1-1 **Lesson Reading Guide**

A Plan for Problem Solving

7MR1.1, 6AF2.3

Get Ready for the Lesson

**Complete the Mini Lab at the top of page 24 in your textbook.
Write your answers below.**

1. How many white tiles does it take to border each of these three gardens?

2. Predict how many white tiles it will take to border the next-largest garden. Check your answer by modeling the garden.

3. How many tiles will it take to border a garden that is 6 tiles long? Explain your reasoning.

Read the Lesson

4. Read the Check section in Example 1 at the bottom of page 25. In the equation $8 + 18 = 26$, what does the 8 stand for? What does the 18 stand for?

5. Look at the Explore section in Example 2 on page 26. What does the word "difference" mean? Now read the Plan section. Explain how to find the distance traveled in 1 minute when you know the distance per second.

6. Look at the graph in Example 2 on page 26. Explain how the animals in the chart are listed. Why is the cheetah first?

Remember What You Learned

7. *Early problem solvers care* is a mnemonic aid to remember the first letters of the steps in the problem-solving plan. Write a mnemonic aid of your own using the first letters of the steps.

Lesson 1–1

1-2   **Lesson Reading Guide**   7AF1.2, 7AF1.3, 7AF1.4

Variables, Expressions, and Properties

Get Ready for the Lesson

Complete the Mini Lab at the top of page 29 in your textbook. Write your answers below.

1. Complete the table below.

Figure Number	1	2	3	4	5	6
Perimeter		4	8			

What is the relationship between the figure number and the perimeter of the figure?

2. What would be the perimeter of Figure 10?

Read the Lesson

3. Number the operations in the correct order for simplifying $2 + 4(9 - 6 \div 3)$. Then simplify the expression.

____ Addition   ____ Multiplication

____ Subtraction   ____ Division

For Exercises 4–8, describe how each pair of numerical expressions is different. Then determine whether the two expressions are equal to each other. If the expressions are equal, name the property that says they are equal.

4. $2 + 5, 5 + 2$

5. $(6 - 4) - 1, 6 - (4 - 1)$

6. $2(5 - 3), 2 \cdot 5 - 2 \cdot 3$

7. $5 \cdot (4 \cdot 7), (5 \cdot 4) \cdot 7$

8. $10 \div 2, 2 \div 10$

Remember What You Learned

9. The word *counter* has several meanings in the English language. Use a dictionary to find the meaning of *counter* when it is used as a prefix in the word *counterexample*. Then write your own definition of *counterexample*.

Lesson 1–2

1-3 Lesson Reading Guide

7NS2.5

Integers and Absolute Value

Get Ready for the Lesson

Read the introduction at the top of page 35 in your textbook. Write your answers below.

1. What does an elevation of -86 meters represent?

2. What does a temperature of $-35°$ represent?

Read the Lesson

The symbol ... is called an ellipsis.

3. Look on page 35 in your textbook to find the meaning of the ellipsis as it is used in the list 1, 4, 7, 10,... .

4. Use a dictionary to find the meaning of the ellipsis as it is used in the sentence *The marathon began...downtown.*

5. How can you explain the usage of the ellipsis in the list in Exercise 3 in terms of the meaning for the ellipsis in the sentence in Exercise 4?

6. Look at the number line on page 35 of your textbook. How are the ellipses (plural of ellipsis) in the set of integers {...,-4, -3, -2, -1, 0, 1, 2, 3, 4,...} represented on the number line?

Complete each sentence with either *left* or *right* to make a true sentence. Then write a statement comparing the two numbers with either < or >.

7. -45 lies to the _____ of 0 on a number line.

8. 72 lies to the _____ of 0 on a number line.

9. -3 lies to the _____ of -95 on a number line.

10. 6 lies to the _____ of -7 on a number line.

11. Describe the symbol for the absolute value of 3. Then write the symbol.

Remember What You Learned

12. Write a mathematical expression that represents the following sentence. (*Hint*: Let *f* represent the 49ers' score and *s* represent the Seahawks' score.)

    The Seahawks and the 49ers scored within 3 points of each other.

1-4 Lesson Reading Guide

Adding Integers

Get Ready for the Lesson

Read the introduction at the top of page 41 in your textbook. Write your answers below.

1. Write an integer that describes the game show host's statement.

2. Write an addition sentence that describes this situation.

Read the Lesson

3. Look at your answer for Exercise 2. Identify each number in the addition sentence as either an addend or a sum.

Identify the number with the greater absolute value.

4. $4, 8$

5. $-3, 5$

6. $9, -12$

7. $-23, -16$

Determine whether you *add* or *subtract* the absolute values of the numbers to find the sum. Give a reason for your answer.

8. $4 + 8$

9. $-3 + 5$

10. $9 + (-12)$

11. $-23 + (-16)$

Determine whether the sum is *positive* or *negative*. Then find the sum.

12. $4 + 8$

13. $-3 + 5$

14. $9 + (-12)$

15. $-23 + (-16)$

Add.

16. $3 + (-4)$ **17.** $-3 + 4$ **18.** $-6 + (-4)$ **19.** $7 + 8$

20. $25 + (-17)$ **21.** $-34 + (-17)$ **22.** $-43 + 4$ **23.** $11 + (-30)$

24. $-81 + (-63)$ **25.** $-39 + 124$ **26.** $97 + (-165)$ **27.** $-49 + (-75)$

Remember What You Learned

28. You have seen what a negative number means in terms of weather or money. Describe what a negative number means on a video cassette recorder.

Lesson 1–4

1-5　Lesson Reading Guide

Subtracting Integers

Get Ready for the Lesson

**Complete the Mini Lab at the top of page 46 in your textbook.
Write your answers below.**

1. How does this result compare with the result of $3 + (-5)$?

2. Use algebra tiles to find $-4 - 2$.

3. How does this result compare to $-4 + (-2)$?

4. Use algebra tiles to find each difference and sum. Compare the results in each group.

    a. $1 - 5; 1 + (-5)$　　　　　　　　　　**b.** $-6 - 4; -6 + (-4)$

Read the Lesson

5. Find the opposite of 7.

6. Find the additive inverse of 7.

7. How is the opposite of a number different from the additive inverse of the number?

Rewrite each difference as a sum. Then find the sum.

8. $2 - 9$　　　　　　　　　　　　　　**9.** $-3 - 8$

10. $10 - (-12)$　　　　　　　　　　　　**11.** $-5 - (-16)$

Subtract.

12. $3 - (-5)$　　　**13.** $-3 - 5$　　　**14.** $-7 - (-3)$　　　**15.** $6 - 8$

16. $23 - (-17)$　　**17.** $-24 - (-12)$　　**18.** $-41 - 4$　　　**19.** $31 - (-26)$

20. $-81 - (-33)$　　**21.** $-139 - 134$　　**22.** $97 - (-265)$　　**23.** $-59 - (-77)$

24. Describe the method for subtracting integers.

Remember What You Learned

25. Subtraction and addition are often referred to as opposite operations. Explain in your own words the relationship between addition and subtraction.

1-6 Lesson Reading Guide

7NS1.2, 7AF1.3

Multiplying and Dividing Integers

Get Ready for the Lesson

Read the introduction at the top of page 51 in your textbook. Write your answers below.

1. Write two different addition sentences that could be used to find the submersible's depth after 3 minutes. Then find their sums.

2. Write a multiplication sentence that could be used to find this same depth. Explain your reasoning.

3. Write a multiplication sentence that could be used to find the submersible's depth after 10 minutes. Then find the product.

Read the Lesson

4. Identify each number in the multiplication sentence $3(-120) = -360$ as either a factor or a product.

Complete each sentence with either *positive* or *negative*.

5. The product of two integers with different signs is _____ .

6. The product of two integers with the same signs is _____ .

7. The quotient of two integers with different signs is _____ .

8. The quotient of two integers with the same signs is _____ .

Determine whether each product or quotient is *positive* or *negative*. Then evaluate the expression.

9. $4 \cdot 8$

10. $-3 \cdot 5$

11. $9(-2)$

12. $-6(-7)$

13. $12 \div (-4)$

14. $-35 \div (-7)$

15. $\dfrac{21}{3}$

16. $\dfrac{-64}{8}$

Remember What You Learned

17. Explain how to find the mean of a set of numbers. What is another name for the mean?

1-7 Lesson Reading Guide

Writing Equations

7AF1.1, 7AF1.4

Get Ready for the Lesson

**Read the introduction at the top of page 57 in your textbook.
Write your answers below.**

1. What is the relationship between the number of guests and the cost of the party?

2. Write an expression representing the cost of a party with g guests.

3. What does the equation $g \cdot 8 = 120$ represent in this situation?

Read the Lesson

**Look at the steps for writing an algebraic equation on page 57. Then
determine whether each situation requires *addition*, *subtraction*,
multiplication, or *division*.**

4. Find the difference between the cost of a gallon of premium gasoline and the cost of a gallon of regular gasoline.

5. Find the cost per person when the price of a pizza is split among several people.

6. Find the price of an airline ticket after the price has been decreased by $50.

7. Find how much an executive spent on breakfast, lunch, and dinner.

8. Find the flight time after the time has been increased by 15 minutes.

9. Find the product of the price of a calculator and the number of students in the class.

10. Find the high temperature on Wednesday if this temperature is 3° less than the high temperature on Tuesday.

11. Find the ratio of the amount of gasoline used and the distance traveled.

Remember What You Learned

12. Devise your own way to determine how a verbal description should be translated as an algebraic equation.

1-9 Lesson Reading Guide

Solving Addition and Subtraction Equations

Get Ready for the Lesson

Complete the Mini Lab at the top of page 65 in your textbook.
Write your answers below.
Solve each equation using algebra tiles.

1. $x + 1 = 4$ **2.** $x + 3 = 7$ **3.** $x + (-4) = -5$

4. Explain how you would find a value of x that makes $x + (-3) = -8$ true without using models.

Read the Lesson

5. Match the method of solving with the appropriate equation.

$x + 6 = 9$ _____   **a.** Subtract 11 from each side.

$s - 5 = 14$ _____   **b.** Subtract 6 from each side.

$4 = -3 + p$ _____   **c.** Add 3 to each side.

$11 + m = 33$ _____   **d.** Add 5 to each side.

For Exercises 6–8, explain how to solve each equation.

6. $w - 7 = -2$ _____

7. $c + 3 = 9$ _____

8. $17 = 11 + k$ _____

Solve each equation.

9. $z + 8 = 2$ **10.** $3 = -7 + r$ **11.** $-9 = g - 14$

Remember What You Learned

12. Write two addition and two subtraction equations of your own. Trade your equations with a partner and solve. Explain to each other the method you used to solve the equations.

1-10 Lesson Reading Guide

6AF1.1

Solving Multiplication and Division Equations

Get Ready for the Lesson

**Read the introduction at the top of page 70 in your textbook.
Write your answers below.**

1. If d represents the number of days the bamboo has been growing, write a
   multiplication equation you could use to find how long it would take for
   the bamboo to reach a height of 210 inches.

Read the Lesson

Complete each sentence.

2. To solve $3x = 51$, _____ each side by 3.

3. To solve $\dfrac{b}{-2} = 4$, _____ each side by -2.

4. To solve $-65 = -5t$, _____ each side by -5.

5. To solve $-7 = \dfrac{d}{6}$, _____ each side by 6.

Explain how to solve each equation.

6. $\dfrac{u}{6} = 13$ _____

7. $-2c = -14$ _____

8. $64 = 16k$ _____

Solve each equation.

9. $8r = 32$ 10. $3 = \dfrac{x}{7}$ 11. $-9 = -9g$

Remember What You Learned

12. Write two multiplication and two division equations of your own. Trade
    your equations with a partner and solve. Explain to each other the
    method you used to solve the equations.

2-1   # Lesson Reading Guide

Rational Numbers

Get Ready for the Lesson

Read the introduction at the top of page 84 in your textbook. Write your answers below.

1. What fraction of the sites are in the United States?

2. What fraction of the sites are in Canada?

3. At what fraction of the sites might you see gray whales?

4. What fraction of the humpback viewing sites are in Mexico?

Read the Lesson

5. Explain the difference in meaning between the expressions $4\frac{3}{4}$ and $4\left(\frac{3}{4}\right)$.

6. Explain the difference between the numbers $2.5\overline{7}$ and $2.\overline{57}$.

Remember What You Learned

7. Notice that the first five letters of the word *rational* is the word *ratio*. Explain what a ratio is. If this term is not familiar to you, look it up in the dictionary. Write a ratio and a rational number. Explain how they are related.

Lesson 2-1

2-2 Lesson Reading Guide

7NS1.1

Comparing and Ordering Rational Numbers

Get Ready for the Lesson

Read the introduction at the top of page 91 in your textbook. Write your answers below.

1. Do we recycle more or less than half of the paper we produce? Explain.

2. Do we recycle more or less than half of the aluminum cans? Explain.

3. Which items have a recycle rate less than one half?

4. Which items have a recycle rate greater than one half?

5. Using this estimation method, can you order the rates from least to greatest?

Read the Lesson

6. Read Example 4 on page 93. Explain how to use a number line to determine which of two rational numbers is the lesser number.

For Exercises 7 and 8, graph each pair of rational numbers on a number line. Then identify the lesser number.

7. $\frac{1}{5}, \frac{1}{3}$

8. $-\frac{4}{5}, -\frac{9}{10}$

Remember What You Learned

9. Order the numbers $\frac{3}{7}, \frac{3}{5}, \frac{3}{8}, \frac{3}{4}$, and $\frac{3}{11}$ from least to greatest. Then write a rule that helps you compare two positive fractions with the same numerator.

Lesson 2-2

2-3 Lesson Reading Guide

7NS1.2, 7MG1.3

Multiplying Positive and Negative Fractions

Get Ready for the Lesson

Complete the Mini Lab at the top of page 96 in your textbook.
Write your answers below.

1. What is the product of $\frac{1}{3}$ and $\frac{2}{5}$?

2. Use an area model to find each product.

    a. $\frac{3}{4} \cdot \frac{1}{2}$ **b.** $\frac{2}{5} \cdot \frac{2}{3}$ **c.** $\frac{1}{4} \cdot \frac{3}{5}$ **d.** $\frac{2}{3} \cdot \frac{4}{5}$

3. What is the relationship between the numerators of the factors and the numerator of the product?

4. What is the relationship between the denominators of the factors and the denominator of the product?

Read the Lesson

5. What is the greatest common factor of two numbers?

6. How is the greatest common factor used when multiplying fractions?

7. How is *dimensional analysis* defined on page 98 in your textbook?

8. How is dimensional analysis used in Example 5 on page 98 in your textbook?

Remember What You Learned

9. If you were to visit Europe, you may need to exchange some of your money for Euros. The *exchange rate* tells you how many dollars equals how many Euros. How would you use dimensional analysis to compute the number of Euros you would get from $50?

Lesson 2-3

2-4 **Lesson Reading Guide**

7NS1.2, 7MG1.3

Dividing Positive and Negative Fractions

Get Ready for the Lesson

**Read the introduction at the top of page 102 in your textbook.
Write your answers below.**

1. Find the value of $110 \div 4$.

2. Find the value of $110 \cdot \frac{1}{4}$.

3. Compare the values of $110 \div 4$ and $110 \cdot \frac{1}{4}$.

4. What can you conclude about the relationship between dividing by 4 and multiplying by $\frac{1}{4}$?

Read the Lesson

5. Describe the process for finding the multiplicative inverse of a mixed number.

For Exercises 6–9, write the multiplicative inverse of each mixed number.

6. $2\frac{1}{5}$ **7.** $-1\frac{3}{8}$ **8.** $3\frac{4}{7}$ **9.** $5\frac{5}{9}$

10. Explain how to divide by a fraction.

11. Look at your answers for Exercises 6 and 10 above. How do you divide a number by $2\frac{1}{5}$?

Remember What You Learned

12. Look up the word *invert* in the dictionary. Draw a simple picture and then invert it. Explain how this helps you remember how to divide fractions.

Lesson 2-4

2-5 Lesson Reading Guide

Adding and Subtracting Like Fractions

Lesson 2-5

Get Ready for the Lesson

Read the introduction at the top of page 108 in your textbook. Write your answers below.

1. What is the sum of the whole-number parts of the amounts?

2. How many $\frac{1}{3}$ cups are there?

3. Can you combine these ingredients in a 4-cup mixing bowl? Explain.

Read the Lesson

4. Define *like fractions*.

For Exercises 5–8, determine whether each pair of fractions are like fractions.

5. $\frac{3}{5}, \frac{3}{7}$

6. $\frac{5}{8}, \frac{7}{8}$

7. $\frac{4}{7}, -\frac{5}{7}$

8. $\frac{5}{9}, -\frac{2}{3}$

9. Explain how to add like fractions.

10. Explain how to subtract like fractions.

Add or subtract. Write in simplest form.

11. $\frac{3}{5} + \frac{1}{5}$

12. $\frac{5}{8} + \frac{7}{8}$

13. $\frac{5}{9} - \frac{2}{9}$

14. $\frac{4}{7} - \frac{5}{7}$

Remember What You Learned

15. Talk with a partner about the word *like*. What does it usually mean? How is this different from the way it is used in the lesson?

33

2-6 **Lesson Reading Guide**

7NS1.2, 7NS2.2

Adding and Subtracting Unlike Fractions

Get Ready for the Lesson

Read the introduction at the top of page 114 in your textbook. Write your answers below.

   1. What are the denominators of the fractions?

   2. What is the least common multiple of the denominators?

   3. Find the missing value in $\frac{1}{4} = \frac{?}{8}$.

Read the Lesson

   4. What do *LCM* and *LCD* stand for? Give a definition for each.

Find the LCM of each pair of numbers.

   5. 2, 3   **6.** 4, 6   **7.** 5, 10   **8.** 9, 12

Find the LCD of each pair of fractions.

   9. $\frac{3}{5}, \frac{3}{7}$ **10.** $\frac{5}{8}, \frac{7}{12}$ **11.** $\frac{4}{7}, -\frac{5}{7}$ **12.** $\frac{5}{9}, -\frac{2}{3}$

   13. Explain how to add or subtract unlike fractions.

Rewrite each sum or difference in terms of like fractions. Then add or subtract. Write in simplest form.

   14. $\frac{3}{5} + \frac{1}{2}$ **15.** $\frac{3}{4} + \frac{7}{8}$ **16.** $\frac{5}{9} - \frac{2}{3}$

   17. $\frac{4}{7} - \frac{1}{2}$ **18.** $\frac{3}{5} + \frac{3}{7}$ **19.** $\frac{5}{8} - \frac{7}{12}$

Remember What You Learned

   20. Describe what the prefix *un-* usually means when it appears in front of a word. How does this meaning relate to unlike fractions?

Lesson 2-6

2-7 Lesson Reading Guide

7AF1.1, 7NS1.2

Solving Equations with Rational Numbers

Lesson 2-7

Get Ready for the Lesson

Read the introduction at the top of page 119 in your textbook. Write your answers below.

1. Multiply each side of the equation by 6. Then divide each side by 5. Write the result.

2. Multiply each side of the original equation by the multiplicative inverse of $\frac{5}{6}$. Write the result.

3. What is the speed of a grizzly bear?

4. Which method of solving the equation seems most efficient?

Read the Lesson

5. Match the method of solving with the appropriate equation.

   $1.25a = 3.75$ _____   **a.** Subtract $\frac{3}{5}$ from each side.

   $x + 1.25 = 5.25$ _____   **b.** Multiply each by $\frac{5}{3}$.

   $\frac{3}{5}m = \frac{7}{10}$ _____   **c.** Add 1.25 to each side.

   $r - 1.25 = 4.5$ _____   **d.** Divide each side by 1.25.

   $\frac{3}{5} + f = \frac{1}{2}$ _____   **e.** Subtract 1.25 from each side.

Explain in words how to solve each equation.

6. $\frac{y}{3.2} = 1.1$

7. $\frac{3}{8} + v = \frac{7}{12}$

Remember What You Learned

8. The description of a problem often has more information than you need to design an equation and solve it. Describe the process of writing an equation to solve a problem.

2-9 Lesson Reading Guide

7NS1.2, 7NS2.1, 7AF2.1

Powers and Exponents

Get Ready for the Lesson

Read the introduction at the top of page 126 in your textbook. Write your answers below.

1. How many 2s are multiplied to determine the number of great grandparents? great-great grandparents?

Read the Lesson

2. Define the terms *base*, *exponent*, and *power*.

For Exercises 4–6, identify the base, exponent, and power in each expression.

3. 5^4

4. 7^{-2}

5. x^8

6. Explain in words what 5^4 means.

Rewrite each expression using multiplication instead of an exponent.

7. 5^4　　　　　　　　8. 9^5　　　　　　　　9. c^8

Evaluate each expression.

10. 5^4　　　　11. 9^5　　　　12. 6^3　　　　13. 2^8

Remember What You Learned

14. Notice that $4^{-3} = \frac{1}{4^3}$. A power with a negative exponent is not negative.

Write a true sentence using the terms *negative exponent*, *power*, *positive*, and *rational*.

2-10 Lesson Reading Guide

Scientific Notation

7NS1.1

Get Ready for the Lesson

Read the introduction at the top of page 130 in your textbook.
Write your answers below.

1.

Expression	Product
$8.7 \times 10^1 = 8.7 \times 10$	87
$8.7 \times 10^2 = 8.7 \times 100$	
$8.7 \times 10^3 = 8.7 \times$	

Expression	Product
$8.7 \times 10^{-1} = 8.7 \times \dfrac{1}{10}$	0.87
$8.7 \times 10^{-2} = 8.7 \times \dfrac{1}{100}$	
$8.7 \times 10^{-3} = 8.7 \times$	

2. If 8.7 is multiplied by a positive power of 10, what relationship exists between the decimal point's new position and the exponent?

3. When 8.7 is multiplied by a negative power of 10, how does the new position of the decimal point relate to the negative exponent?

Read the Lesson

4. How can you tell that a number is in standard form?

Identify each positive number as either very large or very small.

5. 9,245,000

6. 0.00083986

7. 0.0000003

8. 1,000,000,000

For each pair of numbers, determine how many places the decimal has moved and whether the exponent of the original would be *positive* or *negative* in scientific notation.

9. $0.00037 \rightarrow 3.7$

10. $185,000 \rightarrow 1.85$

Write each number in scientific notation.

11. 8,790,000

12. 0.0000125

13. 0.00899

14. 402,500,000

Remember What You Learned

15. Work with a partner. One person should explain how to write a very large number in scientific notation. The other person should explain how to write a very small number in scientific notation.

Lesson 2-10

3-1 Lesson Reading Guide

7NS2.4

Square Roots

Get Ready for the Lesson

Complete the Mini Lab at the top of page 144 in your textbook. Write your answers below.

1. Copy and complete the following table.

Tiles on a Side	1	2	3	4	5
Total Number of Tiles in the Square Arrangement	1	4			

2. Suppose a square arrangement has 36 tiles. How many tiles are on a side?

3. What is the relationship between the number of tiles on a side and the number of tiles in the arrangement?

Read the Lesson

4. The opposite of _____ is finding one of two equal factors of a number.

5. Explain how you know whether a square root is the principal square root or not.

6. To solve an equation in which one side of the equation is a squared term, what can you do to each side of the equation?

Remember What You Learned

7. Given enough time and enough tiles, how might you go about determining whether a whole number is a perfect square?

Lesson 3–1

3-2 Lesson Reading Guide

Estimating Square Roots

Get Ready for the Lesson

Complete the Mini Lab at the top of page 148 in your textbook.
Write your answers below.

1. Place your square on the number line. Between what two consecutive whole numbers is $\sqrt{8}$, the side length of the square, located?

2. Between what two perfect squares is 8 located?

3. Estimate the length of a side of the square. Verify your estimate by using a calculator to compute the value $\sqrt{8}$.

Use grid paper to determine between which two consecutive whole numbers each value is located.

4. $\sqrt{23}$ 5. $\sqrt{52}$

6. $\sqrt{27}$ 7. $\sqrt{18}$

Read the Lesson

8. Explain how you can estimate the square root of a number if you know perfect squares greater than and less than the number.

For Exercises 9–12, estimate to the nearest whole number.

9. $\sqrt{33}$ 10. $\sqrt{71}$

11. $\sqrt{114}$ 12. $\sqrt{211}$

13. Read Example 3 on page 149 of your textbook. What is a "golden rectangle"?

Remember What You Learned

14. Draw a triangle and label its sides. (Make sure your triangle is a real triangle. For example, sides of lengths 2, 2 and 8 do not make a triangle.) Trade triangles with a partner and estimate the area of your triangles using Heron's Formula.

3-4 Lesson Reading Guide

7NS1.4

The Real Number System

Get Ready for the Lesson

Read the introduction at the top of page 155 in your textbook. Write your answers below.

1. The length of the court is 60 feet. Is 60 a rational number? Explain.

2. The distance from the net to the rear spikers line is $7\frac{1}{2}$ feet. Is $7\frac{1}{2}$ a rational number? Explain.

3. The diagonal across the court is $\sqrt{4,500}$ feet. Can this square root be written as a rational number? Explain.

Read the Lesson

4. What do rational and irrational numbers have in common? What is the difference between rational numbers and irrational numbers? Give an example of each.

5. Match the property of real numbers with the algebraic example.

Commutative _____   **a.** $(x + y) + z = x + (y + z)$

Associative _____   **b.** $pq = qp$

Distributive _____   **c.** $h + 0 = h$

Identity _____   **d.** $c + (-c) = 0$

Inverse _____   **e.** $x(y + z) = xy + xz$

Remember What You Learned

6. Think of a way to remember the relationships between the sets of numbers in the real number system. For example, think of a rhyme that tells the order of the sets of numbers from smallest to largest.

Lesson 3-4

3-5 Lesson Reading Guide

7MG3.3, 7MR3.2

The Pythagorean Theorem

Get Ready for the Lesson

Complete the Mini Lab at the top of page 162 in your textbook. Write your answers below.

1. What is the relationship between the values in the $H^2 + B^2$ column and the values in the L column?

2. How could you use a value in the $H^2 + B^2$ column to find a corresponding value in the L column?

Read the Lesson

3. Is it possible to have a right triangle for which the Pythagorean Theorem is *not* true?

4. If you know the lengths of two of the sides of a right triangle, how can you find the length of the third side?

Use the Pythagorean Theorem to determine whether each of the following measures of the sides of a triangle are the sides of a right triangle.

5. 4, 5, 6

6. 9, 12, 15

7. 10, 24, 26

8. 5, 7, 9

Remember What You Learned

9. In everyday language, a *leg* is a limb used to support the body. How does this meaning relate to the legs of a right triangle?

3-6 Lesson Reading Guide

Using the Pythagorean Theorem

Get Ready for the Lesson

Read the introduction at the top of page 167 in your textbook. Write your answers below.

1. What type of triangle is formed by the horizontal distance, the vertical height, and the length of the towrope?

2. Write an equation that can be used to find the length of the towrope.

Read the Lesson

Determine whether each of the following is a Pythagorean triple.

3. 13-84-85   **4.** 11-60-61

5. 21-23-29   **6.** 12-25-37

7. The triple 8-15-17 is a Pythagorean triple. Complete the table to find more Pythagorean triples.

	a	b	c	Check: $c^2 = a^2 + b^2$
original	8	15	17	$289 = 64 + 225$
× 2				
× 3				
× 5				
× 10				

8. If the sides of a square are of length s, how can you find the length of a diagonal of the square?

Remember What You Learned

9. Work with a partner. Write a word problem that can be solved using the Pythagorean Theorem, including the art. Exchange problems with your partner and solve.

3-7 Lesson Reading Guide

Distance on the Coordinate Plane

Get Ready for the Lesson

Read the introduction at the top of page 173 in your textbook. Write your answers below.

1. What does each colored line on the graph represent?

2. What type of triangle is formed by the lines?

3. What are the lengths of the two red lines?

Read the Lesson

4. On the coordinate plane, what are the four sections determined by the axes called?

5. Match each term of the coordinate plane with its description.

ordinate _____   **a.** point where number lines meet

y-axis _____   **b.** x-coordinate

origin _____   **c.** y-coordinate

abscissa _____   **d.** vertical number line

x-axis _____   **e.** horizontal number line

6. To find the distance between two points, draw a right triangle whose hypotenuse is the distance you want to find; find the lengths of the legs, and use _____ to solve the problem.

Remember What You Learned

7. Think of a way to remember the names of the four quadrants of the coordinate plane.

4-1 Lesson Reading Guide

Ratios and Rates

Get Ready for the Lesson

**Read the introduction at the top of page 190 in your textbook.
Write your answers below.**

1. To make the batch of trail mix, how many scoops of raisins should you use for every 1 scoop of peanuts? Explain your reasoning.

Read the Lesson

2. What does it mean if the ratio of red marbles to blue marbles is 3 to 5?

3. What is another way to write the ratio *3 to 5*?

4. What must you do before you can simplify the ratio *30 minutes to 8 hours*? What is the simplified ratio?

Remember What You Learned

5. When you go to a bank to exchange money of one currency for another, the bank uses a conversion rate to calculate the amount of money in the new currency. Find out what the current conversion rate is to exchange U.S. dollars to Canadian dollars at a local bank. Then write the rate as a ratio of one currency compared to the other.

Lesson 4–1

4-2 Lesson Reading Guide

Proportional and Nonproportional Relationships

Get Ready for the Lesson

Read the introduction at the top of page 194 in your textbook.
Write your answers below.

1. Complete the table shown to determine the cost for different-sized orders.

Pizzas Ordered	1	2	3	4
Cost of Order ($)	8			

2. Express the relationship between the cost of an order and number of pizzas ordered for each set of values as a ratio in simplest form. What do you notice?

Read the Lesson

3. At Better Shirts, an order of 10 printed T-shirts is $45 and an order of 250 printed T-shirts is $875. What must you do before you can compare the ratios to see if they are proportional?

4. What must be true in order for the ratios to be proportional?

5. What are the simplified ratios for the T-shirt orders? Are the ratios proportional or nonproportional?

Remember What You Learned

6. A delivery service charges $7 per package delivered locally. There is also a $2 service charge for registering an order of packages for any number of packages. Create a table to show what the costs of sending 1, 2, 3, and 4 packages are, using the service. Is the relationship between total cost and number of packages proportional or nonproportional? Explain your reasoning.

4-3 Lesson Reading Guide

7AF4.2

Solving Proportions

Get Ready for the Lesson

**Read the introduction at the top of page 198 in your textbook.
Write your answers below.**

1. Write a ratio in simplest form that compares the number of Calories from fat to the total number of Calories.

2. Suppose you plan to eat two such granola bars. Write a ratio comparing the number of Calories from fat to the total number of Calories.

3. Is the ratio of Calories from fat proportional to the total number of Calories for one and two bars? Explain your reasoning.

Read the Lesson

4. Complete the sentence: If two ratios form a proportion, then the ratios are said to be _____.

5. Do the ratios $\frac{a}{b}$ and $\frac{c}{d}$ always form a proportion? Why or why not?

6. Explain how you can use cross products to solve proportions in which one of the terms is not known.

Remember What You Learned

7. For the proportion $\frac{a}{b}$ and $\frac{c}{d}$, why do you think the products ad and bc are called *cross products*?

4-5 Lesson Reading Guide

Similar Polygons

Get Ready for the Lesson

Complete the Mini Lab at the top of page 206 in your textbook. Write your answers below.

1. Compare the angles of the triangles by matching them up. Identify the angle pairs that have equal measure.

2. Express the ratios $\frac{DF}{LK}$, $\frac{EF}{JK}$, and $\frac{DE}{LJ}$ to the nearest tenth.

3. What do you notice about the ratios of the matching sides of matching triangles?

Read the Lesson

4. Complete the sentence: If two polygons are similar, then their corresponding angles are _____, and their corresponding sides are _____.

5. If two polygons have corresponding angles that are congruent, does that mean that the polygons are similar? Why or why not?

6. If the sides of one square are 3 centimeters and the sides of another square are 9 centimeters, what is the ratio of corresponding sides from the first square to the second square?

Remember What You Learned

7. Look up the everyday definition of the word *similar* in a dictionary. How does the definition relate to what you learned in this lesson?

Lesson 4–5

4-6 Lesson Reading Guide

Converting Measures

Get Ready for the Lesson

**Read the introduction at the top of page 213 in your textbook.
Write your answers below.**

1. One meter is a little longer than 1 yard. Estimate the distance in yards of the 100-meter dash.

2. There are approximately 3.28 feet in 1 meter. What is the distance in feet of the 100-meter dash?

3. Compare your answers to Questions 1 and 2. Are they reasonable? Explain.

Read the Lesson

4. A _____ is a ratio in which the denominator is 1 unit and is equivalent to the numerator.

5. In order to convert from a larger unit to a smaller unit, _____ the larger unit by the appropriate unit ratio to find the new measurement.

6. Explain why you need to multiply by the *reciprocal* of the appropriate unit ratio in order to convert from smaller units to larger units.

Remember What You Learned

7. When you are following a recipe, sometimes the measurements are given in metric units. If the only materials you have to measure are in customary units, how might you find the correct amount of each item to complete the recipe?

4-7 **Lesson Reading Guide**

Converting Square and Cubic Units of Measure

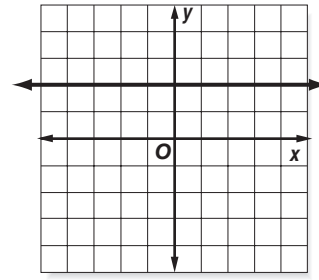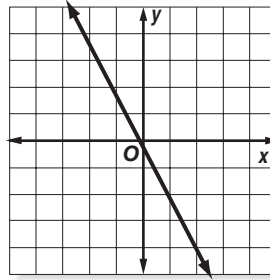## Get Ready for the Lesson

Read the introduction at the top of page 220 in your textbook. Write your answers below.

1. Look at one face of a puzzle cube. How many cubes are there along each edge? How many squares are there on one face?

2. Suppose the puzzle cube is made of 3 layers with 9 small cubes in each layer. How many small cubes are there in all?

3. What is the relationship between the number of cubes along each edge and the number of squares on one face? between the number of cubes along each edge and the total number of small cubes?

Read the Lesson

4. What is the difference in the unit notation for area and volume?

5. How would you convent 3 square yards to square feet?

6. If you need to convert cubic inches to a metric unit, what is the closest unit of measurement to convert to?

Remember What You Learned

7. You are going to buy wall paper to put on the walls in your bedroom. You know that you need to buy 369 square feet of wall paper to cover the walls, but the store only sells wall paper in square yards. How many square yards of wallpaper do you need to buy?
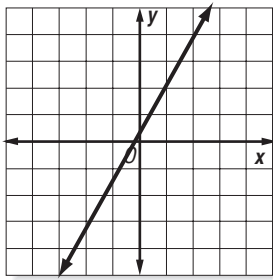
4-8 Lesson Reading Guide

Scale Drawings and Models

7MG1.2

Get Ready for the Lesson

Read the introduction at the top of page 224 in your textbook. Write your answers below.

1. How many units wide is the room?

2. The actual width of the room is 18 feet. Write a ratio comparing the drawing width to the actual width.

3. Simplify the ratio you found and compare it to the scale shown at the bottom of the drawing.

Read the Lesson

4. Give another example of a scale drawing or scale model that is different from the examples of scale drawings and scale models given on page 220 in your textbook.

5. Complete the sentence: distances on a scale model are _____ to distances in real life.

6. What is the scale factor for a model if part of the model that is 4 inches corresponds to a real-life object that is 16 inches?

Remember What You Learned

7. Make a scale drawing of a room, such as your classroom or your bedroom. Select an appropriate scale so that your drawing is a reasonable size. Be sure to indicate your scale on your drawing. Use another piece of paper if necessary.

4-9 **Lesson Reading Guide**

Rate of Change

Get Ready for the Lesson

**Read the introduction at the top of page 230 in your textbook. Write your answers below.**

1. What is the change in the number of entries from 2004 to 2006?

2. Over what number of years did this change take place?

3. Write a rate that compares the change in the number of entries to the change in the number of years. Express your answer as a unit rate and explain its meaning.

Read the Lesson

4. What does a rate of change measure on a graph?

5. On a graph, what does it mean when a rate of change is negative?

6. Complete the sentence: When a quantity does not change over a period of time, it is said to have a _____ rate of change.

Remember What You Learned

7. Write out in words the formula for finding a rate of change between two data points (x_1, y_1) and (x_2, y_2).

Lesson 4–9

4-10 Lesson Reading Guide

Section Title

Get Ready for the Lesson

Read the introduction at the top of page 236 in your textbook. Write your answers below.

1. Pick several pairs of points from those plotted and find the rate of change between them. What is true of these rates?

Read the Lesson

2. The rate of change between two points on a line can be negative, positive, or zero. Label each of the following graphs as negative, positive, or zero.

Remember What You Learned

3. A linear relationship is defined as having a constant rate of change between any two points along the line. Look at the following points and determine if they have a linear relationship: (0,0), (1,2), (3,5), (4,9), (5,15).

Lesson 4–10

5-1 Lesson Reading Guide

7NS1.3

Ratios and Percents

Get Ready for the Lesson

Read the introduction at the top of page 252 in your textbook.
Write your answers below.

1. Name two states from the table that have ratios in which the second numbers are the same.

2. How can you determine which of the four states has the greatest ratio of people under 18 to total population?

Read the Lesson

3. How is *percent* defined on page 252 of your textbook?

For Exercises 5 and 6, use the grid at the right.

4. Describe how the grid at the right can be used to represent percents.
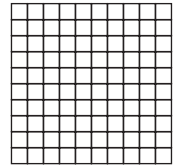
5. Fill in the grid to represent 55%.

6. What ratio is represented by each grid? How do the two ratios compare to each other? What percent do they represent?
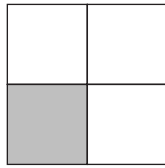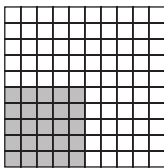
Remember What You Learned

7. Work with a partner. Make up a silly statement involving a ratio, for example, "4 out of 5 of the diddlewads were goraks." Your partner writes the ratio as a fraction and a percent. Then your partner makes up a different percent and you write the percent as a fraction in simplest form. Start again with your partner making up a silly ratio statement this time.

Lesson 5–1

5-2 **Lesson Reading Guide**   7NS1.1, 7NS1.3

Comparing Fractions, Decimals, and Percents

Get Ready for the Lesson

**Read the introduction at the top of page 256 in your textbook.
Write your answers below.**

1. Write each percent as a fraction. Do not simplify the fractions.

2. Write each fraction in Question 1 as a decimal.

3. How could you write a percent as a decimal without writing the percent as a fraction first?

Read the Lesson

Complete each sentence.

4. To write a decimal as a percent, _____ by 100 and add the percent symbol.

5. To write a percent as a decimal, _____ by 100 and remove the percent symbol.

6. Dividing by 100 is the same as moving the decimal point two places to the _____.

7. Multiplying by 100 is the same as moving the decimal point two places to the _____.

Determine whether each expression represents changing from a decimal to a percent or a percent to a decimal.

8. 0.435   _____

9. 14.5   _____

10. 33.60   _____

11. 07.819   _____

Remember What You Learned

12. Work with a partner. Pretend your partner has not studied this lesson. On a piece of paper, write a percent and a decimal using different numbers. Teach your partner how to write a percent as a decimal and how to write a decimal as a percent. Be sure to show how to place the decimal point.

Lesson 5–2

5-3 Lesson Reading Guide

Algebra: The Percent Proportion

Get Ready for the Lesson

Complete the Mini Lab at the top of page 263 in your textbook. Write your answers below.

1. What is 40% of 5?

2. 4 is 80% of what number?

3. Draw a model and find what percent 7 is of 20.
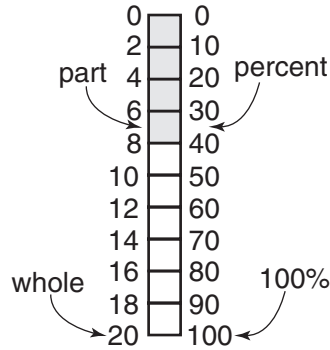
Read the Lesson

4. Look at page 263 in your textbook. Fill in the blanks to complete the percent proportion.

—————— =

5. Complete the table for each statement or problem. For a quantity that needs to be found, put a question mark in the appropriate column.

a. 14 is 20% of 70.
b. 6% of 40 is 2.4
c. 13 out of 25 is 52%
d. What is 30% of 65?
e. Find 41% of 250.
f. What percent of 25 is 18?

part	whole	percent

Remember What You Learned

6. Use a clean sheet of paper and Examples 1–3 on pages 263 and 264 in your textbook. Starting with Example 1, cover up everything in the example with your paper except the title and its question. Now try to work the problem without looking at the book. Then compare your work to the work in the book. Repeat this with the other two examples.

5-4 Lesson Reading Guide

7NS1.3

Finding Percents Mentally

Get Ready for the Lesson

Read the introduction at the top of page 268 in your textbook.
Write your answers below.

1. 50% of the eighth grade class are girls. How could you find 50% of 104 mentally?

2. Use mental math to find the number of girls in the eighth grade class.

3. 25% of the sixth grade class play basketball. Use mental math to find the number of students in the sixth grade who play basketball.

Read the Lesson

4. Complete the following table.

Percent	Fraction	Decimal
25%		
	$\frac{1}{10}$	

Complete each statement.

5. 40% of 25 = _____ of 25 or 10

6. _____ of 36 = $\frac{1}{4}$ of 36 or 9

7. $66\frac{2}{3}$% of 48 = _____ of 48 or 32

8. _____ of 89 = 0.1 of 89 or 8.9

Remember What You Learned

9. Work alone or with a partner. Look at the Percent-Fraction Equivalents table at the bottom of page 268 in your textbook. Create your own table on a sheet of paper or poster paper. Underneath each equivalent percent and fraction, write an example in which knowing the fraction helps you find the percent mentally.

5-6 Lesson Reading Guide

7NS1.3

Percent and Estimation

Get Ready for the Lesson

Read the introduction at the top of page 275 in your textbook. Write your answers below.

1. Round the total area of Earth to the nearest hundred million square miles.

2. Round the percent of Earth that is land to the nearest ten percent.

3. Use mental math in to estimate the area of the land on Earth.

Read the Lesson

4. What are compatible numbers?

5. Are $\frac{1}{8}$ and 56 compatible numbers? Explain.

6. Are $\frac{6}{7}$ and 32 compatible numbers? Explain.

Remember What You Learned

Describe how to estimate the following using compatible numbers.

7. 65% of 64

8. 18 out of 59 is what percent

5-7 Lesson Reading Guide

Algebra: The Percent Equation

7NS1.3, 7NS1.7

Get Ready for the Lesson

Read the introduction at the top of page 279 in your textbook.
Write your answers below.

1. Use a percent proportion to find the area of water in New York.

2. Express the percent for New York as a decimal. Multiply the total area of New York by this decimal.

3. How are the answers for Exercises 1 and 2 related?

Read the Lesson

4. What is the *percent equation?*

Write each percent proportion as a percent equation.

5. $\dfrac{16}{64} = \dfrac{25}{100}$ _____

6. $\dfrac{x}{14} = \dfrac{2}{100}$ _____

7. $\dfrac{96}{b} = \dfrac{48}{100}$ _____

8. $\dfrac{13}{100} = \dfrac{p}{675}$ _____

Remember What You Learned

9. Write the percent equation in its three forms. Then choose the best form to find the total price of a jacket after sales tax. Use the sales tax percent for where you live. Find out or estimate to the nearest whole number what you think a jacket will cost where you live.

5-8 Lesson Reading Guide

Percent of Change

7NS1.6, 7NS1.7

Get Ready for the Lesson

Read the introduction at the top of page 284 in your textbook. Write your answers below.

1. How much did the price increase from 1930 to 1940?

2. Write the ratio $\frac{\text{amount of increase}}{\text{price in 1930}}$. Then write the ratio as a percent.

3. How much did the price increase from 1940 to 1950? Write the ratio $\frac{\text{amount of increase}}{\text{price in 1940}}$. Then write the ratio as a percent.

4. How much did the price increase from 1950 to 1960? Write the ratio $\frac{\text{amount of increase}}{\text{price in 1950}}$. Then write the ratio as a percent.

5. **MAKE A CONJECTURE** Why are the amounts of increase the same but the percents are different?

Read the Lesson

6. Explain the relationship between selling price and markup.

Remember What You Learned

7. When a book has many new terms or ideas, you can sometimes make an outline or concept map to help you understand the information. Read about the new terms on page 284 and the ones just before each example on pages 285 and 286. Then complete the concept map below using these words: discount, more than, new amount, markup, decrease, increase.

```
                    Percent of Change
              ┌──────────┴──────────┐
    _____ is less than          _____ is _____
    the original amount          the original amount
              │                        │
      percent of _____          percent of _____
              │                        │
        Example: _____           Example: _____
```
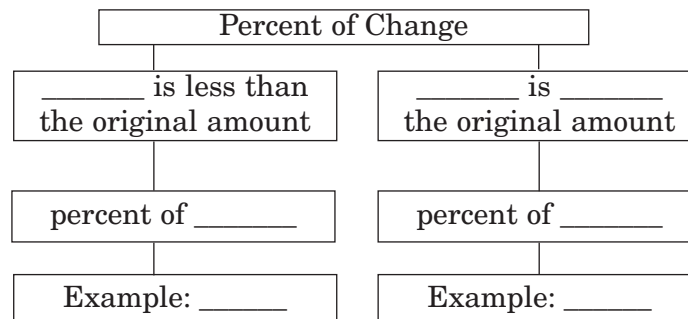
Lesson 5–8

5-9 Lesson Reading Guide

Percent of Change

Get Ready for the Lesson

**Read the introduction at the top of page 290 in your textbook.
Write your answers below.**

1. If Hector puts his money in a savings account, he will receive 2.5% of $1,000 in interest for one year. Find the interest Hector will receive.

2. Compare the interest Hector can receive in one year from a money market and from a certificate of deposit.

Read the Lesson

3. Look up the word *interest* in a dictionary. Read some of the different definitions. Find and write a definition that seems to match the topic in your textbook.

4. Read the paragraph just below the activity on page 290 in your textbook. What is the difference between how interest is applied to a customer for a savings account and for a credit card?

5. The words *principle* and *principal* are often confused. Look up both words in a dictionary. Which word would you use to describe the person in charge of your school and also the money invested or borrowed? Which word would you use to describe a rule of conduct?

Remember What You Learned

6. Find out about what interest rate a bank near you pays on a savings account and what interest rate it charges on a credit card. Compute how much interest you would earn on $600 after 2 years. Then compute how much interest you would have to pay on a credit card if you borrowed $600 for 2 years.

6-1 **Lesson Reading Guide**

Line and Angle Relationships

Get Ready for the Lesson

**Read the introduction at the top of page 306 in your textbook.
Write your answers below.**

1. Suppose that the measure of angles 2 and 4 are each 60°. Using angle relationships you have previously learned, or a protractor, find and record the measure of each numbered angle. Explain your reasoning.

2. Congruent angles are angles that have the same measure. Describe the pairs of angles that appear to be congruent.

3. In your drawing, what do you notice about the measure of angles that are side by side?

Read the Lesson

4. Match the model with its name. Put the correct letter on the line.

←•————•→ _____	**a.** Point
•————→ _____	**b.** Line Segment
∠ _____	**c.** Line
•————• _____	**d.** Ray
• _____	**e.** Angle

Remember What You Learned

Fill in the blanks to answer questions 5 and 6.

5. Two angles are complimentary if the sum of their measure is _____.

6. Two angles are supplementary if the sum of their measure is _____.

Lesson 6–1

6-3 **Lesson Reading Guide**

7MR3.3, 7AF1.1

Polygons and Angles

Get Ready for the Lesson

Read the introduction at the top of page 316 in your textbook. Write your answers below.

1. Predict the number of triangles and the sum of the angle measures in a polygon with 8 sides.

2. Write an algebraic expression that could represent the number of triangles in an n-sided polygon. Then write an expression to represent the sum of the angle measures in an n-sided polygon.

Read the Lesson

3. How many triangles would be in a 12-sided polygon?

4. Why do you think that you need to subtract 2 from the number of sides?

5. What do you call the angles that lie inside a polygon?

Remember What You Learned

6. The outside walls of a sports stadium create a giant regular 60-sided figure. Write an equation to find the number of triangles inside the figure. Then write and solve an equation to find the sum of the interior angles of the figure.

Lesson 6–3

6-4 **Lesson Reading Guide**

Congruent Polygons

Get Ready for the Lesson

**Read the introduction at the top of page 320 in your textbook.
Write your answers below.**

   1. How many different triangles are shown in the *Winter Stars* quilt?
   Explain your reasoning and draw each triangle.

   2. Copy the quilt and label all matching triangles with the same number,
   starting with 1.

Read the Lesson

   3. What does it mean for two angles to be congruent?

   4. What does it mean for two polygons to be congruent?

   5. What does congruence mean in your own words?

Remember What You Learned

   6. Make a simple drawing of the front of a house. Include at least two pairs
   of congruent polygons in your drawing. Then write a sentence describing
   the congruent polygons.

Lesson 6–4

6-5 Lesson Reading Guide

Symmetry

Get Ready for the Lesson

Complete the Mini Lab at the top of page 327 in your textbook. Write your answers below.

1. Draw a line through the center of the pentagon. Then fold your paper across this line. What do you notice about the two halves?

2. Are there other lines you can draw that will produce the same result? If so, how many?

3. Place the transparency over the outline on your tracing paper. Use your pencil point at the center of the pentagon to hold the transparency in place. How many times can you rotate the transparency from its original position so that the two figures match?

4. Find the first angle of rotation by dividing 360° by the number of times the figures matched.

5. List the other angles of rotation by adding the measure of the first angle of rotation to the previous angle measure. Stop when you reach 360°.

Read the Lesson

6. What is a line of symmetry?

7. What does it mean to rotate a figure?

8. After a 360° rotation about its center, a figure looks exactly as it does in its original position. Does this mean that the figure has rotational symmetry? Explain.

Remember What You Learned

9. Name two everyday things that have rotational symmetry. Explain how you know these items have rotational symmetry.

6-6 Lesson Reading Guide

7MG3.2

Reflections

Get Ready for the Lesson

**Read the introduction at the top of page 332 in your textbook.
Write your answers below.**

1. Compare the shape and size of the bird to its image in the water.

2. Compare the perpendicular distance from the water line to each of the points shown. What do you observe?

3. The points *A*, *B*, and C appear *counterclockwise* on the bird. How are these points oriented on the bird's image?

Read the Lesson

For Exercises 4–7, read the Concept Summary information on page 330 in your textbook and refer to the graph at the right that shows quadrilaterals *ABCD* and *A´B´C´D´* and a line.
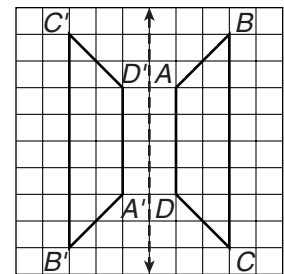
4. Find the distance of each vertex from the given line. Are corresponding vertices, such as *A* and *A´*, the same distance from the line?

5. Are quadrilaterals *ABCD* and *A´B´C´D´* congruent? Explain.

6. Do the vertices *A*, *B*, *C*, and *D* appear clockwise or counterclockwise on quadrilateral *ABCD?* Do the vertices *A´*, *B´*, *C´*, and *D´* appear clockwise or counterclockwise on quadrilateral *A´B´C´D´?* Do the two figures have the same orientation?

7. Is quadrilateral *A´B´C´D´* a reflection of quadrilateral *ABCD* over the given line? Why or why not?

Remember What You Learned

8. Find two real-life examples of objects that have line symmetry. Then draw a sketch of each so that the sketch can be reflected over a line to produce a drawing of the entire object.

37

Lesson 6–6

6-7 Lesson Reading Guide

Translations

7MG3.2

Get Ready for the Lesson

Read the introduction at the top of page 337 in your textbook. Write your answers below.

1. Describe the motion involved in moving the knight.

2. Compare the shape, size, and orientation of the knight in its original position to that of the knight in its new position.

Read the Lesson

For Exercises 3–6, read the Concept Summary information on page 337 in your textbook and refer to the graph at the right that shows quadrilaterals *ABCD* and *A´B´C´D´*.
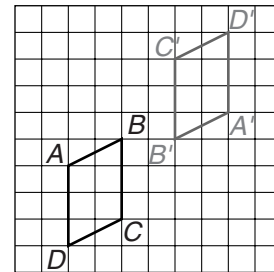
3. Determine how many units up and to the right each vertex of quadrilateral *ABCD* has moved to get to the corresponding vertex of quadrilateral *A´B´C´D´*. Have all the vertices moved the same distance in the same direction?

4. Are quadrilaterals *ABCD* and *A´B´C´D´* congruent? Explain.

5. Do the vertices *A*, *B*, *C*, and *D* appear clockwise or counterclockwise on quadrilateral *ABCD?* Do the vertices *A´*, *B´*, *C´*, and *D´* appear clockwise or counterclockwise on quadrilateral *A´B´C´D´?* Do the two figures have the same orientation?

6. Is quadrilateral *A´B´C´D´* a translation of quadrilateral *ABCD?* Why or why not?

Remember What You Learned

7. Translations and reflections are both types of transformations. One way to remember the difference between them is to note that a translation is a slide while a reflection is a flip. Come up with your own ways to help you distinguish between the different types of transformations.

7-1   **Lesson Reading Guide**   7MG2.1, 7MG3.1

Circumference and Area of Circles

Get Ready for the Lesson

Complete the Mini Lab at the top of page 352 in your textbook.
Write your answers below.

1. What distance does C represent?

2. Find the ratio $\dfrac{C}{d}$ for this object.

3. Repeat the steps above for at least two other circular objects and compare the ratios of C to d. What do you observe?

4. Graph the data you collected as ordered pairs, (d, C). Then describe the graph.
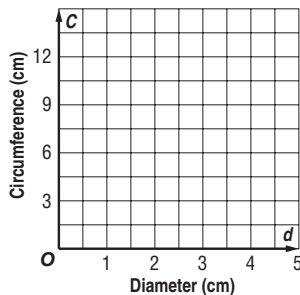
Read the Lesson

5. Explain the difference between the radius and the diameter of a circle.

6. What is the ratio of the circumference of a circle to its diameter?

7. Explain how you find the circumference of a circle given its radius is 4 inches.

Remember What You Learned

8. One way to help you remember a formula or concept is to make up a saying. For example, to remember the formula for the area of a circle you might use, "Fuzzy Wuzzy was a bear; area equals π (pi) r squared." Make up your own sayings to help you remember the formulas for the circumference and area of circles.

Lesson 7-1

7-3 **Lesson Reading Guide**

Area of Complex Figures

7MG2.1, 7MG2.2

Get Ready for the Lesson

**Read the introduction at the top of page 363 in your textbook.
Write your answers below.**

1. Identify some of the polygons that make up the family room, nook, and foyer area shown in this floor plan.

2. How can the polygons be used to find the total area that will be carpeted?

Read the Lesson

3. What is a complex figure?

4. What is the first step in finding the area of a complex figure?

5. Explain how to divide up the figure shown.
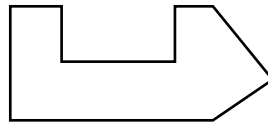
Remember What You Learned

6. Look up the everyday definition of the word *complex* in a dictionary. How does the definition relate to what you learned in the lesson?

7-4 Lesson Reading Guide

7MG3.6

Three-Dimensional Figures

Get Ready for the Lesson

**Read the introduction at the top of page 368 in your textbook.
Write your answers below.**

1. Name the two-dimensional shapes that make up the sides of this crystal.

2. If you observed the crystal from directly above, what two-dimensional figure would you see?

3. How are two- and three-dimensional figures related?

Read the Lesson

4. A plane is a two-dimensional flat surface that extends in all directions. What is formed when two planes intersect?

5. How can you tell the difference between a prism and pyramid?

6. Identify a three-dimensional figure that has one base that is a hexagon and six other faces that are triangles.

Remember What You Learned

7. Visualize your classroom as a prism with yourself sitting in the middle of the room. What parts of the classroom represent an edge, a face, and a vertex?
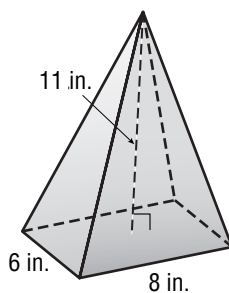
7-5   Lesson Reading Guide

7MG2.1, 7MG2.2

Volume of Prisms and Cylinders

Get Ready for the Lesson

**Complete the Mini Lab at the top of page 373 in your textbook.
Write your answers below.**

1. Describe how the volume V of each prism is related to its length ℓ, width w, and height h.

2. Describe how the area of the base B and the height h of each prism is related to its volume V.

Read the Lesson

3. What is another way to write the volume of a rectangular prism other than $V = Bh$?

4. What does it mean if a figure has a volume of 120 cubic centimeters?

5. Explain how finding the volume of a complex solid is similar to finding the area of a complex figure.

Remember What You Learned

6. Complete the table below by filling in the correct formula.

Figure	Formula for Finding Volume
rectangular prism	
triangular prism	
cylinder	

7-6 Lesson Reading Guide

7MG2.1

Volume of Pyramids and Cones

Lesson 7-6

Get Ready for the Lesson

Complete the Mini Lab at the top of page 380 in your textbook. Write your answers below.

1. Compare the base areas and the heights of the two solids.

2. Fill the pyramid with rice, sliding a ruler across the top to level the amount. Pour the rice into the cube. Repeat until the prism is filled. How many times did you fill the pyramid in order to fill the cube?

3. What fraction of the cube's volume does one pyramid fill?

Read the Lesson

4. How is the volume of a cone related to that of a cylinder?

5. How is the volume of a pyramid related to that of a prism?

6. Fill in the table about what you know from the diagram. Then compute the volume of the pyramid.

length of rectangle	
width of rectangle	
area of base	
height of pyramid	
volume of pyramid	

11 in.

6 in.

8 in.

Remember What You Learned

7. Explain why the radius and height of cones and pyramids always form a right angle.

7-7 Lesson Reading Guide

Surface Area of Prisms and Cylinders

Get Ready for the Lesson

Complete the Mini Lab at the top of page 386 in your textbook. Write your answers below.

1. Find the area of each face. Then find the sum of these areas.

2. Find the perimeter of one of the bases. Then multiply the perimeter by the height of the box. What does this product represent?

3. Add the product from Exercise 2 to the sum of the areas of the two bases.

4. Compare your answers from Exercises 1 and 3.

Read the Lesson

5. Complete the sentence with the correct numbers. When you draw a net of a triangular prism, there are _____ congruent triangular faces and _____ rectangular faces.

6. Explain how using a net helps to find the surface area of a figure.

7. If you unroll a cylinder, what does the net look like?

Remember What You Learned

8. Surface area contains the word *face*. Remember to turn the object so that each side *faces* you, and no face is left out. Fill in the chart to help you remember how many faces you should be looking for in each figure.

Figure	Total Number of Faces
rectangular prism	
trianglular prism	

7-8 Lesson Reading Guide

Surface Area of Pyramids

Get Ready for the Lesson

Read the introduction at the top of page 393 in your textbook.
Write your answers below.

1. How many cloth faces does this pyramid have? What shape are they?

2. How could you find the total area of the material used for the parachute?
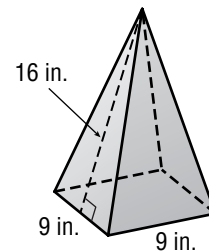
Read the Lesson

3. Complete the steps in finding the lateral and total surface areas of a pyramid.
Lateral Surface Area

$L = \frac{1}{2} P\ell$ _____

$L = \frac{1}{2}(36)(16)$ _____

$L = \underline{}$ _____

Total Surface Area

$S = L + B$ _____

$S = \underline{} + 9^2$ _____

The lateral surface area is _____ square inches, and the total surface area
of the pyramid is $288 + 81 = $ _____ square inches.

4. What two areas are needed to calculate the surface area of a pyramid?

5. In a pyramid, what is the altitude of each face called?

Remember What You Learned

6. Explain how the slant height of a pyramid is different from the height of
the pyramid. Find a real-life example of a solid pyramid and use it to
determine whether it is easier to measure the height or the slant height
of a pyramid. Explain your reasoning.

Lesson 7-8

Figure labels: 16 in., 9 in., 9 in.

7-9 Lesson Reading Guide

Similar Solids

Get Ready for the Lesson

Read the introduction at the top of page 399 in your textbook. Write your answers below.

1. If the model car is 4.2 inches long, 1.6 inches wide, and 1.3 inches tall, what are the dimensions of the original car?

2. Make a conjecture about the radius of the wheel of the original car compared to the model.

Read the Lesson

3. What is the scale factor for two similar solids?

4. If a 6-meter high pyramid is a model of an actual Egyptian pyramid and the scale factor is $\frac{1}{8}$, what is the height of the actual pyramid?

5. A cube has a volume of 216 cubic feet. A smaller cube is similar by a scale factor of 2. What is the length of a side of the smaller cube?

Remember What You Learned

6. You can calculate the slant height of either pyramid using the Pythagorean Theorem by creating a right triangle with the pyramid's height, its slant height, and $\frac{1}{2}$ of the side of the square base. The slant height is the hypotenuse. The slant height of the larger pyramid is about 8.4 meters. How can you find the slant height of the smaller pyramid without using the Pythagorean Theorem?

Lesson 7-9

8-1 Lesson Reading Guide

7AF1.1, 7AF1.3, 7AF1.4

Simplifying Algebraic Expressions

Get Ready for the Lesson

Do the Mini Lab at the top of page 416 in your textbook. Write your answers below.

1. Choose two positive and one negative value for x. Then evaluate $2(x + 3)$ and $2x + 6$ for each of these values. What do you notice?

2. Use algebra tiles to rewrite the expression $3(x - 2)$. (*Hint:* Use one green x-tile and 2 red -1-tiles to represent $x - 2$.)

Read the Lesson

3. When is the Distributive Property used to simplify an algebraic expression?

4. Explain how to simplify the expression $5(x - 3)$.

5. Explain what it means for two expressions to be equivalent.

6. Give an example of an expression containing three terms, one of which is a constant.

Remember What You Learned

7. One of your classmates was absent from school today and has not studied the lesson. Write a letter to your classmate explaining how to simplify an expression and how to identify terms and constants.

Lesson 8–1

8-2　Lesson Reading Guide

Solving Two-Step Equations

Get Ready for the Lesson

Read the introduction at the top of page 422 in your textbook. Write your answers below.

1. Explain how you could use the work backward strategy to find the cost of each hardback book. Then find the cost.

Read the Lesson

2. Define *two-step equation*.

Determine whether each equation is a two-step equation. Explain.

3. $n + 8 = 21$ **4.** $2x + 1 = 15$ **5.** $\frac{c}{4} = 6.5$

What is the first step in solving each equation?

6. $3y - 2 = 16$ **7.** $5 - 6x = -19$ **8.** $-2p + 11 = 7$

Remember What You Learned

9. Draw a diagram that shows how the equation $2x + 3 = 8$ can be modeled using algebra tiles.

Lesson 8–2

8-3 Lesson Reading Guide

Writing Two-Step Equations

Get Ready for the Lesson

Read the introduction at the top of page 427 in your textbook. Write your answers below.

1. Let n represent the number of payments. Write an expression that represents the amount of the loan paid after n payments.

2. Write and solve an equation to find the number of payments you will have to make in order to pay off your loan.

3. What type of equation did you write for Exercise 2? Explain your reasoning.

Read the Lesson

Jennifer bought 3 CDs, each having the same price. Her total for the purchase was $51.84, which includes $3.84 in sales tax. Find the price of each CD.

4. Explain how to define the variable in the problem. Then define the variable.

5. The next step is to write an equation for the problem. Assuming that the total, 51.84, will be on the right side of the equals sign by itself, determine which two operations will be represented on the left side of the equals sign. Which is performed first? Explain.

6. Complete the equation. Then solve it. How much does each CD cost?
   _____ = $51.84

Remember What You Learned

7. Work with a partner. Have one partner write a word problem that involves a two-step equation and solve it. Have the other partner check the solution. Then have partners switch tasks.

8-4 Lesson Reading Guide

Solving Equations with Variables on Each Side

Get Ready for the Lesson

Read the introduction at the top of page 434 in your textbook. Write your answers below.

1. Use the table. Continue filling in rows to find how long it will take you to catch up to your friend.

2. Write an expression for your distance after x seconds.

3. Write an expression for your friend's distance after x seconds.

4. What is true about the distances you and your friend have gone when you catch up to your friend?

5. Write an equation that could be used to find how long it will take for you to catch up to your friend.

Time (s)	Friend's Distance (m)	Your Distance (m)
0	$15 + 5(0) = 15$	$6(0) = 0$
1	$15 + 5(1) = 20$	$6(1) = 6$
2	$15 + 5(2) = 25$	$6(2) = 12$
3	$15 + 5(3) = 30$	$6(3) = 18$

Read the Lesson

6. What is the first step in solving an equation with variables on each side?

7. What does it mean to *isolate* the variable when solving an equation?

Determine whether the variable is isolated in each equation. Then determine whether the equation is solved for the variable.

8. $c = 8$

9. $3x + 1 = 7$

10. $5d = 15$

Remember What You Learned

11. Create a general set of guidelines to solve any type of equation.

8-6 Lesson Reading Guide

Inequalities

Get Ready for the Lesson

**Read the introduction at the top of page 441 in your textbook.
Write your answers below.**

1. Name three truck heights that can safely pass on a road where the first
sign is posted. Can a truck that is 10 feet 6 inches tall pass? Explain.

2. Name three speeds that are legal according to the second sign. Is a car
traveling at 45 miles per hour driving at a legal speed? Explain.

Read the Lesson

3. Complete the table by providing the symbol used to represent each
phrase.

Phrase	Symbol	Phrase	Symbol
is greater than		is at most	
is at least		exceeds	
is fewer than		is less than or equal to	
is more than		is no less than	

4. Explain the difference between an open and a closed circle on the graph
of an inequality.

5. What does the arrow to the right or to the left indicate on the graph of an
inequality?

6. Describe how to graph $x > 7$.

7. Describe how to graph $x \leq -6$.

Remember What You Learned

8. Use a newspaper to find real-world situations in which relationships
between quantities are described by phrases like *no more than, at least,
greater than*, and *at most*.

8-7   **Lesson Reading Guide**

7AF1.1, 7AF4.1

Solving Inequalities by Adding or Subtracting

Get Ready for the Lesson

**Read the introduction at the top of page 445 in your textbook.
Write your answers below.**

1. Add 10 to each side of the inequality $13 < 16$. Write the resulting inequality and decide whether it is *true* or *false*.

2. Was Victoria's dad younger or older than Victoria's mom 13 years ago? Explain your reasoning using an inequality.

Reading the Lesson

3. How are solving an inequality and solving an equation similar?

4. Explain what solving an equality means.

5. Are $x \leq 7$ and $7 \leq x$ equivalent inequalities? Explain.

6. Are $x > -2$ and $-2 < x$ equivalent inequalities? Explain.

7. Write an inequality equivalent to $n < 5$, but use the $>$ symbol.

Helping You Remember

8. Look up *inequality* in a dictionary. How does its meaning relate to what you have learned in this lesson?

Lesson 8–7

8-8 **Lesson Reading Guide**

Solving Inequalities by Multiplying or Dividing

Get Ready for the Lesson

Read the introduction at the top of page 449 in your textbook.
Write your answers below.

1. Divide each side of the inequality $80 < 150$ by 2. Write the resulting inequality and decide whether it is *true* or *false*.

2. Would the cost of three pairs of basketball shoes be greater or less than the cost of three pairs of running shoes all sold at the regular price? Explain your reasoning using an inequality.

Reading the Lesson

What is the first step in solving each inequality? How is the
inequality symbol affected by this first step? Explain.

3. $\frac{x}{3} > 2$

4. $-5x \leq 60$

5. $3x + 4 \geq 22$

6. Describe the conditions under which you reverse the direction of the inequality symbol when solving an inequality.

Helping You Remember

7. You can often forget to change the direction of the inequality symbol when multiplying or dividing by a negative number. The *proposed* solution to the inequality $-9x > -27$ is $x < 3$. Check the values at and near the boundary of the solution by verifying that

• 3 is the solution of the related equation
• 2 is a solution to the inequality
• 4 is not a solution of the inequality

Now create your own inequality and give three different points to check. A point that is a solution of the related equation, a point that is a solution to the inequality, and one point that is not the solution of the inequality.
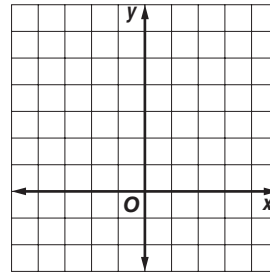
Lesson 8–8

9-1 Lesson Reading Guide

Functions

Get Ready for the Lesson

Read the introduction at the top of page 465 in your textbook.
Write your answers below.

1. Complete the table at the right.

2. If 6 DVDs are purchased, what is the total cost?

3. Explain how to find the total cost of 9 DVDs.

DVDs	Cost ($)
1	15
2	30
3	
4	
5	

Read the Lesson

4. If $f(x) = x + 5$, explain how to find $f(2)$. Then find $f(2)$.

5. Identify the input value and the output value in Exercise 4.

6. Define *domain*. What number in Exercise 4 is part of the domain?

7. Explain why the output value is called the dependent variable. What
represents the dependent variable in the function $f(x) = x + 5$?

Remember What You Learned

8. When looking at the word *domain,* you see the word *in* located at the end
of the word. This is a way to remember that the domain is the set of *in*put
values. Find a way to remember that the range is the set of output
values.

9-2 **Lesson Reading Guide**

7AF1.5

Representing Linear Functions

Get Ready for the Lesson

Read the introduction at the top of page 471 in your textbook. Write your answers below.

1. Complete the following function table.

Input x	Rule $1.5x$	Output y	(Input, Output) (x, y)
1	1.5(1)	1.5	(1, 1.5)
2	1.5(2)		
3			
4			

2. Graph the ordered pairs on a coordinate plane.

3. What do you notice about the points on your graph?

Read the Lesson

4. In your own words, explain how to graph a function.

5. Explain how to find the x-intercept of the graph of a linear function. Then find the x-intercept of $y = 2x + 8$.

6. Explain how to find the y-intercept of the graph of a linear function. Then find the y-intercept of $y = 2x + 8$.

Remember What You Learned

7. Think of a gas pump with prices for regular and super gasoline. When the same amount of gas is being pumped into a tank, how does the price per gallon affect the total cost of the gas?

9-3 Lesson Reading Guide

7AF3.3

Slope

Get Ready for the Lesson

Do the Mini Lab at the top of page 477 in your textbook. Write your answers below.

1. The rate of change of the ladder compares the height it is raised to the distance of its base from the building. Write this rate as a fraction in simplest form.

2. Find the rate of change of a ladder that has been raised 100 feet and whose base is 50 feet from the building.

Read the Lesson

3. A line passes through the points $A(-1, -5)$, $B(0, -1)$, $C(1, 3)$, and $D(2, 7)$. Does it matter which two points you use to find the slope using the slope formula? Explain.

4. Suppose you choose to find the slope of the line in Exercise 3 using points $C(1, 3)$ and $D(2, 7)$. If your numerator after substitution into the slope formula is $3 - 7$, what should be your denominator? Explain.

5. Explain the difference between $\frac{0}{3}$ and $\frac{3}{0}$.

Remember What You Learned

6. Fill in the table with the appropriate term, *positive* or *negative*.

Translating Rise and Run	Slope
up	
left	
down	
right	

Lesson 9–3

9-4 **Lesson Reading Guide**

Direct Variation

Get Ready for the Lesson

Read the introduction at the top of page 483 in your textbook.

1. What is the constant rate of change, or slope, of the line?

2. Is the total number of pages printed always proportional to the printing time? If so, what is the constant ratio?

3. Compare the constant rate of change to the constant ratio.

Read the Lesson

4. How much does the number of pages change for each interval on the graph?

5. Does the number of pages change by the same amount for each interval on the graph? If not, by how much does it change for each interval?

6. Why might a graph need to use a different interval for the y-axis and x-axis?

Remember What You Learned

7. A graph of Jesse's earnings has an interval of $5 for the y-axis and an interval of 1 hour for the x-axis. A point on the graph shows that he earns $30 in 2 hours. The amount that he earns varies directly as the time he works. What is the constant ratio?

Lesson 9–4

9-5 Lesson Reading Guide

7AF3.3

Slope-Intercept Form

Get Ready for the Lesson

Complete the Mini Lab at the top of page 491 in your textbook. Write your answers below.

1. Use the graphs of the equations to find the slope and y-intercept of each line. Complete the table.

Equation	Slope	y-intercept
$y = 3x + 2$		
$y = \frac{1}{4}x + (-1)$		
$y = -2x + 3$		

2. Compare each equation with the value of its slope and its y-intercept. What do you notice?

Read the Lesson

3. In the formula $y = mx + b$, what do the letters m and b represent?

Identify the slope and the y-intercept of the graph of each equation.

4. $y = -3x + 4$

5. $y = \frac{2}{3}x - 7$

6. How can you find the slope and the y-intercept of the graph of $x + y = 8$?

7. If you know the y-intercept of a line is 4 and that the slope is $-\frac{3}{2}$, how do you graph the line?

Remember What You Learned

8. Work with a partner. Using a coordinate grid, take turns graphing lines and identifying the slope and y-intercept of each graph.

9-6 Lesson Reading Guide

7AF1.1

Writing Systems of Equations and Inequalities

Get Ready for the Lesson

Read the introduction at the top of page 498 in your textbook. Write your answers below.

1. What relationship do the lines of the two functions have?

2. At what point do the two lines intersect?

3. What does this represent?

Read the Lesson

4. What is the intersection of the graphs of two functions called?

5. What does a system of inequalities have that a system of equations does not?

6. Why would it be beneficial to keep the like variables lined up in relation to each other?

Remember What You Learned

7. There are thirty-five students in Mr. Fuente's class. There are nine more girls than boys in the class. Write a system of equations to represent this situation.

9-8 **Lesson Reading Guide**

Scatter Plots

Get Ready for the Lesson

**Complete the Mini Lab at the top of page 505 in your textbook.
Write your answers below.**

   1. Graph each of the ordered pairs listed on the board.

   2. Examine the graph. Do you think there is a relationship between height
and arm span? Explain.

Read the Lesson

   3. How is a scatter plot different from the graph of a linear function?

   4. What pattern would you expect to see in a scatter plot that shows a
positive relationship?

   5. What pattern would you expect to see in a scatter plot that shows a
negative relationship?

   6. Would you expect a scatter plot to show a *positive*, *negative*, or *no*
relationship between the population of a state and its number of
representatives in the U.S. Congress? Explain.

Remember What You Learned

   7. Using a newspaper or magazine, find an article with data given. Plot the
data on a coordinate plane and identify whether the data has a *positive*,
negative, or *no* relationship.

Lesson 9–8

10-1 Lesson Reading Guide

AF1.5

Linear and Nonlinear Functions

Get Ready for the Lesson

Read the introduction at the top of page 522 in your textbook. Write your answers below.

1. During its ascent, did the rocket travel the same distance each second? Justify your answer.

2. During its descent, did the rocket travel the same distance each second? Justify your answer.

3. Graph the ordered pairs (time, height) for the rocket's ascent and descent on separate axes. Connect the points with a straight line or smooth curve. Then compare the graphs.

Read the Lesson

4. How does the rate of change of a nonlinear function differ from the rate of change of a linear function?

5. Determine whether the table represents a linear or nonlinear function. Explain.

x	3	7	11	15
y	46	35	24	13

6. How can you distinguish the equations of linear functions from the equations of nonlinear functions?

Remember What You Learned

7. Using a newspaper or magazine, find one example of a linear graph and one example of a nonlinear graph.

Lesson 10–1

10-2　Lesson Reading Guide

Graphing Quadratic Functions

Get Ready for the Lesson

Complete the Mini Lab at the top of page 528 in your textbook. Write your answers below.

1. Is the relationship between the side length and the area of a square linear or nonlinear? Explain.

**2.** Describe the shape of the graph.

Read the Lesson

3. How can you distinguish the equations of quadratic functions from the equations of other functions?

Determine whether each equation represents a quadratic function.

4. $y = 3x - 5$　　　　**5.** $y = 6 - x^2$　　　　**6.** $y = x^3 + 2$　　　　**7.** $y = \dfrac{8}{x}$

8. Describe the shape of the graph of a quadratic function. What is this shape called?

Determine whether each graph represents a quadratic function.

9.

10.

11.

12.
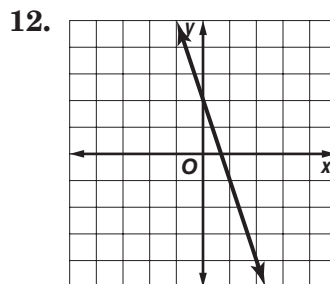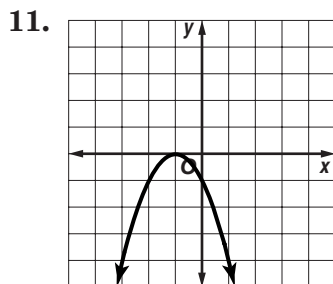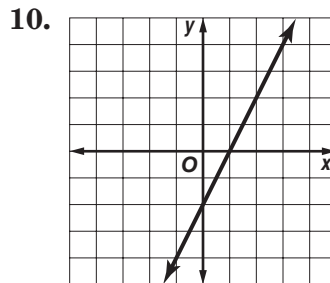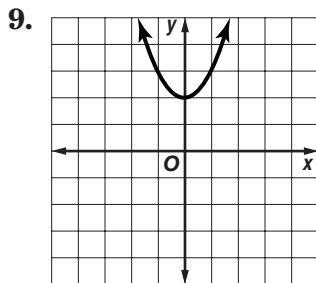
Remember What you Learned

13. Work with a partner. Have your partner write a quadratic equation. Then you create a table of values and graph the equation. After a few equations have been completed, switch roles.

Lesson 10–2

10-4 Lesson Reading Guide

7AF3.1, 7AF3.2

Graphing Cubic Functions

Get Ready for the Lesson

Read the introduction at the top of page 534 in your textbook. Write your answers below.

1. The volume V of a cube is found by cubing the length of a side s. Write a formula to represent the volume of a cube as a function of side length.

2. Graph the volume as a function of side length. (Hint: Use values of s such as 0, 0.5, 1, 1.5, 2, and so on.)

3. Would it be reasonable to use negative numbers for x-values in this situation? Explain.
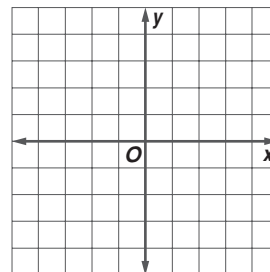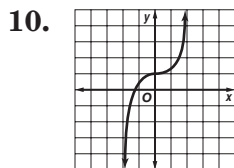

Read the Lesson

4. Describe the shape of the graph $V = s^3$.

5. How can you distinguish the equations of cubic functions from the equations of other functions?
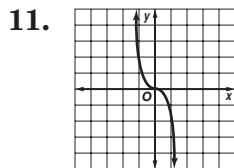
Determine whether each equation represents a cubic function.

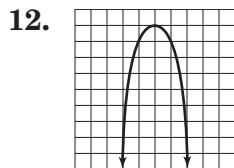6. $y = x^3 + 4$ 　　　　 7. $y = \dfrac{x}{3}$ 　　　　 8. $y = x^3 - x^2$ 　　　　 9. $y = 1 - x^3$

Match the following equations and graphs.

10.

a. $y = -2x^2 + 1$

11.

b. $y = 2x^3 + 3$

12.

c. $y = -3x^3$

Remember What you Learned

13. Work with a partner. Have your partner write a cubic equation. Then you create a table of values and graph the equation. After a few equations have been completed, switch roles.

10-5 Lesson Reading Guide

Multiplying Monomials

7NS2.3, 7AF2.1, 7AF2.2

Get Ready for the Lesson

Read the introduction at the top of page 539 in your textbook. Write your answers below.

1. Examine the exponents of the factors and the exponents of the products in the last column. What do you observe?

Read the Lesson

2. Under what condition can you multiply two powers by adding the exponents?

Determine whether each multiplication can be performed by adding exponents. Explain.

3. $6^5 \cdot 6^3$ **4.** $c^2 \cdot c^{10}$ **5.** $m^3 \cdot n^2$

6. Explain how to multiply $(6x^3)(-3x^2)$. Then find the product.

Remember What You Learned

7. Explain in your own words the Product of Powers Property. Be sure to include an example in your explanation.

10-6 **Lesson Reading Guide**

Dividing Monomials

7NS2.3, 7AF2.1, 7AF2.2

Get Ready for the Lesson

Read the introduction at the top of page 544 in your textbook. Write your answers below.

1. Examine the exponents of the divisors and dividends and compare them to the exponents of the quotients. What do you notice?

2. Make a conjecture as to the quotient of $2^5 \div 2^2$ written using powers of 2.

Read the Lesson

3. Under what condition can you divide two powers by subtracting their exponents?

Determine whether each division can be performed by subtracting exponents. Explain.

4. $\dfrac{8^3}{4^2}$ 5. $\dfrac{a^3}{b^3}$ 6. $\dfrac{z^6}{z^5}$

Find each quotient.

7. $\dfrac{7^4}{7^2}$ 8. $\dfrac{v^9}{v^3}$ 9. $\dfrac{6^7}{6^6}$

Remember What You Learned

10. Explain in your own words the Quotient of Powers Property. Be sure to include an example in your explanation.

11. Explain how dividing powers is related to simplifying fractions. Provide an example as part of your explanation.

10-7 Lesson Reading Guide

Powers of Monomials

Get Ready for the Lesson

Read page 549 in your textbook, then answer the questions below.

1. Express the volume in cubic centimeters for a cube with side length 8 centimeters.

2. Express the volume in Exercise 1 as a power of 2.

3. Express the side length 8 centimeters as a power of 2.

4. Express the volume of a cube with side length 8 centimeters as a power of the answer you found in Exercise 3.

5. What is true about the volumes in Exercises 2 and 4? What does this tell you about the expressions you found in Exercises 2 and 4?

Read the Lesson

6. How do you find the power of a power?

Find the power of the power.

7. $(6^2)^3$ 　　　　　　　　8. $(4^2)^4$ 　　　　　　　　9. $(b^6)^2$

Remember What You Learned

10. Explain the steps involved when you solve $(7^3)^2$.

10-8 Lesson Reading Guide

Roots of Monomials

Get Ready for the Lesson

Read the introduction at the top of page 553 in your textbook.
Write your answers below.

1. Count the number of dots that form the length of one side of the largest outlined square represented by the square numbers 4, 9, and 16.

2. How do your answers to Exercise 1 relate to the square numbers 4, 9, and 16?

Read the Lesson

3. Why is it important to use absolute value when finding the square root of a monomial?

4. Do you need to use absolute value when finding the cube root of a monomial? Explain.

5. What is the difference between a square root and a cube root?

Remember What you Learned

6. Work with a partner. Create a monomial and see if your partner can find the square root or cube root of that monomial. If you cannot find either a square root or a cube root, explain why and determine what needs to be changed in the monomial for you to find an exact answer.

11-2 **Lesson Reading Guide**

Histograms

Get Ready for the Lesson

Read the introduction at the top of page 570 in your textbook. Write your answers below.

1. What do you notice about the price intervals in the table?

2. How many tickets were greater than $20.00 but less than $50.00?

Read the Lesson

3. Explain the difference between a bar graph and a histogram.

4. What does a histogram display?

5. Can the data in the table at the right be used to draw a histogram? Explain.

Eye Color in an Eighth-Grade Class		
Color	**Tally**	**Frequency**
Blue	卌 卌 ‖	12
Brown	卌 ‖‖	9
Green	‖‖	3

6. What is wrong with the histogram at the right?

Test Scores

Number of Students (y-axis: 0, 2, 4, 6, 8, 10)

Score (x-axis: 0–59, 60–69, 70–79, 80–89, 90–100)

Remember What You Learned

7. Work with a partner. Have one partner create a frequency table. Have the other partner draw a histogram from the table.

Lesson 11–2

11-3 Lesson Reading Guide

Circle Graphs

7SDAP1.1

Get Ready for the Lesson

Read the introduction at the top of page 576 in your textbook. Write your answers below.

1. What percent of U.S. movie-goers found a ringing cell phone the most annoying behavior at a movie theater?

2. What percent of U.S. movie-goers were annoyed with some kind of noise disturbance?

3. Which behavior was reported as most annoying?

4. Are all the behaviors surveyed accounted for in the graphic?

Read the Lesson

5. Complete the sentence: A circle graph compares _____ to the _____.

6. When drawing a circle graph from given percents, explain how the degrees for each section are determined.

7. What must you do before you can construct a circle graph for the data in the table at the right?

Favorite Shoes	
Dress	17
Sandals	21
Sneakers	42

Remember What You Learned

8. Can the data in the table at the right be used to make a circle graph? Explain. What must be true of the percents used to make a circle graph?

Color of T-Shirt Worn	
Blue	32%
Red	19%
Gray	6%

11-4 Lesson Reading Guide

Measures of Central Tendency and Range

Get Ready for the Lesson

**Read the introduction at the top of page 585 in your textbook.
Write your answers below.**

1. What is the *average* number of days for these nine countries?

2. Order the numbers from least to greatest. What is the middle number in your list?

3. What number(s) appear more than once?

4. Which of the number or numbers from Questions 1–3 might be representative of the data? Explain.

Read the Lesson

5. Name the most common measures of central tendency.

6. Explain in your own words how to find the mean of a data set.

7. When finding the median, what first must be done to the set of data?

Remember What You Learned

8. Think about the hours of television you have watched each day in the past week. List the times, and find their mean, median, mode, and range. Which measure of central tendency best represents the data? Compare your findings with your classmates.

11-5 Lesson Reading Guide

Measures of Variation

Get Ready for the Lesson

Read the introduction at the top of page 593 in your textbook. Write your answers below.

1. Find the median of the data.

2. Organize the data into five groups of equal size. How many data values are in each group?

3. What fraction of the entire data is in each group? What percent?

4. What fraction of the data is below the median? Above the median?

5. Find the range of the data.

6. What does the range tell you about the data of the average number of hours teens spend online each week?

Read the Lesson

7. When given a set of data, explain how to find the range.

8. What is the interquartile range?

9. Describe the steps for finding the limits for outliers of a set of data.

Remember What You Learned

10. Explain how the words *quarter* and *quartile* are similar. Explain how they are different.

11-6 Lesson Reading Guide

Box-and-Whisker Plots

Get Ready for the Lesson

Read the introduction at the top of page 599 in your textbook. Write your answers below.

1. What is the least value in the data?

2. What is the lower quartile of the data?

3. What is the median of the data?

4. What is the upper quartile of the data?

5. What is the greatest value in the data?

6. Name any outliers.

Read the Lesson

7. Explain the parts of the box-and-whisker plot in your own words.

8. Complete the sentence: A box-and-whisker plot separates a set of data into _____ parts, each containing _____ of the data.

9. What does the length of a whisker tell you about the data?

Remember What You Learned

10. What five key numbers are necessary to construct a box-and-whisker plot? Identify the point corresponding to each of these numbers on the graph below.
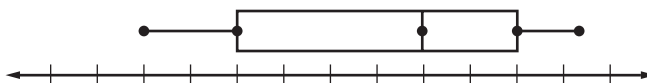
11-7 Lesson Reading Guide

Stem-and Leaf Plots

Get Ready for the Lesson

Read the introduction at the top of page 606 to Lesson 11-7 in your textbook. Write your answers below.

a. Is there an equal number of electors in each group? Explain.

b. Name an advantage of displaying the data in groups.

Read the Lesson

Write a definition and give an example of each new vocabulary word or phrase.

Vocabulary	Definition	Example
1. stem-and-leaf plot		
2. stems		
3. leaves		
4. back-to-back stem-and-leaf plot		

Remember What You Learned

5. How will you remember which numbers of a stem-and-leaf plot represent the greater place value? Use the data to draw a back-to-back stem-and-leaf plot like actual leaves on stems. Read the data from the tree trunk and move outward.

Ages of Persons					
Apartment Building A			**Apartment Building B**		
33	16	19	39	21	20	1
26	23	11	10	21	36	37
34	24	37	32	22	11	2
17	29		10	1	32	38
			12	36	39	

11-8 Lesson Reading Guide

Select an Appropriate Display

Get Ready for the Lesson

Read the introduction at the top of page 611 in your textbook. Write your answers below.

1. Which display(s) show the interval of test scores for half the class?

2. Which display(s) allow you to find the score for a specific student?

Read the Lesson

3. Name three different ways to display data.

4. What two questions should you ask yourself when determining which type of display to use?

Remember What You Learned

Choose the letter that best matches the type of display to its use.

5. Circle Graph   **a.** shows the frequency of data that has been organized into equal intervals

6. Line Graph   **b.** lists all individual numerical data in a condensed form

7. Bar Graph   **c.** shows the number of items in specific categories in the data using bars

8. Histogram   **d.** compares part to a whole

9. Line Plot   **e.** shows change over a period of time

10. Stem-and-Leaf Plot   **f.** shows how many times each number occurs in the data

Lesson 11–8

12-1 Lesson Reading Guide

Counting Outcomes

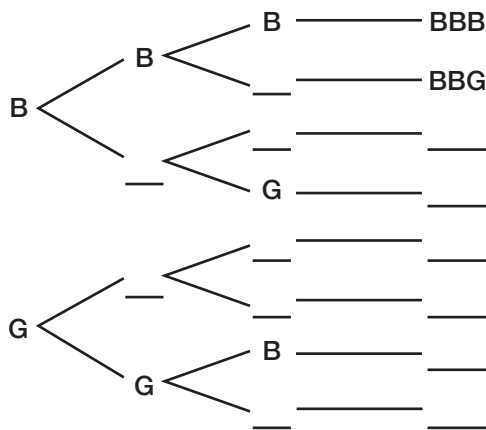## Get Ready for the Lesson

Read the introduction at the top of page 626 in your textbook. Write your answers below.

1. How many different styles are available? colors? sizes?

2. Make a list showing all of the different bicycles that are available.

Read the Lesson

3. Complete the tree diagram shown below for how many boys and how many girls are likely to be in a family of three children.

Child 1   Child 2   Child 3   Sample Outcome

4. Explain when you would not want to use a tree diagram.

Remember What You Learned

5. Make a simple lunch menu. Include at least two sandwich choices, 3 side choices, and 3 dessert choices. Then write a sentence describing how you could determine the number of different meals that can be made by choosing only one item from each category.

Lesson 12–1

12-2 Lesson Reading Guide

Probability of Compound Events

Get Ready for the Lesson

**Read the introduction at the top of page 631 in your textbook.
Write your answers below.**

1. A player rolls the number cube. What is P(odd number)?

2. The player spins the spinner. What is P(red)?

3. What is the product of the probabilities in Exercises 1 and 2?

4. On a separate piece of paper, draw a tree diagram to determine the probability that the player will roll an odd number and spin red.

Read the Lesson

5. What is a compound event?

6. Are the events of spinning a spinner and rolling a number cube independent events? Why or why not?

7. Explain how to find the probability of two independent events.

Remember What You Learned

8. Look up the everyday definitions of the words *dependent* and *independent* in a dictionary. How does each definition relate to what you have learned in this lesson?

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12-3 **Lesson Reading Guide**

Experimental and Theoretical Probability

Get ready for the Lesson

**Complete the Mini Lab at the top of page 637 in your textbook.
Write your answers below.**

1. Find the ratio $\dfrac{\text{number of times color was drawn}}{\text{total number of draws}}$ for each color.

2. Is it possible to have a certain color marble in the bag and never draw that color?

3. Open the bag and count the marbles. Find the ratio
$\dfrac{\text{number of each color marble}}{\text{total number of marbles}}$ for each color of marble.

4. Are the ratios in Exercises 1 and 3 the same? Explain.

Read the Lesson

5. The table at the right shows the results
of a survey.

How many people bought balloons? _____

How many people were surveyed? _____

What is the experimental probability that
a person surveyed preferred balloons?

Item	Number of People
balloons	75
cards	15
decorations	25
cake	50

6. A bag contains 15 red marbles, 25 purple marbles, and 10 yellow marbles.
Describe an experiment that you could conduct with the marbles to find
an experimental probability.

Remember What You Learned

7. One way to remember the difference between experimental probability
and theoretical probability is to note that experimental probability is
based on an experiment and theoretical probability is based on what
should happen in theory. Look in a newspaper and find an example of
each type of probability.

12-5 Lesson Reading Guide

Using Sampling to Predict

Get Ready for the Lesson

Read the instruction at the top of page 647 in your textbook. Write your answers below.

1. Suppose she decides to survey a group of people at a basketball game. Do you think the results would represent all of the people in the viewing area? Explain.

2. Suppose she decides to survey students at your middle school. Do you think the results would represent all of the people in the viewing area? Explain.

3. Suppose she decides to call every 100th household in the telephone book. Do you think the results would represent all of the people in the viewing area? Explain.

Read the Lesson

4. What is the first step in conducting a survey?

5. When you conduct a survey by asking ten students selected at random from each grade at your school what their favorite class is, what type of random sample have you taken?

6. A grocery store owner asks the shoppers in his store where they prefer to shop for groceries. What type of sample has he conducted?

Remember What You Learned

7. Working with a partner, complete the table below with an example of each type of sample.

Type of Sample	Example
systematic random	
simple random	
stratified random	
convenience	
voluntary response	