in 1997 was the lowest in the history of the Masters Tournament. What was Woods's record-breaking final score?
 A -16
 B -17
 C -18
 D -20
6. Tom Kite placed second in the 1997 Masters Tournament. His final score was 12 strokes higher than Tiger Woods's final score. What was Kite's final score?
 F -30
 G -12
 H - 8
 J 0
7. Which of the following is the sum of Woods's scores on the 8th hole?
 A 2
 B 1
 C -1
 D -2
8. Which of the following is the sum of Woods's scores on the 15th hole?
 F 4
 G -4
 H 0
 J 1

LESSON

Problem Solving**11-5****Subtracting Integers**

Write the correct answer.

1. The average surface temperature on Earth is 59°F . The average surface temperature on Mars is 126°F lower than on Earth. What is the average surface temperature on Mars?

2. The average surface temperature on Saturn is 46°F colder than on Jupiter. Jupiter's average surface temperature is 162°F below zero. What is the average surface temperature on Saturn?

3. Venus has the hottest average surface temperature at 854°F . Mercury, the planet closest to the Sun, has an average surface temperature that is 522°F colder than Venus's. What is Mercury's average surface temperature?

4. Pluto has an average surface temperature of 355°F below zero. Neptune, its closest neighbor, has the coldest average surface temperature. It is 10°F colder on Neptune than on Pluto. What is the average surface temperature on Neptune?

Circle the letter of the correct answer.

5. Which of the following is the difference between 247°F below zero and 221°F above zero?
A -26°F
B 129°F
C -468°F
D 468°F
6. Which of the following is the difference between 806°C above zero and 328°C below zero?
F $1,134^{\circ}\text{C}$
G 478°C
H -478°C
J $-1,134^{\circ}\text{C}$
7. Which of the following is the difference between -40°C and -30°C ?
A -10°C
B 708°C
C -120°C
D -1°C
8. Which of the following is the difference between $8,700^{\circ}\text{F}$ and -344°F ?
F $8,356^{\circ}\text{F}$
G 900°F
H -9°F
J $9,044^{\circ}\text{F}$

LESSON

11-6**Problem Solving****Multiplying Integers**

Write the correct answer.

1. The coldest temperature ever recorded in Rhode Island was 25°F below zero. Though Nevada lies much farther south, its coldest temperature was twice as cold as Rhode Island's. What was Nevada's record cold temperature?

2. Tom and Kim made up a game in which black tiles equal $+5$ points each, and red tiles equal -3 points each. The person with the most points wins. At the end of the game Tom had 6 red tiles and 4 black tiles, and Kim had 4 red tiles and 3 black tiles. Who won?

3. During a month-long drought, the amount of water in the family's well changed -4 gallons a day. How much did the amount of water in the well change after one week?

4. Sperm whales dive deeper than any other mammals. They regularly dive to 3,937 feet below sea level. But they sometimes dive to twice this depth! To what depth can sperm whales dive?

Circle the letter of the correct answer.

5. On Monday morning, the value of LCM stock was \$15 a share. Then the value of the stock changed by -3 dollars a day for 4 days in a row. What was the value of one share of LCM stock after the fourth day?
A \$1
B \$3
C \$6
D \$12
6. Lake Manitoba and Lake Winnipeg are two of the largest lakes in Canada. The greatest depth of Lake Manitoba is 12 feet. Lake Winnipeg is 5 times deeper than Lake Manitoba. What is the greatest depth of Lake Winnipeg?
F 5 feet
G 17 feet
H 50 feet
J 60 feet
7. Which addition expression could be used to check the product of $5 \cdot (-3)$?
A $5 + 5 + 5$
B $-3 + (-3) + (-3)$
C $5 + 5 + 5 + 5 + 5$
D $-3 + (-3) + (-3) + (-3) + (-3)$
8. Which property allows you to rewrite $-2 \cdot (-4)$ as $-4 \cdot (-2)$?
F Commutative Property
G Distributive Property
H Integer Property
J Associative Property

LESSON **Problem Solving**
11-7 *Dividing Integers*

Use the table below to answer questions 1–6.

Temperatures for Barrow, Alaska

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Temp (°F)	-13	-18	-15	-2	19	34	39	38	31	14	-2	-11

- What is the average temperature in Barrow for December and January?

- What is the average temperature in Barrow for March and July?

- Which month's average temperature is half as warm as August's?

- What is the average temperature in Barrow for October and November?

- What is the average temperature in Barrow for January through April?

- What is the city's average temperature for September through December?

Circle the letter of the correct answer.

- A submarine dove to a depth of 168 feet in 7 minutes. What was the average rate of change in its location?
A 24 feet
B 168 feet
C -24 feet
D -168 feet
- In its first 4 months of business, Skyscraper Records reported its losses as $-\$1,520$. What was the company's average monthly loss?
F $-\$1,520$
G $-\$380$
H $-\$38$
J $\$380$
- Which of these expressions checks the solution to the division problem $-8 \div (-2) = 4$?
A $-8 \cdot (-2)$
B $4 \cdot 4$
C $-2 \cdot (2)$
D $4 \cdot (-2)$
- A glacier is melting 3 in^3 a year. At that rate, how long will it take for the glacier to change by -24 in^3 ?
F 72 years
G 6 years
H 8 years
J 24 years

LESSON
11-8 **Problem Solving**
Solving Integer Equations

For questions 1–8, the temperatures found are in °F.

1. The highest recorded temperature in Africa is the solution to $x \div (-4) = -34$. What is Africa's highest recorded temperature?

2. The lowest recorded temperature in Australia is the solution to $7x = -56$. What is Australia's lowest recorded temperature?

3. To find Africa's lowest recorded temperature, solve the following equation: $80 - x = 91$.

4. To find Europe's highest recorded temperature, solve the following equation: $x \div -2 = -61$.

5. The solution to $-2x = -116$ is the highest recorded temperature in Antarctica. What is Antarctica's highest recorded temperature?

6. The solution to $x + (-23) = -90$ is the lowest recorded temperature in Europe. What is Europe's lowest recorded temperature?

Circle the letter of the correct answer.

7. Which of the following is a solution to $x + (-11) = -140$?
A 12
B -129
C -151
D -1,540
8. Which of the following is a solution to $-110 + x = 19$?
F 91
G 129
H -5
J -2,090
9. Which of the following is a solution to $5x = -75$?
A -375
B -80
C -70
D -15
10. Which of the following is a solution to $-270 \div x = -30$?
F 8,100
G -300
H 9
J -240

LESSON
11-9 **Problem Solving**
Tables and Functions

Use the tables to answer each question.

Table 1

miles	kilometers
2	3.22
3	4.83
4	
5	8.05

Table 2

ounces	grams
1	28.35
2	
3	85.05
4	113.4

Table 3

gallons	liters
5	
10	37.9
15	56.85
20	75.8

1. Write an equation for a function that gives the values in table 1. Define the variables you use. Use your equation to find the missing term in the table.

2. Write an equation for a function that gives the values in table 2. Define the variables you use. Use your equation to find the missing term in the table.

3. Write an equation for a function that gives the values in table 3. Define the variables you use. Use your equation to find the missing term in the table.

4. There are 4 quarts in a gallon. Write an equation for a function relating quarts to liters. Then use your equation to find how many liters of oil a 50-quart barrel can hold.

Circle the letter of the correct answer.

5. The Rocky Mountains stretch 3,750 miles across North America. What is this length in kilometers?
- A** 2,329.2 kilometers
 - B** 1,164.6 kilometers
 - C** 6,037.5 kilometers
 - D** 12,075 kilometers

6. A hummingbird egg only weighs 0.25 grams! How many ounces does the egg weigh?
- F** about 7.0875 ounces
 - G** about 0.009 ounces
 - H** about 28 ounces
 - J** about 9 ounces

LESSON
11-10 **Problem Solving**
Graphing Functions

Use the table to answer each question.

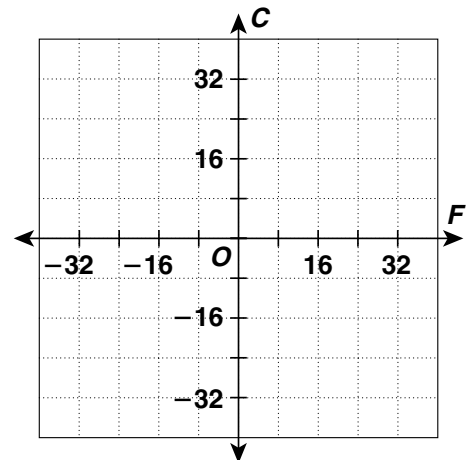
1. $F = \frac{9}{5}C + 32$ is an equation for the function that gives the values in the table. What does each variable represent in the equation? Use the equation to complete the table.

Celsius (°C)	Fahrenheit (°F)
-20	-4
-10	14
0	32
10	
20	

2. Write a different equation for a function that gives the values in the table.

3. Is the ordered pair (30, 86) a solution for either equation? Why or why not? What does each value in the ordered pair represent?

4. Graph the function described by either equation on the graph at right.



Circle the letter of the correct answer.

5. Use your graph to find the equivalent Fahrenheit temperature for -8°C .
- A 18°F
 B 28°F
 C 42°F
 D 46°F
6. What Celsius temperature is equivalent to -58°F ?
- F -50°C H 50°C
 G 14.4°C J -40°C

7. Which is not a solution for the equation in Exercise 1?
- A (100, 212) C (-40, 104)
 B (0, 32) D (60, 140)

LESSON
12-1 **Problem Solving**
Introduction to Probability

Floods are categorized by their probability of occurrence. For example, a flood categorized as a 20-year flood means it has a 1 in 20 chance of occurring in any given year. Complete the flood probability chart below. Then use it to answer the questions. Write answers in simplest form.

Flood Probabilities of Occurrence

	Category	Probability Fraction	Probability Decimal	Probability Percent
1.	2-year flood			
2.	5-year flood			
3.	10-year flood			
4.	50-year flood			
5.	100-year flood			

6. Which flood category in the table is the most likely to occur in a given year? The least likely?

8. The Yukon River in Alaska had a 100-year flood in 1992. Does this mean that another 100-year flood could not occur on the Yukon River until 2092? Explain.

7. Following the naming system in the table, what category name would you use for a flood that is certain to occur in any given year?

- A** a 1-week flood
- B** a 1-month flood
- C** a 1-year flood
- D** a 3-year flood

9. The Mississippi River system had a rare 500-year flood in 1993. What is the percent of probability that another 500-year flood will occur on the Mississippi River system next year?

- F** 2%
- G** 0.2%
- H** 0.02%
- J** 0.002%

LESSON
12-2 **Problem Solving**
Experimental Probability

Write the correct answer. Write answers in simplest form.

1. Brandy tossed a fair coin several times. She recorded the result of each toss in this table. What is the experimental probability that Brandy's next toss will land heads up?

Heads Up	
Tails Up	

2. In this table, Charles recorded the gender of each person who shopped at his store this morning. What is the experimental probability that his next customer will be a woman?

Male	
Female	

3. Nita packed 4 pairs of shorts for her beach vacation—a blue pair, a white pair, a denim pair, and a black pair. Without looking, she pulls out the blue pair from her suitcase. What is the outcome?

4. Mick rolled two number cubes at the same time. Each cube is numbered 1 through 6. The cubes showed a sum of 7. What is the outcome for this experiment?

Abdul recorded the number of free throws his favorite basketball player made in each of 24 games. He organized his results in this frequency table. Circle the letter of the correct answer.

Free Throws Made	0	1	2	3	4
Frequency	1	4	7	9	3

5. What is the experimental probability that this player will make 1 free throw in the next game?

- A** $\frac{1}{24}$
B $\frac{1}{6}$
C $\frac{7}{24}$
D $\frac{1}{8}$

6. Based on Abdul's experiment, how many free throws will this player most likely make in any given game?

- F** 3
G 4
H 0
J 2

LESSON **12-3** **Problem Solving**
Counting Methods and Sample Spaces

Write the correct answer.

1. Computer spreadsheet programs use letter-number combinations to name cells. How many different cells can a spreadsheet have where its name has 1 English letter followed by 1 digit?

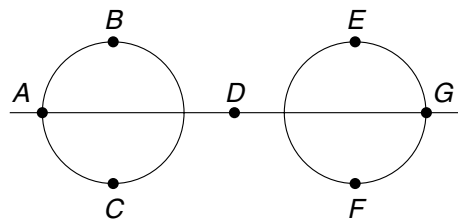
2. An airline has five different flights to San Francisco today. Each flight offers first-class or coach seats. From how many different tickets to San Francisco can you choose today?

3. On Friday, the school cafeteria is serving pizza, hamburgers, chicken, milk, chocolate milk, and juice. From how many different meal-drink combinations can you choose?

4. Tanya packed 4 T-shirts, 6 pairs of shorts, and 2 pairs of shoes for her vacation. How many different short-shirt-shoes outfit combinations can she wear?

Circle the letter of the correct answer.

5. There are 4 people at a meeting. Every person shakes hands with each other person once. How many handshakes are done in all?
A 16 handshakes
B 12 handshakes
C 8 handshakes
D 6 handshakes
6. There are 3,628,800 different ways to arrange the digits 0 through 9! How many different ways can you arrange the digits 1, 2, and 3?
F 4 different ways
G 6 different ways
H 7 different ways
J 9 different ways
7. A spinner has 6 equal sections labeled *A*, *B*, *C*, *D*, *E*, and *F*. A second spinner has 5 equal sections colored red, blue, green, yellow, and black. If you spin both spinners at the same time, how many different possible outcomes are there?
8. How many different ways can you get from point *A* to point *G*?



- | | |
|------------|-------------|
| A 5 | C 11 |
| B 6 | D 30 |

- | | |
|------------|-------------|
| F 4 | H 5 |
| G 9 | J 12 |

LESSON

Problem Solving

12-4 Theoretical Probability

Each time a letter is drawn, it is returned to the bag. Write the correct answer. Write answers in simplest form.

1. At the beginning of a game, each player picks letter tiles from a bag without looking. What is the probability that a player will pick a blank tile?

2. Which letter are you most likely to pick from the bag? Write this probability as a fraction, decimal, and percent.

3. Which letters are you least likely to pick from the bag? What is the probability that you will pick any one of those letters? Write this probability as a fraction, decimal, and percent.

Numbers of Tiles for Each Letter

Letter	Tiles	Letter	Tiles
A	9	O	8
B	2	P	2
C	2	Q	1
D	4	R	6
E	12	S	4
F	2	T	6
G	3	U	4
H	2	V	2
I	9	W	2
J	1	X	1
K	1	Y	2
L	4	Z	1
M	2	BLANK	2
N	6		

Circle the letter of the correct answer.

4. The probability of randomly picking a letter is $\frac{3}{50}$. What could that letter possibly be?

A E

B G

C N, R, or T

D V, W, or Y

5. The probability of randomly picking a letter is $\frac{1}{25}$. What could that letter possibly be?

F A

G B

H C, F, H, or M

J D, L, S, or U

6. What is the probability that you will select a vowel tile (including Y) from the bag?

A $\frac{9}{100}$

C $\frac{11}{25}$

B $\frac{26}{49}$

D $\frac{21}{50}$

7. Most words with a Q must also have a U. What is the probability that you will select a U?

F $\frac{1}{100}$

H $\frac{1}{20}$

G $\frac{1}{25}$

D $\frac{1}{300}$

LESSON **Problem Solving**
12-5 **Compound Events**

You have two decks of playing cards. You draw one card from each deck at the same time. Write the correct answer.

1. What is the probability that you will draw a black card from Deck 1 and a red card from Deck 2?
- _____

2. What is the probability that you will draw a club card from both decks?
- _____

3. What is the probability that you will draw a heart from Deck 1 and a black card from Deck 2?
- _____

**Standard Deck of
Playing Cards**

Suit	Color	Number
Spades	Black	13
Hearts	Red	13
Clubs	Black	13
Diamonds	Red	13

You roll two standard number cubes at the same time. Circle the letter of the correct answer.

4. What is the probability that you roll doubles, or the same two numbers?

A $\frac{1}{2}$
B $\frac{1}{3}$
C $\frac{1}{6}$
D $\frac{1}{12}$

6. Which sums are you least likely to get? What is the probability of rolling either of those sums?

A 2 or 3; $\frac{1}{12}$
B 2 or 4; $\frac{1}{9}$
B 2 or 6; $\frac{1}{6}$
D 2 or 12; $\frac{1}{18}$

5. What is the probability of rolling a sum less than 6?

F $\frac{5}{18}$
G $\frac{1}{6}$
H $\frac{1}{9}$
J $\frac{1}{18}$

7. Which sum are you most likely to get? What is the probability of rolling that sum?

F 7; $\frac{1}{6}$
G 8; $\frac{1}{9}$
H 9; $\frac{1}{9}$
J 10; $\frac{1}{12}$

LESSON **Problem Solving**
12-6 **Making Predictions**

Write the correct answer.

U.S. Public High School Graduation Rates, Top 5 States

State	Number of Students	Percent that Graduate
Iowa	497,301	83.2%
Minnesota	854,034	84.7%
Nebraska	288,261	87.9%
North Dakota	112,751	84.5%
Utah	480,255	83.7%

- In which state are students most likely to graduate from public high school? About how many of the students who are enrolled in that state now do you predict will graduate?
- About how many students enrolled in North Dakota public high schools now do you predict will graduate?

Circle the letter of the correct answer.

- About how many students enrolled in Minnesota public high schools now do you predict will graduate?
 - A** about 717,389 students
 - B** about 723,367 students
 - C** about 743,010 students
 - D** about 7,233,667 students
- About how many more students in public high schools do you predict will graduate in Iowa than in Utah?
 - F** about 413,754 more students
 - G** about 401,973 more students
 - H** about 11,781 more students
 - J** about 1,781 more students
- The total U.S. high school graduation rate is 68.1%. There are 48,857,321 students enrolled in public schools. About how many of those students do you predict will graduate?
 - A** about 332 million students
 - B** about 20 million students
 - C** about 33 million students
 - D** about 16 million students
- About 11% of all students in the U.S. are enrolled in private schools. There are more than 48 million students in the U.S. About how many do you predict will go to private schools?
 - F** about 5,280,000 students
 - G** about 6 million students
 - H** about 52,800 students
 - J** about 528,000 students