Name _____ Date _____ Class _____

# Ready to Go On? Skills Intervention
## *1-1 Sets of Numbers*

**Find these vocabulary words in Lesson 1-1 and the Multilingual Glossary.**

| Vocabulary |
| --- |
| set        element        subset        empty set        roster notation        finite set |
| infinite set              interval notation                set-builder notation |

## Ordering and Classifying Real Numbers
**Order the numbers from least to greatest. Then classify each number by the subsets of the real numbers to which it belongs.**

$3.4,\ -2\dfrac{1}{4},\ \sqrt{6},\ -\dfrac{2}{5},\ 0.5892$

Rewrite these numbers as decimals.

$-2\dfrac{1}{4} = $ _____, $\sqrt{6} \approx $ _____, $-\dfrac{2}{5} = $ _____

Is $-2$ greater than or less than $-1$?

_____

Order the numbers from least to greatest.

| Number | Real | Rational | Irrational |
| --- | --- | --- | --- |
| 3.4 | x | x | |
| $-2\dfrac{1}{4}$ | | | |
| $\sqrt{6}$ | | | |
| $-\dfrac{2}{5}$ | | | |
| 0.5892 | | | |

_____, _____, _____, _____, ____

Irrational numbers are non-_____ and non-_____ decimals.

Classify the numbers by completing the table.

## Interval Notation and Set-Builder Notation
**Rewrite the sets in the indicated notation.**

**A.** $-2 < x \le 8$: interval notation

Is $-2$ included? _____          Is 8 included? _____

Write the correct notation. Use [ ] to include an endpoint and ( ) to

exclude an endpoint. _____

**B.**  : set-builder notation

−5 −4 −3 −2 −1  0  1  2  3  4  5

What does an empty circle at 4 represent?_____

What does a solid circle at −2 represent? _____

Write the correct notation for the set. _____

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## Finding Inverses
**Find the additive and multiplicative inverse for −6.**

What is the opposite of −6? ____ What is the sum of −6 and its opposite? _____

What is the opposite of a number called? _____

So, the additive inverse of −6 is _____.

What is the reciprocal of a number called? _____

What is the reciprocal of −6? _____ What is the product of −6 and its reciprocal? _____

So, the multiplicative inverse of −6 is _____.

## Identifying Properties of Real Numbers
**Identify the property demonstrated by each equation.**

**A.** $3(a + 4b) = 3a + 12b$

What number is multiplied by each term in the parentheses? _____

What property involves multiplying a sum by a number? _____

**B.** $4 + (\sqrt{2} + 6) = (4 + \sqrt{2}) + 6$

Is the grouping of numbers on the left side of the equation the same as the grouping

on the right side of the equation? _____

What property involves changing the grouping of terms being added?

_____

## Using Properties of Real Numbers
**Apply the property described to complete the equation.**

**A.** $2(c + 2b) = ?$    Distributive Property

Find $2 \times c$. _____    Find $2 \times 2b$. _____

Write the sum of the products. $2(c + 2b) =$ _____

**B.** $16 + 12 = ?$    Commutative Property

The Commutative Property states that two or more real numbers can be

_____ or multiplied in any _____ without changing the result.

Use the Commutative Property. $16 + 12 =$ _____ + _____

**3**                                                                      **Holt Algebra 2**

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# Ready to Go On? Problem Solving Intervention
## *1-2 Properties of Real Numbers*

You can apply the properties of real numbers to solve problems mentally.

Miranda wants to add a 15% tip to a bill of $32.60. Use mental math to find the tip.

## Understand the Problem

1. How can you use mental math to find the percent of a number? _____

   _____

   _____

2. Explain how to move the decimal point of a dollar amount to quickly determine

   10% of a number? _____

## Make a Plan

3. A tip of 15% is the same as 10% + _____.

4. If Miranda finds 10% of the bill, how can she use this value to find 5% of the bill?

   _____

   _____

## Solve

5. What is 10% of 32.60? _____

6. What is 5% of 32.60? _____

7. Complete to find the tip.

   Tip = 15% of 32.60 = 10% of 32.6 + 5% of 32.60

   Tip = _____

## Look Back

8. Round $32.60 down to $30.00. What is 15% of $30? _____

9. Use the result from Exercise 8, to check if your answer to Exercise 7 is reasonable.

   _____

   _____

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# Ready to Go On? Skills Intervention

## *1-3 Square Roots*

**Find these vocabulary words in Lesson 1-3 and the Multilingual Glossary.**

| Vocabulary | | |
|---|---|---|
| radical symbol | radicand | principal root |
| like radical terms | rationalize the denominator | |

## Simplifying Square-Root Expressions
**Simplify each expression.**

**A.** $\sqrt{75}$

What are the factors of 75? _____

Which factor of 75 is a perfect square? _____

Rewrite $\sqrt{75}$ using its factors. $\sqrt{75} = \sqrt{\rule{1cm}{0.15mm} \cdot \rule{0.7cm}{0.15mm}}$

Use the Product Property of Square Roots to complete this expression:

$\sqrt{75} = \sqrt{\rule{1cm}{0.15mm} \cdot \rule{0.7cm}{0.15mm}} = \rule{0.7cm}{0.15mm} \sqrt{3}$

**B.** $\dfrac{\sqrt{108}}{\sqrt{3}}$

Rewrite the expression as the square root of a quotient. $\dfrac{\sqrt{108}}{\sqrt{3}} = \sqrt{\dfrac{\square}{\square}}$

Use the Quotient Property of Square Roots to complete the expression.
*Hint*: Divide the numerator by the denominator. Then find the square root.

$\sqrt{\dfrac{108}{\square}} = \sqrt{\rule{1cm}{0.15mm}} = \rule{0.7cm}{0.15mm}$

## Rationalizing the Denominator

**Simplify.** $\dfrac{4\sqrt{3}}{\sqrt{5}}$

Complete the fraction to make a factor of 1. $\dfrac{\sqrt{\square}}{\sqrt{5}} = 1$

Multiply the expression by the factor of 1 and simplify.

$\dfrac{4\sqrt{3}}{\sqrt{5}} \cdot \dfrac{\sqrt{\square}}{\sqrt{5}} = \dfrac{4 \cdot \sqrt{\square \cdot \square}}{\square} = \dfrac{4 \cdot \sqrt{\square}}{\square}$

## Adding and Subtracting Square Roots

**A.** $2\sqrt{7} + 3\sqrt{7}$

What are the coefficients? _____ and _____ Add the coefficients. _____ + _____ = _____

Are the radical terms the same? _____ If so, then combine like terms. _____

**B.** $6\sqrt{2} - \sqrt{8}$

Can either radical be simplified? _____ If so, simplify radical terms. $\sqrt{8} = \rule{0.7cm}{0.15mm} \sqrt{\rule{0.7cm}{0.15mm}}$

What are the coefficients? _____ and _____

Subtract the coefficients. _____ − _____ = _____ Combine like radical terms. _____

**Holt Algebra 2**

Name _____ Date _____ Class _____

# Ready to Go On? Problem Solving Intervention

*1-3 Square Roots*

The side length of a square is the square root of its area.

A builder is adding a square patio to a garden. He can build a patio with an area of 49, 81, or 121 square feet. Find the dimensions of each patio. Then identify which of the three sizes is the largest patio that can fit in a space that is 9 feet wide and 12 feet long.

## Understand the Problem

**1.** What is the builder trying to do? _____

_____

**2.** How is the area of a square calculated? _____

## Make a Plan

**3.** How can the builder determine the length of the sides of each patio?

_____

**4.** How can you determine which patio will fit in the space described?

_____

_____

## Solve

**5.** What are the lengths of the sides of each patio?

49 square feet: _____, 81 square feet: _____, 121 square feet: _____

**6.** How much area is in a 9 ft by 12 ft space? _____

**7.** Which patio(s) will fit in a space that measures 9 ft by 12 ft?

_____

**8.** Which is the largest patio that can fit in the space? _____

## Look Back

**9.** Draw a diagram to show that the patio fits in the given space.

## SECTION 1A Ready to Go On? Skills Intervention
### *1-4 Simplifying Algebraic Expressions*

**Evaluating Algebraic Expressions**
**Evaluate each expression for the given values of the variables.**

**A.** $2x - xy + 4y$ for $x = 3$ and $y = 5$

Complete the steps for the order of operations.

Step 1: Parentheses and _____
Step 2: Exponents

Step 3: _____ and divide from left to _____.

Step 4: _____ and _____ from _____ to right.

Rewrite the expression substituting 3 for each $x$ and 5 for each $y$.

_____

To evaluate this expression, first _____ from left to right.

Perform the first step. _____

Now add and subtract from left to right. What is the result? _____

**B.** $2a^2b + 3ab - b^2$ for $a = 4$ and $b = 3$

Rewrite the expression replacing 4 for each $a$ and 3 for each $b$.

_____

To evaluate this expression, first evaluate _____.

Perform the first step. _____
Now multiply from left to right. _____
Add and subtract from left to right. What is the result? _____

**Simplifying Expressions**
**Simplify each expression.**

**A.** $3x^2 + 2x - y + x^2$

Rewrite the expression so that like terms are together. _____

Combine like terms. _____

**B.** $s(3t^2 + 4u) - st^2 + 2su$

Distribute the term outside the parentheses. _____

Rewrite the expression so that like terms are together. _____

Combine like terms. _____

**Holt Algebra 2**

**SECTION** **Ready to Go On? Skills Intervention**
**1A** *1-5 Properties of Exponents*

Find this vocabulary word in Lesson 1-5 and the
Multilingual Glossary.

| **Vocabulary** |
| --- |
| scientific notation |

**Evaluating Expressions with Negative or
Zero Exponents**

**A.** $3^{-2}$

What is the base? _____    What is the reciprocal of the base? _____

What is the exponent? _____    What is the opposite of the exponent? _____

What is the reciprocal of the base raised to the opposite exponent? _____

**B.** $15^0$

What is the value of any real number, other than 0, raised to the zero power? _____

What is the value of $15^0$? _____

**Using Properties of Exponents to Simplify Expressions**
**Simplify each expression. Assume all variables are nonzero.**

**A.** $4x^2(-3x)$

What are the coefficients of the two terms? _____ and _____

Multiply the coefficients. _____ · _____ = _____

What are the powers of $x$? _____ and _____

When you multiply powers with the same base, you should _____ the powers.

What is the sum of the powers? _____ + _____ = _____

Simplify the expression. _____

**B.** $\left(\dfrac{x^2y^4}{y^3}\right)^2$

What variable is in both the numerator and the denominator? _____

Subtract the power of this variable in the denominator from the power in the numerator

and rewrite the expression. _____

What is the power outside the parentheses? _____

Multiply the power of each variable inside the parentheses by the power outside the

parentheses. _____

**Holt Algebra 2**

Name _____ Date _____ Class _____

# Ready to Go On? Problem Solving Intervention
## 1-5 Properties of Exponents

Use the properties of exponents to calculate with numbers expressed in scientific notation.

A chemist has several samples of a pure substance. Each sample has a mass of $0.4 \times 10^2$ g. How many samples were combined to form a single sample with a mass of $3.76 \times 10^5$ g?

## Understand the Problem

1. What information is provided? _____

   _____

2. What is the question being asked? _____

   _____

3. How is the mass of each sample related to the total combined mass? _____

   _____

   _____

## Make a Plan

4. How can you find the number of samples that were combined?

   _____

5. What steps do you follow to divide two numbers written in scientific notation?

   _____

## Solve

6. To find $\dfrac{3.76 \times 10^5}{0.4 \times 10^2}$ first divide 3.76 by 0.4. $3.76 \div 0.4 = $ _____

7. To determine the power on 10, subtract the exponents. $5 - 2 = $ _____

8. Write the answer in scientific notation. _____

## Look Back

9. Multiply the quotient by the divisor to check if the number of samples you found is correct.

   _____ $(0.4 \times 10^2) \overset{?}{=} 3.76 \times 10^5$

   Does your answer check? _____

Holt Algebra 2

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| SECTION | **Ready to Go On? Quiz** |
|---------|--------------------------|
| **1A** |  |

## 1-1  Sets of Numbers

**Order the given numbers from least to greatest. Then classify each number by the subsets of the real numbers to which it belongs.**

1. $4\frac{1}{2}$, $\sqrt{17}$, $-3.98$, $3.\overline{33}$ _____

   $4\frac{1}{2}$ : _____

   $\sqrt{17}$ : _____

   $-3.98$: _____

   $3.\overline{33}$: _____

2. $2\pi$, $6.5$, $\frac{2}{3}$, $-1$ _____

   $2\pi$ : _____

   $6.5$ : _____

   $\frac{2}{3}$ : _____

   $-1$ : _____

**Rewrite each set in the indicated notation.**

3. $\{x \mid -1 < x \le 1\}$ : interval notation _____

4.  : set builder notation _____

## 1-2  Properties of Real Numbers

**Identify the property demonstrated by each equation.**

5. $16 + 0 = 16$ _____

6. $(4ab) = (4a)b$ _____

7. $4(x + 2y) = 4x + 4(2y)$ _____

8. Use mental math to find a 15% rebate on an item that costs $180. Explain your steps.

   _____

   _____

   _____

**Holt Algebra 2**

**SECTION** **Ready to Go On? Quiz** continued

**1A**

### 1-3  Square Roots

**9.** Daphne is buying a ceiling border for her bedroom. The ceiling has an area of 256 square feet. If the border comes in rolls of 20 feet, how many rolls should she buy to place a border around the edges of the entire ceiling?

_____

**Simplify each expression.**

**10.** $\dfrac{-2\sqrt{6}}{\sqrt{3}}$ _____

**11.** $-\sqrt{40}$ _____

**12.** $\sqrt{8} \cdot \sqrt{32}$ _____

**13.** $3\sqrt{18} + 5\sqrt{2}$ _____

### 1-4  Simplifying Algebraic Expressions

**Evaluate each expression for the given values of the variables.**

**14.** $\dfrac{2b^2c}{3} + \dfrac{bc}{2}$ for $b = 2$ and $c = 6$ _____

**15.** $\dfrac{xy^2}{3x^2y}$ for $x = -1$ and $y = 3$ _____

**Simplify each expression.**

**16.** $8x^2 + 4y - 3x + 2x^2$ _____

**17.** $4(2x - y) - 3x + 2y$ _____

### 1-5  Properties of Elements

**Simplify each expression. Assume all variables are nonzero.**

**18.** $(a^{10}b^{-3})^2$ _____

**19.** $\dfrac{-2m^4n^{-2}}{m^{-2}n^4}$ _____

**20.** $5(x^3y^4)^{-2}$ _____

**21.** $\left(\dfrac{xy^3}{y^5}\right)^2$ _____

**22.** The average distance of Mercury from the Sun is about $5.8 \times 10^{10}$ m. Jupiter's average distance from the Sun is about $7.8 \times 10^{11}$ m. About how many times farther away from the Sun is Jupiter than Mercury?

_____

**Holt Algebra 2**

| SECTION | **Ready to Go On? Enrichment** |
|---------|--------------------------------|
| **1A**  |                                |

## Simplifying Expressions

**Simplify each expression on the left. Write the letter of the simplified expression on the line. Assume all variables are nonzero.**

**1.** $-3a^{-2}b(6ab^{-4})$ _____

**A.** $4x^2y^4$

**2.** $\left(\dfrac{1}{3}\right)x(9x^4)$ _____

**B.** $8x\sqrt{3}$

**3.** $\dfrac{4x(x^2 + 2x - 4)}{x}$ _____

**C.** $6.48x^3y$

**4.** $\sqrt{63x^3}$ _____

**D.** $\dfrac{y^2\sqrt{15}}{5}$

**5.** $\dfrac{(6x^2y^3)(2y)}{3}$ _____

**E.** $3x^5$

**6.** $\dfrac{2x^2y^3(4xy^2)^2}{8xy^5}$ _____

**F.** $5y\sqrt{3y}$

**7.** $4\sqrt{2x} \cdot \sqrt{6x}$ _____

**G.** $4x^2 + 8x - 16$

**8.** $y\sqrt{12y} + \sqrt{27y^3}$ _____

**H.** $3x\sqrt{7x}$

**9.** $3.6xy(1.8x^2)$ _____

**I.** $4x^3y^2$

**10.** $\sqrt{\dfrac{3y^5}{5y}}$ _____

**J.** $\dfrac{-18}{ab^3}$

**Fill in the blank to complete each equation.**

**11.** $(3x)^2 \cdot$ _____ $= 36x^3$

**12.** $3ab \cdot$ _____ $= 15a^3b$

**13.** $\dfrac{24m^5n^6}{\boxed{\phantom{xxx}}} = 6m^4n^5$

**14.** $\dfrac{25a^7b^3}{\boxed{\phantom{xxx}}} = 5a^5b^2$

**Holt Algebra 2**

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# Ready to Go On? Skills Intervention
**_1-6 Relations and Functions_**

**Find these vocabulary words in Lesson 1-6 and the Multilingual Glossary.**

| Vocabulary | | | |
|---|---|---|---|
| relation | domain | range | function |

## Identifying Domain and Range
**Give the domain and range for each relation.**

**A.**

| Table 1 | | | | | |
|---|---|---|---|---|---|
| Year | 2000 | 2001 | 2002 | 2003 | 2004 |
| Fee ($) | 1.50 | 2.00 | 2.00 | 2.50 | 3.00 |

List the ordered pairs. _____

_____

The input values make up the domain. Give the domain:

{_____} ← Set of *x*-coordinates

The output values make up the range. Give the range:

{_____} ← Set of *y*-coordinates

**B.**

List the ordered pairs. _____

The input values make up the domain. Give the domain:

{_____} ← Set of *x*-coordinates

The output values make up the range. Give the range:

{_____} ← Set of *y*-coordinates

## Determine Whether a Relation Is a Function

| *x* | 1 | 2 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| *y* | 5 | 10 | 15 | 20 | 25 |

What are the *x*-coordinates? _____

Are any of the *x*-coordinates repeated? _____ Is the relation a function? _____

**Holt Algebra 2**

Name _____ Date _____ Class _____

# Ready to Go On? Skills Intervention
## 1-7 Function Notation

**Find these vocabulary words in Lesson 1-7 and the Multilingual Glossary.**

| Vocabulary |
|---|
| function notation     dependent variable     independent variable |

## Evaluating Functions
**For each function, evaluate $f(0)$, $f(-1)$, and $f(2)$.**

**A.** $f(x) = 12x - 3$

Substitute 0 for $x$. $12(0) - 3$ Evaluate. $f(0) =$ _____

Substitute $-1$ for $x$. _____ Evaluate. $f(-1) =$ _____

Substitute 2 for $x$. _____ Evaluate. $f(2) =$ _____

**B.** $f(x) = 3x^2 + 1$

Substitute 0 for $x$. $3(0)^2 + 1$ Evaluate. $f(0) =$ _____

Substitute $-1$ for $x$. _____ Evaluate. $f(-1) =$ _____

Substitute 2 for $x$. _____ Evaluate. $f(2) =$ _____

## Graphing Functions
**Graph $f(x) = 2x + 4$.**

Complete the table.

Graph the ordered pairs and draw a line through the points.

| $x$ | $2x + 4$ | $y$ |
|---|---|---|
| 0 | $2(0) + 4$ | |
| 2 | | 8 |
| 4 | | |
| 6 | | |
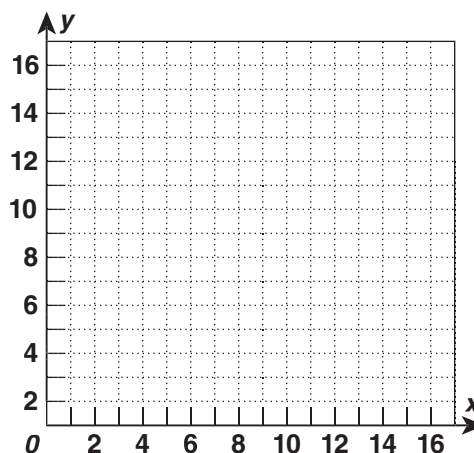
Write the ordered pairs.

_____   _____

_____   _____

## SECTION 1B  Ready to Go On? Problem Solving Intervention
### *1-7 Function Notation*

A banquet hall can host parties for up to 500 people. The cost of having a dinner party is $15 per person plus a $50 charge for preparing the room.

   **a.** Write a function to represent the cost of having a party.

   **b.** Give the value of the function for an input of 30 and explain its real-world meaning.

### Understand the Problem

   **1.** Describe the relationship between the number of people and the cost of the party.

   _____

   _____

   **2.** What will be the cost of preparing the room if there are 250 people? Explain.

   _____

   _____

### Make a Plan

   **3.** What is the dependent variable in the function? _____

   **4.** What is the independent variable in the function? _____

   **5.** What letters will you use to represent the variables in the function?

   _____

   **6.** What value is constant (does not change) in the function?

   _____

### Solve

   **7.** Write a function to relate the dependent variable to the independent variable and the constant.

   _____

   **8.** Use your function to find the value for an input of 30. What does this value mean?

   _____

### Look Back

   **9.** Find the fee for 10 people: _____ For 20 people: _____

   Does your answer for 30 people fit the pattern? _____

**Holt Algebra 2**

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**Find these vocabulary words in Lesson 1-8 and the Multilingual Glossary.**

**Vocabulary**

transformation        translation        reflection        stretch
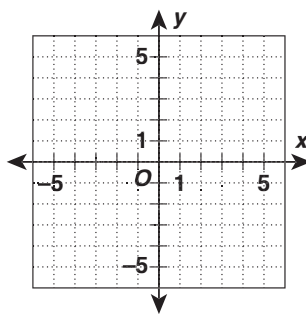
## Translating and Reflecting Functions

**Use a table to perform each transformation of $y = f(x)$. Use the same coordinate plane as the original function.**

**A.** translation down 3 units

Complete the table.

| x | y | y − 3 |
|---|---|-------|
| −3 | 3 | |
| 0 | 1 | |
| 3 | 2 | |

Graph the coordinates $(x, y)$.
Then graph the coordinates $(x, y − 3)$.

What happens to the graph $(x, y)$ after it is translated down 3 units?

_____

**B.** reflection across *x*-axis

Complete the table.

| x | y | −y |
|---|---|-----|
| −2 | 2 | |
| 0 | 0 | |
| 2 | 2 | |

← Multiply each *y*-coordinate by −1.

Graph the coordinates $(x, y)$.
Then graph the coordinates $(x, −y)$.
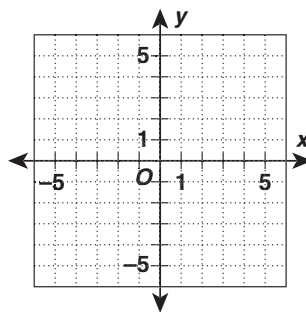
What happens to the graph $(x, y)$ after it is reflected across the *x*-axis?

_____

**Holt Algebra 2**

Name _____ Date _____ Class _____

# Ready to Go On? Problem Solving Intervention
## 1-8 Exploring Transformations

A local exercise gym charges different monthly fees depending on the length of the contract a person signs. The graph shows the various fees. Sketch a graph to represent each of the following situations and identify the transformation of the original graph that it represents.

**Gym Fees**
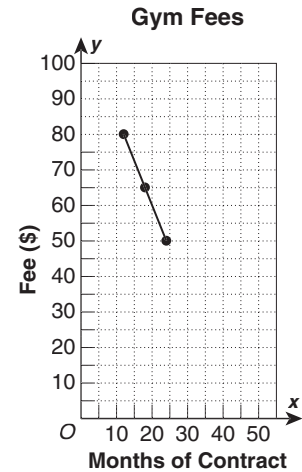
**a.** A coupon allows for monthly fees to be decreased by $5 per month.

**b.** A rise in costs causes monthly fees to increase by 10%.

### Understand the Problem

**1.** What does the line on the graph show?

_____

_____

**2.** Upon what does the monthly fee depend? _____

### Make a Plan

**3.** If monthly fees decrease by $5, the *x*-coordinate will remain the same and the

*y*-coordinate will decrease by _____.

**4.** If monthly fees increase by 10%, the *x*-coordinate will remain the same and

the *y*-coordinate will increase by _____.

### Solve

**5.** List three points from the original graph. (12, ___); (18, ___); (24, ___)

Write the new coordinates that result when monthly fees decrease by $5.

(12, ___); (18, ___); (24, ___) Plot the new points on the graph.

How is the graph translated? _____

**6.** Write the new coordinates that result when monthly fees increase by 10%.

(12, ___); (18, _____); (24, ___) Plot the new points on the graph. How is the

graph translated? _____

### Look Back

**7.** Look at the graphs. Do the translations match the change in the monthly fees?
Explain.

_____

_____

**17**

**Holt Algebra 2**

Name _____ Date _____ Class _____

Find this vocabulary word in Lesson 1-9 and the
Multilingual Glossary.

| **Vocabulary** |
| parent function |

**Identifying Transformations of Parent Functions**
Identify the parent function for *g* from its function rule. Then graph
*g* on your calculator and describe what transformation of the parent
function it represents.

**A.** $g(x) = x + 4$

What is the power of *x* in the function $g(x) = x + 4$? _____

What parent function has the same power? _____

Graph the function on your calculator.

How is the parent function transformed? _____

**B.** $g(x) = x^3 - 1$

What is the power of *x* in the function $g(x) = x^3 - 1$? _____

What parent function has the same power? _____

Graph the function on your calculator.

How is the parent function transformed? _____

**C.** $g(x) = (x + 2)^2$

What is the power of *x* in the function $g(x) = (x + 2)^2$? _____

What parent function has the same power? _____

Graph the function on your calculator.

How is the parent function transformed? _____

**D.** $g(x) = 3x$

What is the power of *x* in the function $g(x) = 3x$? _____

What parent function has the same power? _____

Graph the function on your calculator.

How is the parent function transformed? _____

_____

Name _____ Date _____ Class _____

# Ready to Go On? Problem Solving Intervention
## *1-9 Introduction to Parent Functions*

Parent functions can help you sketch a curve to approximate
those values not in a data table.

The table lists the distance an object has fallen after a given
number of seconds. Graph the relationship between distance and
time and identify which parent function best describes this function.
Then use the graph to estimate the distance the object will have
fallen after 10 seconds.

| **Falling Object** | |
|---|---|
| **Time (s)** | **Distance (ft)** |
| 1 | 16 |
| 2 | 64 |
| 3 | 144 |
| 4 | 256 |
| 5 | 400 |

## Understand the Problem

**1.** What information is shown in the table? _____

_____

**2.** What are the input values? _____

**3.** What are the output values? _____

## Make a Plan

**4.** What variable should be plotted on the *x*-axis of the graph? _____

**5.** What variable should be plotted on the *y*-axis of the graph? _____

## Solve

**6.** List five points to plot on the graph based on the information in the table.

(1, 16); (2, _____); (_____, 144); (_____, _____); (_____, _____)

**7.** Graph the points you listed in Exercise 6.
Draw a smooth curve through them.

**8.** What is the shape of the graph?

_____

What is the parent function? _____

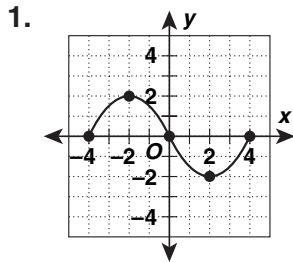**9.** Estimate the distance traveled by the object after
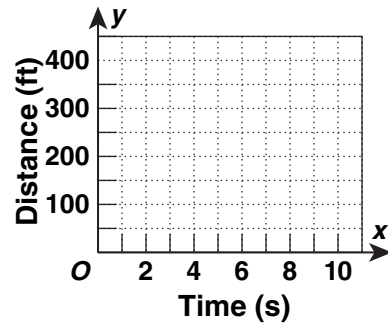
10 seconds. _____

## Look Back

**10.** Extend the line in the graph. Is it close to the estimate? _____

**Holt Algebra 2**

Name _____ Date _____ Class _____

## Ready to Go On? Quiz

### 1-6 Relations and Functions

**Give the domain and range for each relation. Then tell whether the relation is a function.**

**1.**



Domain: _____
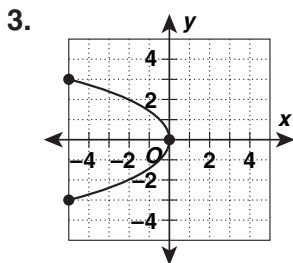
Range: _____

Is this relation a function? _____

**2.**

| x | 10 | 20 | 30 | 40 |
|---|----|----|----|----|
| y | 20 | 40 | 60 | 80 |

Domain: _____

Range: _____

Is this relation a function? _____

**3.**



Domain: _____

Range: _____

Is this relation a function? _____

### 1-7 Function Notation

**For each function, determine $f(0)$, $f(1)$, and $f(-2)$.**

**4.** $f(x) = 2 + x^2$

$f(0) =$ _____

$f(1) =$ _____

$f(-2) =$ _____

**5.** $f(x) = x^3 + 4$

$f(0) =$ _____

$f(1) =$ _____

$f(-2) =$ _____

**6.** $f(x) = 8 - 2x$

$f(0) =$ _____

$f(1) =$ _____

$f(-2) =$ _____

**7.** A baseball pitching machine costs $5 to turn on and $0.50 for each set of 10 pitches.

**a.** Write a function to represent the cost of the pitching machine per set of pitches.



_____

**b.** Graph your function.

**c.** Give the value of the function for an input of 3 and explain its real-world meaning.
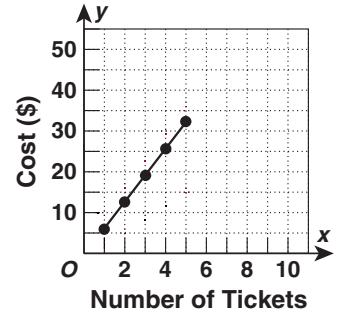
_____

**20**

**Holt Algebra 2**

Name _____ Date _____ Class _____
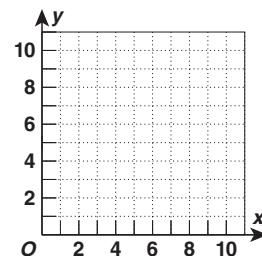
## 1-8 Exploring Transformations
**The graph shows the cost of movie tickets at a particular theater. Sketch a graph to represent each situation and identify the transformation of the original graph that it represents.**

8. The cost of a ticket increases by $3 for special movie premieres.

   Transformation: _____

9. Senior citizens receive a discount of 50%.

   Transformation: _____

## 1-9 Introduction to Parent Functions
**Identify the parent function for *g* from its equation. Then graph *g* on your calculator and describe what transformation of the parent function it represents.**

10. $g(x) = 2.5x$

    Parent function: _____     Transformation: _____

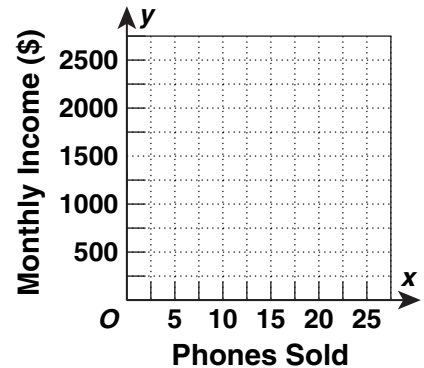11. $g(x) = x^2 + 6$

    Parent function: _____     Transformation: _____

12. $g(x) = x^3 - 4$

    Parent function: _____     Transformation: _____

13. Graph the relationship between the number of cell phones sold and monthly income. Identify which parent function best describes the relationship. Then use the graph to estimate the monthly income when 50 cell phones are sold.

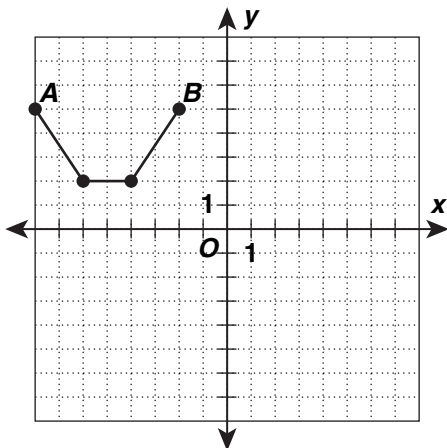| Cell Phone Sales Income | |
|---|---|
| **Phones Sold** | **Monthly Income ($)** |
| 5 | 750 |
| 10 | 1000 |
| 15 | 1250 |
| 20 | 1500 |

_____

**Holt Algebra 2**
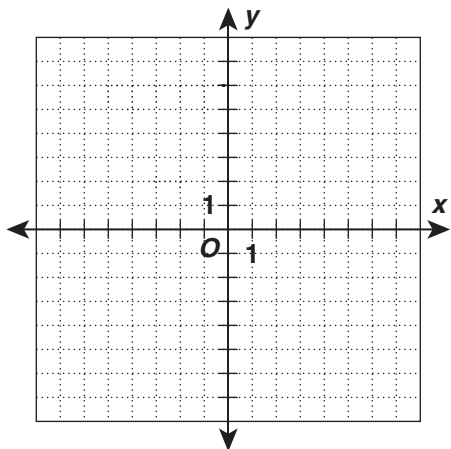
Name _____ Date _____ Class _____

# Ready to Go On? Enrichment
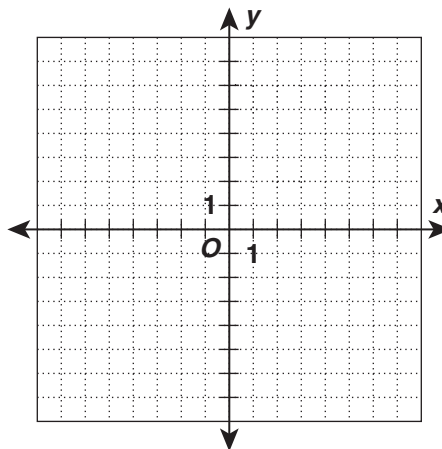
## Exploring Transformations

**Transform y = f(x) through the series of changes described. Draw each transformation on the grids provided.**
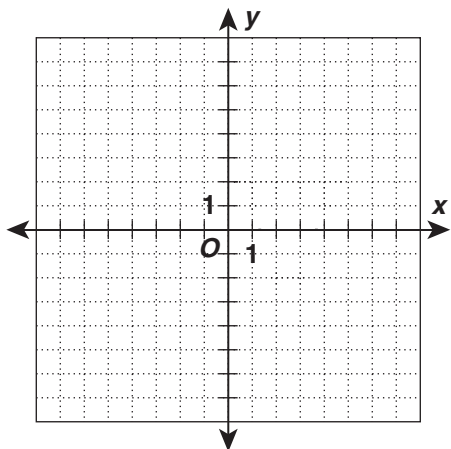


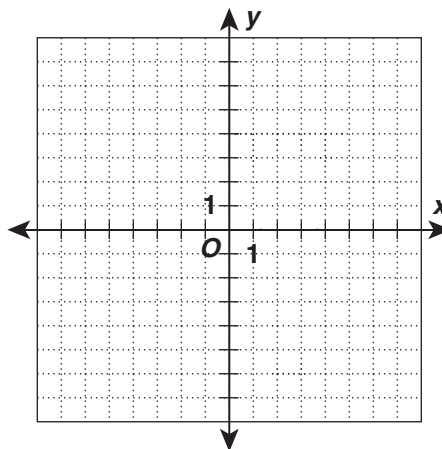**1.** horizontal compression by a factor of $\frac{1}{2}$



**2.** then a reflection across the *y*-axis



**3.** then a translation down four units



**4.** then a vertical stretch by a factor of 3

**22**

**Holt Algebra 2**

## SECTION 1A — Ready to Go On? Skills Intervention
### 1-1 Sets of Numbers

**Find these vocabulary words in Lesson 1-1 and the Multilingual Glossary.**

**Vocabulary**

| | | | | |
|---|---|---|---|---|
| set | element | subset | empty set | roster notation | finite set |
| infinite set | | interval notation | | set-builder notation |

**Ordering and Classifying Real Numbers**
Order the numbers from least to greatest. Then classify each number by the subsets of the real numbers to which it belongs.

$3.4, -2\frac{1}{4}, \sqrt{6}, -\frac{2}{5}, 0.5892$

Rewrite these numbers as decimals.

$-2\frac{1}{4} = \underline{-2.25}$, $\sqrt{6} \approx \underline{2.45}$, $-\frac{2}{5} = \underline{-0.4}$

Is $-2$ greater than or less than $-1$?

$\underline{\text{Less than}}$

Order the numbers from least to greatest.

$\underline{-2\frac{1}{4}}, \underline{-\frac{2}{5}}, \underline{0.5892}, \underline{\sqrt{6}}, \underline{3.4}$

| Number | Real | Rational | Irrational |
|---|---|---|---|
| 3.4 | x | x | |
| $-2\frac{1}{4}$ | x | x | |
| $\sqrt{6}$ | x | | x |
| $-\frac{2}{5}$ | x | x | |
| 0.5892 | x | x | |

Irrational numbers are non-$\underline{\text{terminating}}$ and non-$\underline{\text{repeating}}$ decimals.

Classify the numbers by completing the table.

**Interval Notation and Set-Builder Notation**
Rewrite the sets in the indicated notation.

**A.** $-2 < x \le 8$: interval notation

Is $-2$ included? $\underline{\text{No}}$   Is 8 included? $\underline{\text{Yes}}$

Write the correct notation. Use [ ] to include an endpoint and ( ) to exclude an endpoint. $\underline{(-2, 8]}$

**B.** : set-builder notation
$-5\,-4\,-3\,-2\,-1\ 0\ 1\ 2\ 3\ 4\ 5$

What does an empty circle at 4 represent? $\underline{\text{4 is not part of the set.}}$
What does a solid circle at $-2$ represent? $\underline{-2\text{ is part of the set.}}$
Write the correct notation for the set. $\underline{\{x \mid -2 \le x < 4\}}$

Holt Algebra 2

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## SECTION 1A — Ready to Go On? Skills Intervention
### 1-2 Properties of Real Numbers

**Finding Inverses**
Find the additive and multiplicative inverse for $-6$.

What is the opposite of $-6$? $\underline{6}$   What is the sum of $-6$ and its opposite? $\underline{0}$

What is the opposite of a number called? $\underline{\text{Additive inverse}}$

So, the additive inverse of $-6$ is $\underline{6}$.

What is the reciprocal of a number called? $\underline{\text{Multiplicative inverse}}$

What is the reciprocal of $-6$? $\underline{-\frac{1}{6}}$   What is the product of $-6$ and its reciprocal? $\underline{1}$

So, the multiplicative inverse of $-6$ is $\underline{-\frac{1}{6}}$.

**Identifying Properties of Real Numbers**
Identify the property demonstrated by each equation.

**A.** $3(a + 4b) = 3a + 12b$

What number is multiplied by each term in the parentheses? $\underline{3}$

What property involves multiplying a sum by a number? $\underline{\text{Distributive Property}}$

**B.** $4 + (\sqrt{2} + 6) = (4 + \sqrt{2}) + 6$

Is the grouping of numbers on the left side of the equation the same as the grouping on the right side of the equation? $\underline{\text{No}}$

What property involves changing the grouping of terms being added?
$\underline{\text{Associative Property of Addition}}$

**Using Properties of Real Numbers**
Apply the property described to complete the equation.

**A.** $2(c + 2b) = ?$   Distributive Property

Find $2 \times c$. $\underline{2c}$   Find $2 \times 2b$. $\underline{4b}$

Write the sum of the products. $2(c + 2b) = \underline{2c + 4b}$

**B.** $16 + 12 = ?$   Commutative Property

The Commutative Property states that two or more real numbers can be $\underline{\text{added}}$ or multiplied in any $\underline{\text{order}}$ without changing the result.

Use the Commutative Property. $16 + 12 = \underline{12} + \underline{16}$

Holt Algebra 2

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## SECTION 1A — Ready to Go On? Problem Solving Intervention
### 1-2 Properties of Real Numbers

You can apply the properties of real numbers to solve problems mentally.

Miranda wants to add a 15% tip to a bill of $32.60. Use mental math to find the tip.

**Understand the Problem**

**1.** How can you use mental math to find the percent of a number? $\underline{\text{Break down the given percentages into compatible numbers that are easy to mentally calculate, such as multiples of 10.}}$

**2.** Explain how to move the decimal point of a dollar amount to quickly determine 10% of a number? $\underline{\text{Move the decimal point one place to the left.}}$

**Make a Plan**

**3.** A tip of 15% is the same as 10% + $\underline{5\%}$.

**4.** If Miranda finds 10% of the bill, how can she use this value to find 5% of the bill?
$\underline{\text{She can divide the number in half because 5\% is half of 10\%.}}$

**Solve**

**5.** What is 10% of 32.60? $\underline{3.26}$

**6.** What is 5% of 32.60? $\underline{1.63}$

**7.** Complete to find the tip.

Tip = 15% of 32.60 = 10% of 32.6 + 5% of 32.60

Tip = $\underline{\$4.89}$

**Look Back**

**8.** Round $32.60 down to $30.00. What is 15% of $30? $\underline{\$4.50}$

**9.** Use the result from Exercise 8, to check if your answer to Exercise 7 is reasonable.
$\underline{\$4.50\text{ is close to }\$4.89.\text{ The answer is reasonable.}}$

Holt Algebra 2

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## SECTION 1A — Ready to Go On? Skills Intervention
### 1-3 Square Roots

**Find these vocabulary words in Lesson 1-3 and the Multilingual Glossary.**

**Vocabulary**

| | | |
|---|---|---|
| radical symbol | radicand | principal root |
| like radical terms | rationalize the denominator | |

**Simplifying Square-Root Expressions**
Simplify each expression.

**A.** $\sqrt{75}$
What are the factors of 75? $\underline{1, 3, 5, 15, 25, 75}$
Which factor of 75 is a perfect square? $\underline{25}$
Rewrite $\sqrt{75}$ using its factors. $\sqrt{75} = \sqrt{\underline{25} \cdot \underline{3}}$
Use the Product Property of Square Roots to complete this expression:
$\sqrt{75} = \sqrt{\underline{25} \cdot \underline{3}} = \underline{5}\sqrt{3}$

**B.** $\frac{\sqrt{108}}{\sqrt{3}}$
Rewrite the expression as the square root of a quotient. $\frac{\sqrt{108}}{\sqrt{3}} = \sqrt{\frac{\underline{108}}{\underline{3}}}$
Use the Quotient Property of Square Roots to complete the expression.
*Hint*: Divide the numerator by the denominator. Then find the square root.
$\sqrt{\frac{\underline{108}}{\underline{3}}} = \sqrt{\underline{36}} = \underline{6}$

**Rationalizing the Denominator**
Simplify. $\frac{4\sqrt{3}}{\sqrt{5}}$
Complete the fraction to make a factor of 1. $\frac{\sqrt{\underline{5}}}{\sqrt{5}} = 1$
Multiply the expression by the factor of 1 and simplify.
$\frac{4\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{\underline{5}}}{\sqrt{5}} = \frac{4 \cdot \sqrt{\underline{3} \cdot \underline{5}}}{\underline{5}} = \frac{4 \cdot \sqrt{\underline{15}}}{\underline{5}}$

**Adding and Subtracting Square Roots**

**A.** $2\sqrt{7} + 3\sqrt{7}$
What are the coefficients? $\underline{2}$ and $\underline{3}$   Add the coefficients. $\underline{2} + \underline{3} = \underline{5}$
Are the radical terms the same? $\underline{\text{Yes}}$ If so, then combine like terms. $\underline{5\sqrt{7}}$

**B.** $6\sqrt{2} - \sqrt{8}$
Can either radical be simplified? $\underline{\text{Yes}}$ If so, simplify radical terms. $\sqrt{8} = \underline{2}\sqrt{\underline{2}}$
What are the coefficients? $\underline{6}$ and $\underline{2}$
Subtract the coefficients. $\underline{6} - \underline{2} = \underline{4}$   Combine like radical terms. $\underline{4\sqrt{2}}$

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## Ready to Go On? Problem Solving Intervention

**SECTION 1A**  *1-3 Square Roots*

The side length of a square is the square root of its area.

A builder is adding a square patio to a garden. He can build a patio with an area of 49, 81, or 121 square feet. Find the dimensions of each patio. Then identify which of the three sizes is the largest patio that can fit in a space that is 9 feet wide and 12 feet long.

**Understand the Problem**

1. What is the builder trying to do? __Build the largest patio in a given space.__

2. How is the area of a square calculated? __$A = s^2$__

**Make a Plan**

3. How can the builder determine the length of the sides of each patio?
   __By taking the square root of the area of each patio.__

4. How can you determine which patio will fit in the space described?
   __Compare the lengths of the sides of each square to the__
   __measurements of the space.__

**Solve**

5. What are the lengths of the sides of each patio?
   49 square feet: __7 ft__, 81 square feet: __9 ft__, 121 square feet: __11 ft__

6. How much area is in a 9 ft by 12 ft space? __108 ft$^2$__

7. Which patio(s) will fit in a space that measures 9 ft by 12 ft?
   __49 ft$^2$ and 81 ft$^2$__

8. Which is the largest patio that can fit in the space? __81 ft$^2$__

**Look Back**

9. Draw a diagram to show that the patio fits in the given space.
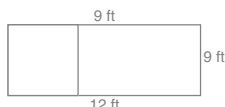
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## Ready to Go On? Skills Intervention

**SECTION 1A**  *1-4 Simplifying Algebraic Expressions*

**Evaluating Algebraic Expressions**
Evaluate each expression for the given values of the variables.

**A.** $2x - xy + 4y$ for $x = 3$ and $y = 5$

Complete the steps for the order of operations.

Step 1: Parentheses and __grouping symbols__
Step 2: Exponents
Step 3: __Multiply__ and divide from left to __right__.
Step 4: __Add__ and __Subtract__ from __left__ to right.

Rewrite the expression substituting 3 for each $x$ and 5 for each $y$.
__$2(3) - 3(5) + 4(5)$__

To evaluate this expression, first __multiply__ from left to right.
Perform the first step. __$6 - 15 + 20$__
Now add and subtract from left to right. What is the result? __11__

**B.** $2a^2b + 3ab - b^2$ for $a = 4$ and $b = 3$

Rewrite the expression replacing 4 for each $a$ and 3 for each $b$.
__$2(4^2)(3) + 3(4)(3) - (3^2)$__

To evaluate this expression, first evaluate __exponents__.
Perform the first step. __$2(16)(3) + 3(4)(3) - 9$__
Now multiply from left to right. __$96 + 36 - 9$__
Add and subtract from left to right. What is the result? __123__

**Simplifying Expressions**
Simplify each expression.

**A.** $3x^2 + 2x - y + x^2$

Rewrite the expression so that like terms are together. __$3x^2 + x^2 + 2x - y$__
Combine like terms. __$4x^2 + 2x - y$__

**B.** $s(3t^2 + 4u) - st^2 + 2su$

Distribute the term outside the parentheses. __$3st^2 + 4su - st^2 + 2su$__
Rewrite the expression so that like terms are together. __$3st^2 - st^2 + 4su + 2su$__
Combine like terms. __$2st^2 + 6su$__

---

## Ready to Go On? Skills Intervention

**SECTION 1A**  *1-5 Properties of Exponents*

**Find this vocabulary word in Lesson 1-5 and the Multilingual Glossary.**

| Vocabulary |
|---|
| scientific notation |

**Evaluating Expressions with Negative or Zero Exponents**

**A.** $3^{-2}$

What is the base? __3__    What is the reciprocal of the base? __$\frac{1}{3}$__

What is the exponent? __$-2$__    What is the opposite of the exponent? __2__

What is the reciprocal of the base raised to the opposite exponent? __$\frac{1}{3^2}$__

**B.** $15^0$

What is the value of any real number, other than 0, raised to the zero power? __1__

What is the value of $15^0$? __1__

**Using Properties of Exponents to Simplify Expressions**
Simplify each expression. Assume all variables are nonzero.

**A.** $4x^2(-3x)$

What are the coefficients of the two terms? __4__ and __$-3$__

Multiply the coefficients. __4__ · __$-3$__ = __$-12$__

What are the powers of $x$? __$x^2$__ and __$x$__

When you multiply powers with the same base, you should __add__ the powers.

What is the sum of the powers? __2__ + __1__ = __3__

Simplify the expression. __$-12x^3$__

**B.** $\left(\dfrac{x^2y^4}{y^3}\right)^2$

What variable is in both the numerator and the denominator? __$y$__

Subtract the power of this variable in the denominator from the power in the numerator and rewrite the expression. __$(x^2y)^2$__

What is the power outside the parentheses? __2__

Multiply the power of each variable inside the parentheses by the power outside the parentheses. __$x^4y^2$__

---

## Ready to Go On? Problem Solving Intervention

**SECTION 1A**  *1-5 Properties of Exponents*

Use the properties of exponents to calculate with numbers expressed in scientific notation.

A chemist has several samples of a pure substance. Each sample has a mass of $0.4 \times 10^2$ g. How many samples were combined to form a single sample with a mass of $3.76 \times 10^5$ g?

**Understand the Problem**

1. What information is provided? __The mass of each sample, and the__
   __total combined masses__

2. What is the question being asked? __How many samples are needed to__
   __make up the total mass?__

3. How is the mass of each sample related to the total combined mass? __The__
   __total mass divided by the sample mass is equal to the__
   __number of samples.__

**Make a Plan**

4. How can you find the number of samples that were combined?
   __Divide the total mass by the mass of each sample.__

5. What steps do you follow to divide two numbers written in scientific notation?
   __Divide the decimals and subtract the exponents.__

**Solve**

6. To find $\dfrac{3.76 \times 10^5}{0.4 \times 10^2}$ first divide 3.76 by 0.4. $3.76 \div 0.4 =$ __9.4__

7. To determine the power on 10, subtract the exponents. $5 - 2 =$ __3__

8. Write the answer in scientific notation. __$9.4 \times 10^3$ grams__

**Look Back**

9. Multiply the quotient by the divisor to check if the number of samples you found is correct.

   __$9.4 \times 10^3$__ $(0.4 \times 10^2) \stackrel{?}{=} 3.76 \times 10^5$

   Does your answer check? __Yes__

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Holt Algebra 2
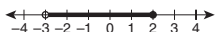
### 1-1 Sets of Numbers

Order the given numbers from least to greatest. Then classify each number by the subsets of the real numbers to which it belongs.

1. $4\frac{1}{2}$, $\sqrt{17}$, $-3.98$, $3.\overline{33}$     $-3.98, 3.\overline{33}, \sqrt{17}, 4\frac{1}{2}$

   $4\frac{1}{2}$ :    **Rational**

   $\sqrt{17}$ :    **Irrational**

   $-3.98$:    **Rational**

   $3.\overline{33}$:    **Rational**

2. $2\pi$, $6.5$, $\frac{2}{3}$, $-1$     $-1, \frac{2}{3}, 2\pi, 6.5$

   $2\pi$ :    **Irrational**

   $6.5$ :    **Rational**

   $\frac{2}{3}$ :    **Rational**

   $-1$ :    **Integers**

Rewrite each set in the indicated notation.

3. $\{x \mid -1 < x \le 1\}$ : interval notation    $(-1, 1]$

4. (number line: $-4$ to $4$, open at $-3$, closed at $2$) : set builder notation   $\{x \mid -3 < x \le 2\}$

### 1-2 Properties of Real Numbers

Identify the property demonstrated by each equation.

5. $16 + 0 = 16$   **Additive Identity Property**

6. $(4ab) = (4a)b$   **Associative Property of Multiplication**

7. $4(x + 2y) = 4x + 4(2y)$   **Distributive Property**

8. Use mental math to find a 15% rebate on an item that costs $180. Explain your steps.

   **$27; $180 × 0.10 = $18; $\frac{1}{2}$ of $18 = 9; $18 + $9 = $27**

---

### 1-3 Square Roots

9. Daphne is buying a ceiling border for her bedroom. The ceiling has an area of 256 square feet. If the border comes in rolls of 20 feet, how many rolls should she buy to place a border around the edges of the entire ceiling?

   **4 rolls**

Simplify each expression.

10. $\dfrac{-2\sqrt{6}}{\sqrt{3}}$   $-2\sqrt{2}$     11. $-\sqrt{40}$   $-2\sqrt{10}$

12. $\sqrt{8} \cdot \sqrt{32}$   $16$     13. $3\sqrt{18} + 5\sqrt{2}$   $14\sqrt{2}$

### 1-4 Simplifying Algebraic Expressions

Evaluate each expression for the given values of the variables.

14. $\dfrac{2b^2c}{3} + \dfrac{bc}{2}$ for $b = 2$ and $c = 6$   $22$

15. $\dfrac{xy^2}{3x^2y}$ for $x = -1$ and $y = 3$   $-1$

Simplify each expression.

16. $8x^2 + 4y - 3x + 2x^2$   $10x^2 - 3x + 4y$

17. $4(2x - y) - 3x + 2y$   $5x - 2y$

### 1-5 Properties of Elements

Simplify each expression. Assume all variables are nonzero.

18. $(a^{10}b^{-3})^2$   $\dfrac{a^{20}}{b^6}$     19. $\dfrac{-2m^4n^{-2}}{m^{-2}n^4}$   $\dfrac{-2m^6}{n^6}$

20. $5(x^3y^4)^{-2}$   $\dfrac{5}{x^6y^8}$     21. $\left(\dfrac{xy^3}{y^5}\right)^2$   $\dfrac{x^2}{y^4}$

22. The average distance of Mercury from the Sun is about $5.8 \times 10^{10}$ m. Jupiter's average distance from the Sun is about $7.8 \times 10^{11}$ m. About how many times farther away from the Sun is Jupiter than Mercury?

   **13.4**

---

### Simplifying Expressions

Simplify each expression on the left. Write the letter of the simplified expression on the line. Assume all variables are nonzero.

1. $-3a^{-2}b(6ab^{-4})$   **J**      A. $4x^2y^4$

2. $\left(\frac{1}{3}\right)x(9x^4)$   **E**      B. $8x\sqrt{3}$

3. $\dfrac{4x(x^2 + 2x - 4)}{x}$   **G**      C. $6.48x^3y$

4. $\sqrt{63x^3}$   **H**      D. $\dfrac{y^2\sqrt{15}}{5}$

5. $\dfrac{(6x^2y^3)(2y)}{3}$   **A**      E. $3x^5$

6. $\dfrac{2x^2y^3(4xy^2)^2}{8xy^5}$   **I**      F. $5y\sqrt{3y}$

7. $4\sqrt{2x} \cdot \sqrt{6x}$   **B**      G. $4x^2 + 8x - 16$

8. $y\sqrt{12y} + \sqrt{27y^3}$   **F**      H. $3x\sqrt{7x}$

9. $3.6xy(1.8x^2)$   **C**      I. $4x^3y^2$

10. $\sqrt{\dfrac{3y^5}{5y}}$   **D**      J. $\dfrac{-18}{ab^3}$

Fill in the blank to complete each equation.

11. $(3x)^2 \cdot$ _**4x**_ $= 36x^3$      12. $3ab \cdot$ _**5a²**_ $= 15a^3b$

13. $\dfrac{24m^5n^6}{\boxed{4mn}} = 6m^4n^5$      14. $\dfrac{25a^7b^3}{\boxed{5a^2b}} = 5a^5b^2$

---

Find these vocabulary words in Lesson 1-6 and the Multilingual Glossary.

| Vocabulary | | | |
|---|---|---|---|
| relation | domain | range | function |

**Identifying Domain and Range**
Give the domain and range for each relation.

A.

| Table 1 | | | | |
|---|---|---|---|---|
| Year | 2000 | 2001 | 2002 | 2003 | 2004 |
| Fee ($) | 1.50 | 2.00 | 2.00 | 2.50 | 3.00 |

List the ordered pairs.   **(2000, 1.50), (2001, 2.00), (2002, 2.00), (2003, 2.50), (2004, 3.00)**
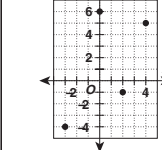
The input values make up the domain. Give the domain:

$\{$ **2000, 2001, 2002, 2003, 2004** $\}$ ← Set of $x$-coordinates

The output values make up the range. Give the range:

$\{$ **1.50, 2.00, 2.50, 3.00** $\}$ ← Set of $y$-coordinates

B. (graph)

List the ordered pairs. **(0, 6), (4, 5), (2, −1), (−3, −4)**

The input values make up the domain. Give the domain:

$\{$ **0, 4, 2, −3** $\}$ ← Set of $x$-coordinates

The output values make up the range. Give the range:

$\{$ **6, 5, −1, −4** $\}$ ← Set of $y$-coordinates

**Determine Whether a Relation Is a Function**

| $x$ | 1 | 2 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| $y$ | 5 | 10 | 15 | 20 | 25 |

What are the $x$-coordinates?   **1, 2, 3, 2, 1**

Are any of the $x$-coordinates repeated? **Yes** Is the relation a function? **No**

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## Ready to Go On? Skills Intervention
### 1-9 Introduction to Parent Functions

Find this vocabulary word in Lesson 1-9 and the Multilingual Glossary.

| Vocabulary |
| --- |
| parent function |

**Identifying Transformations of Parent Functions**
Identify the parent function for *g* from its function rule. Then graph *g* on your calculator and describe what transformation of the parent function it represents.

**A.** $g(x) = x + 4$

What is the power of *x* in the function $g(x) = x + 4$? *x has a power of 1.*

What parent function has the same power? *The parent function is linear.*

Graph the function on your calculator.

How is the parent function transformed? *The parent function is shifted up 4 units.*

**B.** $g(x) = x^3 - 1$

What is the power of *x* in the function $g(x) = x^3 - 1$? *x has a power of 3.*

What parent function has the same power? *The parent function is cubic.*

Graph the function on your calculator.

How is the parent function transformed? *The parent function is shifted down 1 unit.*

**C.** $g(x) = (x + 2)^2$

What is the power of *x* in the function $g(x) = (x + 2)^2$? *x has a power of 2.*

What parent function has the same power? *The parent function is quadratic.*

Graph the function on your calculator.

How is the parent function transformed? *The parent function is shifted left 2 units.*

**D.** $g(x) = 3x$

What is the power of *x* in the function $g(x) = 3x$? *x has a power of 1.*

What parent function has the same power? *The parent function is linear.*

Graph the function on your calculator.

How is the parent function transformed? *The parent function is rotated counterclockwise.*

**Holt Algebra 2**

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## Ready to Go On? Problem Solving Intervention
### 1-9 Introduction to Parent Functions

Parent functions can help you sketch a curve to approximate those values not in a data table.

The table lists the distance an object has fallen after a given number of seconds. Graph the relationship between distance and time and identify which parent function best describes this function. Then use the graph to estimate the distance the object will have fallen after 10 seconds.

| Falling Object | |
| --- | --- |
| Time (s) | Distance (ft) |
| 1 | 16 |
| 2 | 64 |
| 3 | 144 |
| 4 | 256 |
| 5 | 400 |

**Understand the Problem**

1. What information is shown in the table? *The distance an object has fallen after a certain number of seconds.*

2. What are the input values? *The time in seconds*

3. What are the output values? *The distance in feet*

**Make a Plan**

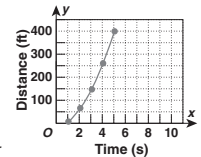4. What variable should be plotted on the *x*-axis of the graph? *Time*

5. What variable should be plotted on the *y*-axis of the graph? *Distance*

**Solve**

6. List five points to plot on the graph based on the information in the table.

   (1, 16); (2, _64_); (_3_, 144); (_4_, _256_); (_5_, _400_)

7. Graph the points you listed in Exercise 6. Draw a smooth curve through them.

8. What is the shape of the graph? *Upward curve*

   What is the parent function? *Quadratic*



9. Estimate the distance traveled by the object after 10 seconds. *1600 ft*

**Look Back**

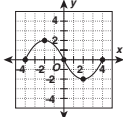10. Extend the line in the graph. Is it close to the estimate? *Yes*

**Holt Algebra 2**

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## Ready to Go On? Quiz

### 1-6 Relations and Functions
Give the domain and range for each relation. Then tell whether the relation is a function.

**1.**



Domain: _{−4, −2, 0, 2, 4}_

Range: _{0, 2, 0, −2, 0}_
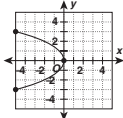
Is this relation a function? *Yes*

**2.**

| x | 10 | 20 | 30 | 40 |
| --- | --- | --- | --- | --- |
| y | 20 | 40 | 60 | 80 |

Domain: _{10, 20, 30, 40}_

Range: _{20, 40, 60, 80}_

Is this relation a function? *Yes*

**3.**



Domain: _{−5, 0, −5}_

Range: _{3, 0, −3}_

Is this relation a function? *No*

### 1-7 Function Notation
For each function, determine $f(0)$, $f(1)$, and $f(-2)$.

**4.** $f(x) = 2 + x^2$
$f(0) = $ _2_
$f(1) = $ _3_
$f(-2) = $ _6_

**5.** $f(x) = x^3 + 4$
$f(0) = $ _4_
$f(1) = $ _5_
$f(-2) = $ _−4_

**6.** $f(x) = 8 - 2x$
$f(0) = $ _8_
$f(1) = $ _6_
$f(-2) = $ _12_

**7.** A baseball pitching machine costs $5 to turn on and $0.50 for each set of 10 pitches.
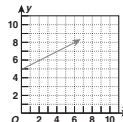
a. Write a function to represent the cost of the pitching machine per set of pitches.

$c = 5 + 0.5p$



b. Graph your function.

c. Give the value of the function for an input of 3 and explain its real-world meaning.

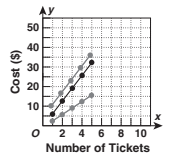*$6.50; Three sets of 10 pitches, or 30 pitches, costs $6.50.*

**Holt Algebra 2**

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## Ready to Go On? Quiz continued

### 1-8 Exploring Transformations
The graph shows the cost of movie tickets at a particular theater. Sketch a graph to represent each situation and identify the transformation of the original graph that it represents.



8. The cost of a ticket increases by $3 for special movie premieres.

   Transformation: *The graph is shifted upward 3 units.*

9. Senior citizens receive a discount of 50%.

   Transformation: *The graph is shifted downward by 50%.*

### 1-9 Introduction to Parent Functions
Identify the parent function for *g* from its equation. Then graph *g* on your calculator and describe what transformation of the parent function it represents.

10. $g(x) = 2.5x$

   Parent function: *$f(x) = x$*    Transformation: *Rotation*

11. $g(x) = x^2 + 6$

   Parent function: *$f(x) = x^2$*    Transformation: *Shifted upward 6 units*

12. $g(x) = x^3 - 4$

   Parent function: *$f(x) = x^3$*    Transformation: *Shifted down 4 units*

13. Graph the relationship between the number of cell phones sold and monthly income. Identify which parent function best describes the relationship. Then use the graph to estimate the monthly income when 50 cell phones are sold.

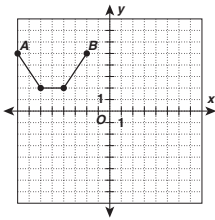| Cell Phone Sales Income | |
| --- | --- |
| Phones Sold | Monthly Income ($) |
| 5 | 750 |
| 10 | 1000 |
| 15 | 1250 |
| 20 | 1500 |


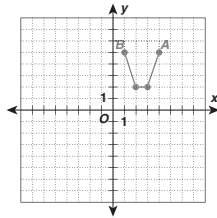
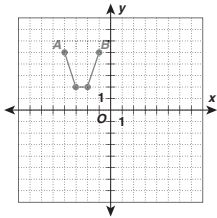*Linear function; $3000*
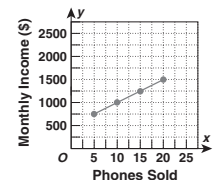
**Holt Algebra 2**

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**Holt Algebra 2**

## Ready to Go On? Enrichment
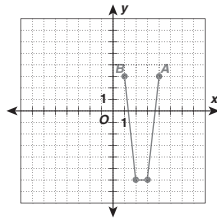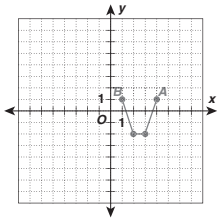
**Exploring Transformations**

Transform $y = f(x)$ through the series of changes described. Draw each transformation on the grids provided.



**1.** horizontal compression by a factor of $\frac{1}{2}$



**2.** then a reflection across the $y$-axis



**3.** then a translation down four units



**4.** then a vertical stretch by a factor of 3

**22**  Holt Algebra 2

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## Ready To Go On? Skills Intervention
### 2-1 Solving Linear Equations and Inequalities

Find these vocabulary words in Lesson 2-1 and the Multilingual Glossary.

**Vocabulary**

| | | |
|---|---|---|
| equation | solution of an equation | linear equation in one variable |
| identity | contradiction | inequality |

**Solving Equations with Variables on Both Sides**

Solve. $10 - 2x = 19 - 4x$

$10 - 2x = 19 - 4x$ — To get the constant on one side of the equation, subtract 10 from both sides of the equation.

$\underline{-10 \qquad -10}$

$\boxed{-2x} = \boxed{9} - 4x$ — To get the variable on one side of the equation, add $4x$ to both sides of the equation.

$\underline{+4x \qquad +4x}$

$\boxed{2x} = 9$

$\dfrac{2x}{2} = \dfrac{\boxed{9}}{2}$ — To isolate $x$, divide both sides of the equation by $\underline{2}$.

$x = \underline{4.5}$ — Solve for $x$.

**Solving Inequalities**

Solve and graph. $\frac{3}{2}(2x + 8) \leq 15$

$\frac{3}{2}(2x + 8) \leq 15$

$\frac{3}{2}\left(\underline{2x}\right) + \frac{3}{2}\left(\underline{8}\right) \leq 15$ — Distribute $\frac{3}{2}$ to both terms in the "parentheses."

$\underline{3}x + \underline{12} \leq 15$ — Multiply.

$\underline{-12 \qquad -12}$ — Subtract 12 from both sides to isolate the variable.

$\underline{3}x \leq \underline{3}$

$\dfrac{\boxed{3}x}{3} \leq \dfrac{\boxed{3}}{3}$ — Divide both sides by 3 to isolate $x$. Do you need to reverse the inequality symbol? $\underline{No}$

$x \leq \underline{1}$ — Solve for $x$.

Graph the solution.

A(n) $\underline{solid}$ circle should be used and the arrow should point to the $\underline{left}$.
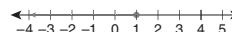


$\frac{3}{2}(2(0) + 8) \leq 15$

$\frac{3}{2}(8) \leq 15$

$\underline{12} \leq 15$

Test $x = 0$ in the original inequality.

Does your solution check? $\underline{Yes}$

**23**  Holt Algebra 2

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## Ready to Go On? Problem Solving Intervention
### 2-1 Solving Linear Equations and Inequalities

Solving a linear equation requires isolating the variable on one side of the equation by using the properties of equality.

Isabella is paid a salary of $600 per month plus a commission of 2% of the sales price of each house she sells. Find the value of the houses Isabella must sell in one month to earn $6600.

**Understand the Problem**

**1.** What are you trying to determine? $\underline{\text{The value of the houses Isabella must sell to earn \$6600.}}$

**2.** What two things make up Isabella's monthly income?
$\underline{\text{Monthly salary}} \qquad \underline{\text{Commission}}$

**3.** What part of Isabella's monthly income is always the same, or constant? $\underline{\$600/mo}$

**4.** What part of Isabella's monthly income changes each month? $\underline{\text{Her commission}}$

**Make a Plan**

**5.** What percentage of each house sale does Isabella earn? $\underline{2\%}$

**6.** What is the decimal equivalent of 2%? $2\% = \underline{0.02}$

**7.** If Isabella sells *no* houses in one month, how much does she earn? $\underline{\$600}$

**8.** If Isabella sold a house for $100,000, how much *commission* would she earn?
2% of $100,000 = 0.02(\$100,000) = \$ \underline{2000}$

**9.** If Isabella sold only one house for $100,000 during the month, write a numerical expression to show much money she would earn for the month. $\underline{600} + \underline{0.02}(\underline{100,000})$

**10.** How much money is Isabella hoping to earn? $\underline{\$6600}$

**Solve**

**11.** If $h$ is the value of the houses Isabella sells, represent the situation with an equation.
$600 + (\underline{0.02})h = \underline{6600}$

**12.** Solve the equation for $h$.
$600 + \underline{0.02}h = \underline{6600}$
$\underline{-600 \qquad -600}$
$\underline{0.02}h = \underline{6000}$
$h = \underline{300,000}$

**13.** Isabella must sell $\underline{300,000}$ worth of houses in one month to earn $6600.

**Look Back**

**14.** Substitute your value for $h$ into the original equation from Exercise 11.
$600 + \underline{0.02}(\underline{300,000}) = 6600.$ Does the left side equal the right side? $\underline{Yes}$

**24**  Holt Algebra 2

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## Ready to Go On? Skills Intervention
### 2-2 Proportional Reasoning

Find these vocabulary words in Lesson 2-2 and the Multilingual Glossary.

**Vocabulary**

| | | | | |
|---|---|---|---|---|
| ratio | proportion | rate | similar | indirect measurement |

**Solving Proportions**

Solve each proportion.

**A.** $\dfrac{x}{8} = \dfrac{9}{4}$

When a proportion contains a variable, use cross products to solve for the $\underline{variable}$.

$\dfrac{x}{8} \times \dfrac{9}{4}$

$4x = 9(\underline{8})$ — Set the cross products equal.

$4x = \underline{72}$ — Mutliply.

$\dfrac{4x}{\boxed{4}} = \dfrac{\boxed{72}}{\boxed{4}}$ — Divide by $\underline{4}$ to solve for $x$.

$x = \underline{18}$ — Solve for $x$.

**B.** $\dfrac{4}{7} = \dfrac{6x}{9}$

$\dfrac{4}{7} \times \dfrac{6x}{9}$

$4(\underline{9}) = 6x(\underline{7})$ — Set the cross products equal.

$36 = \underline{42x}$ — Mutliply.

$\dfrac{36}{\boxed{42}} = \dfrac{\boxed{42x}}{\boxed{42}}$ — Divide by $\underline{42}$ to solve for $x$.

$\dfrac{\underline{6}}{\underline{7}} = x$ — Simplify the fraction.

**C.** $\dfrac{4.5}{-x} = \dfrac{1.8}{3}$

$\dfrac{4.5}{-x} \times \dfrac{1.8}{3}$

$4.5(3) = 1.8(\underline{-x})$ — Set the cross products equal.

$13.5 = \underline{1.8x}$ — Multiply. The product of a negative and a positive number is $\underline{negative}$

$\dfrac{13.5}{\boxed{-1.8}} = \dfrac{\boxed{1.8x}}{-1.8}$ — Divide by $\underline{-1.8}$ to solve for $x$.

$\underline{-7.5} = x$ — Solve for $x$.

**25**  Holt Algebra 2

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