To the Student

This *Study Guide and Intervention Workbook* gives you additional examples and problems for the concept exercises in each lesson. The exercises are designed to aid your study of mathematics by reinforcing important mathematical skills needed to succeed in the everyday world. The materials are organized by chapter and lesson, with one Study Guide and Intervention worksheet for every lesson in *IMPACT Mathematics, Course 2*.

Always keep your workbook handy. Along with your textbook, daily homework, and class notes, the completed Study Guide and Intervention Workbook can help you in reviewing for quizzes and tests.

To the Teacher

These worksheets are the same ones found in the Chapter Resource Masters for *IMPACT Mathematics, Course 2.* The answers to these worksheets are available at the end of each Chapter Resource Masters Booklet.

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COURSE 2

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Lesson 1.1 Study Guide and Intervention

Variables and Expressions

An algebraic expression contains variables, numbers, and at least one operation. To rewrite an algebraic expression, you can combine terms and use exponents. To evaluate an algebraic expression, replace each variable with its numeral value and then use the order of operations to simplify.

Example 1 **Rewrite the expression $y + y + y + 7$.**

$y + y + y + 7 = 3y + 7$ Combine $y + y + y$ as $3y$.

Example 2 **Rewrite the expression $4 \cdot x \cdot x \cdot x$.**

$4 \cdot x \cdot x \cdot x = 4 \cdot x^3$ Use an exponent to write $x \cdot x \cdot x$ as x^3.

$= 4x^3$ Combine $4 \cdot x^3$ as $4x^3$.

Example 3 **Evaluate $6x - 7$ for $x = 8$**

$6x - 7 = 6(8) - 7$ Replace x with 8.

$= 48 - 7$ Use the order of operations.

$= 41$ Subtract 7 from 48.

Example 4 **Evaluate $x^3 + 4$ for $x = 3$.**

$x^3 + 4 = 3^3 + 4$ Replace x with 3.

$= 27 + 4$ Use the order of operations.

$= 31$ Add 27 and 4.

Exercises

Rewrite each expression.

1. $c + c$

2. $d \cdot d$

3. $12 + u \cdot u \cdot u \cdot u$

4. $a + a + a + a - b \cdot b \cdot b$

5. $6w + w + w$

6. $9s \cdot s \cdot s \cdot s \cdot s$

Evaluate each expression for $a = 4$, $b = 2$, and $c = 7$.

7. $5b^3$

8. $5 + 6c$

9. $\frac{b^4}{4}$

10. $6a^2$

11. $7c$

12. $2b^5 + 6$

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Lesson 1.2 Study Guide and Intervention

Expressions and Formulas

The formula $d = rt$ relates distance d, rate r, and time t, traveled.

Example 1 **Find the distance traveled if you drive 40 miles per hour for 3 hours.**

$d = rt$

$d = 40 \cdot 3$ Replace r with 40 and t with 3.

$d = 120$ The distance traveled is 120 miles.

The formula $P = 2(\ell + w)$ relates perimeter P, length ℓ, and width w for a rectangle. The formula $A = \ell w$ relates area A, length ℓ, and width w for a rectangle.

Example 2 **Find the perimeter and area of a rectangle with length 7 feet and width 2 feet.**

$P = 2(\ell + w)$	$A = \ell w$
$P = 2(7 + 2)$	$A = 7 \cdot 2$
$P = 2(9)$	$A = 14$
$P = 18$	
The perimeter is 18 feet.	The area is 14 square feet.

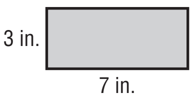
Exercises

Solve.

1. **Train Travel** How far does a train travel in 12 hours at 48 miles per hour?

2. **Travel** How long does it take a car traveling 40 miles per hour to go 200 miles?

Find the perimeter and area of each rectangle.

3.


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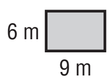

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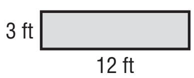

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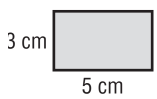

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Lesson 1.3 Study Guide and Intervention
The Distributive Property

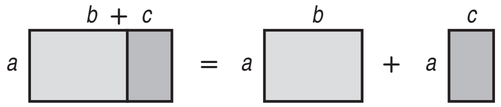
The expressions $2(1 + 5)$ and $2 \cdot 1 + 2 \cdot 5$ are equivalent expressions because they have the same value of 12. The **distributive property** combines addition and multiplication.

Symbols

$a(b + c) = ab + ac$

$(b + c)a = ba + ca$

Model



The distributive property also combines subtraction and multiplication.

Example 1 **Use the distributive property to expand each expression. Then evaluate the expression if possible.**

a. $2(6 + 3)$

$$\begin{aligned} 2(6 + 3) &= 2 \cdot 6 + 2 \cdot 3 \\ &= 12 + 6 \\ &= 18 \end{aligned}$$

b. $7(m + 5)$

$$\begin{aligned} 7(m + 5) &= 7m + 7 \cdot 5 \\ &= 7m + 35 \end{aligned}$$

Example 2 **Use the distributive property to factor each expression.**

a. $12y + 36$

$$12y + 36 = 12(y + 3)$$

b. $18z^2 + 63z$

$$\begin{aligned} 18z^2 + 63z &= 9(2z^2 + 7z) \\ &= 9z(2z + 7) \end{aligned}$$

Exercises

Use the distributive property to expand or factor each expression. Then evaluate the expression, if possible.

1. $3(8 + 2)$

2. $2(9 + 11)$

3. $5(19 - 6)$

4. $3(d + 4)$

5. $(w - 5)4$

6. $2(c + 7)$

7. $15a - 60$

8. $22b^2 + 42b$

9. $42n^3 - 56n^6$

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Lesson 2.1 Study Guide and Intervention
Factors and Multiples

The **greatest common factor (GCF)** of two or more numbers is the largest number that is a factor of each number. The GCF of prime numbers is 1. The least nonzero multiple of two or more numbers is the **least common multiple (LCM)** of the numbers.

Example 1 **Find the GCF of 42 and 60 using prime factors.**

Method 1 Write the prime factorization. Circle the common prime factors.

$60 = 2 \times 2 \times 3 \times 5$

$42 = 2 \times 3 \times 7$

Method 2 Divide by common prime factors. Divide both 42 and 60 by 2.

Then divide the quotients by 3.

$$\begin{array}{r|ll} & 7 & 10 \\ 3 & 21 & 30 \\ 2 & 42 & 60 \end{array}$$

← Start here.

The common prime factors are 2 and 3. Multiply the common prime factors to get the GCF. The GCF of 42 and 60 is 2×3, or 6.

Example 2 **Find the LCM of 8 and 12 using prime factors.**

Method 1 Write the prime factorization.

$8 = 2 \times 2 \times 2 = 2^3$

$12 = 2 \times 2 \times 3 = 2^2 \times 3$

The prime factors of 8 and 12 are 2 and 3. Multiply the greatest power of both 2 and 3.

Method 2 Divide by common prime factors.

$$\begin{array}{r|ll} & 2 & 3 \\ 2 & 4 & 6 \\ 2 & 8 & 12 \end{array}$$

← Start here.

Start dividing by common prime 12 factors until both numbers cannot be divided by the same divisor. Then multiply the divisors and final quotients to get the LCM.

The LCM of 8 and 12 is $2^3 \times 3$, or 24.

Exercises

Find the GCF of each set of numbers.

1. 18, 30 **2.** 60, 45 **3.** 24, 72

Find the LCM of each set of numbers.

4. 4, 6 **5.** 6, 9 **6.** 5, 9

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Lesson 2.2 Study Guide and Intervention

Exponent Machines

A number that is expressed using an exponent is called a **power**. The **base** is the number that is multiplied. The **exponent** tells how many times the base is used as a factor. So, 4^3 has a base of 4 and an exponent of 3, and $4^3 = 4 \cdot 4 \cdot 4 = 64$.

Example 1 **Evaluate each expression.**

a. 5^2 — 5 is a factor 2 times.

$5 \cdot 5 = 25$ — Multiply.

b. $\left(\frac{1}{4}\right)^3$ — $\frac{1}{4}$ is a factor 3 times.

$\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} = \frac{1}{64}$ — Multiply.

The **product laws of exponents** state that when multiplying exponential expressions with the same base, $a^b \cdot a^c = a^{b+c}$. When multiplying exponential expressions with the same exponent, $a^c \cdot b^c = (a \cdot b)^c$.

Example 2 **Rewrite each expression using the product laws of exponents.**

a. $3^7 \cdot 8^7$

$(3 \cdot 8)^7$ — $a^c \cdot b^c = (a \cdot b)^c$

24^7 — Multiply the bases.

b. $12^9 \cdot 12^5$

12^{9+5} — $a^b \cdot a^c = a^{b+c}$

12^{14} — Add the exponents.

Exercises

Evaluate each expression without using a calculator.

1. 2^5 **2.** 3^4 **3.** $\left(\frac{1}{2}\right)^6$

4. 12^2 **5.** $\left(\frac{2}{5}\right)^2$ **6.** 50^1

Rewrite each expression using the product laws of exponents.

7. $4^3 \cdot 5^3$ **8.** $7^{15} \cdot 7^{22}$ **9.** $15^{13} \cdot 15^{10}$

10. $32^{26} \cdot 32^{43}$ **11.** $12^3 \cdot 5^3$ **12.** $6^{14} \cdot 15^{14}$

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Lesson 2.3 Study Guide and Intervention

More Exponent Machines

The **quotient laws of exponents** state that when dividing expressions with the same base, $a^b \div a^c = a^{b-c}$. When dividing expressions with the same exponent, $a^c \div b^c = (a \div b)^c$.

Example 1 **Rewrite each expression using the quotient laws of exponents.**

a. $12^9 \div 12^5$

12^{9-5} — $a^b \div a^c = a^{b-c}$

12^4 — Subtract the exponents.

b. $\dfrac{21^4}{7^4}$

$\left(\dfrac{21}{7}\right)^4$ — $a^c \div b^c = (a \div b)^c$

3^4 — Divide the bases.

The **power of a power law of exponents** states that when raising a power to a power, $(ab)^c = a^{b \cdot c}$.

Example 2 **Rewrite each expression using the power of a power law of exponents.**

a. $(4^3)^6$

$4^{3 \cdot 6}$ — $(a^b)^c = a^{b \cdot c}$

4^{18} — Multiply the exponents.

b. $(5^6)^6$

$5^{6 \cdot 6}$ — $(a^b)^c = a^{b \cdot c}$

5^{36} — Multiply the exponents.

Exercises

Rewrite each expression using the quotient laws of exponents.

1. $7^{11} \div 7^4$

2. $\dfrac{15^{22}}{15^{18}}$

3. $\dfrac{48^5}{8^5}$

4. $56^{13} \div 8^{13}$

5. $\dfrac{23^{19}}{23^{13}}$

6. $96^{32} \div 12^{32}$

7. $\dfrac{45^{18}}{45^{17}}$

8. $102^8 \div 51^8$

Rewrite each expression using the power of a power law of exponents.

9. $(7^3)^4$

10. $(8^2)^2$

11. $(3^8)^9$

12. $(15^{12})^3$

13. $(23^1)^{46}$

14. $(52^{16})^4$

15. $(256^6)^{15}$

16. $(132^{10})^0$

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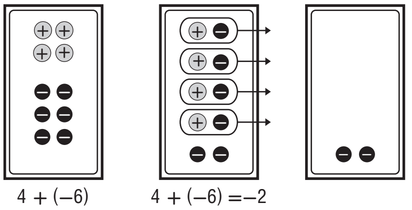
Lesson 3.1 Study Guide and Intervention
Add and Subtract with Negative Numbers

To add or subtract integers, it is helpful to use counters or a number line.

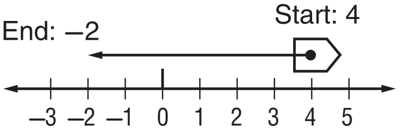
Example 1 **Use a chip model to find 4 + (–6).**

- Use a chip model.
- Combine a set of 4 positive counters and a set of 6 negative counters on a mat.
- Make zero pairs with one positive chip and one negative chip.
- Remove the zero pairs from the mat.
- The chips that are left represent the answer.



Example 2 **Use a number line to find 4 + (–6).**

- Walk the number line.
- Start at 4.
- The operation is addition, so face the pointer to the right.
- You are adding a negative number, –6. Move backward six spaces.



Exercises

Draw chip models to show how to find each sum or difference.

1. $-5 + (-2)$ **2.** $8 - 1$ **3.** $-7 - 10$

Walk the number line to compute the sum or difference.

4. $16 + (-11)$ **5.** $-8 - (-6)$ **6.** $-10 + 4$

7. $-3.75 + 4.5$ **8.** $\frac{25}{4} - (-\frac{14}{4})$ **9.** $-6\frac{2}{5} - \frac{4}{5}$

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Lesson 3.2 Study Guide and Intervention
Multiply and Divide with Negative Numbers

> **Multiplying and Dividing with Negative Numbers**
> If both numbers are negative, the answer is *positive*. If one number is negative and the other is positive, the answer is *negative*.
>
> **Negative Numbers and Exponents**
> If a negative number has an even exponent, the result is *positive*. If a negative number has an odd exponent, the result is *negative*.

Example 1 **Multiply 5(−2).**

$5(-2) = -10$ The integers have different signs. The product is negative.

Example 2 **Multiply −6(−9.2).**

$-6(-9.2) = 55.2$ The integers have the same sign. The product is positive.

Example 3 **Multiply $(-7)^2$.**

$(-7)^2 = (-7)(-7)$ The exponent is an even number.
$= 49$ The product is positive.

Example 4 **Divide $\frac{30}{-5}$.**

$\frac{30}{-5}$ The integers have different signs.

$\frac{30}{-5} = -6$ The quotient is negative.

Example 5 **Divide −100 ÷ (−5).**

$-100 \div (-5)$ The integers have the same sign.

$-100 \div (-5) = 20$ The quotient is positive.

Exercises

Multiply.

1. $-5(8)$ **2.** $-3\left(-\frac{7}{4}\right)$ **3.** $10(-8.2)$

4. $-8\left(1\frac{2}{7}\right)$ **5.** $-12(-12)$ **6.** $(-8)^2$

Divide.

7. $-12 \div 4$ **8.** $-34.5 \div (-15)$ **9.** $\frac{18}{-2}$

10. $-36 \div (-3)^2$ **11.** $-10\frac{2}{5} \div 10$ **12.** $\frac{-80}{-20}$

13. $350 \div (-25)$ **14.** $-440 \div (-2)^3$ **15.** $\frac{-256}{4^2}$

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Lesson 4.1 Study Guide and Intervention

Scientific Notation

A number is in scientific notation when it is written as the product of a number and a power of ten. The number must be greater than or equal to 1 and less than 10.

- To write a number in standard notation, you apply the order of operations. First evaluate the power of ten and then multiply.
- To write a number in scientific notation, move the decimal point to the right of the first nonzero number. Then, find the power of ten by counting the number of places moved.

Example 1 **Write 6.1×10^3 in standard notation.**

$6.1 \times 10^3 = 6.1 \times 1{,}000$ $\quad 10^3 = 1{,}000$

$= 6 . 1\ 0\ 0$ $\quad$ Move the decimal point 3 places to the right.

$= 6{,}100$

Example 2 **Write 62,500 in scientific notation.**

$62{,}500 = 6.250 \times 10{,}000$ $\quad$ Move the decimal point 4 places to get a number between 1 and 10.

$= 6.25 \times 10^4$

Exercises

Write each number in standard notation.

1. 7.25×10^2 **2.** 2.5×10^3 **3.** 9.95×10^5

4. 8.80×10^4 **5.** 3.18×10^6 **6.** 6.12×10^3

Write each number in scientific notation.

7. 325 **8.** 9,210 **9.** 200

10. 5,120 **11.** 561 **12.** 1,230

13. 6 million **14.** 53 thousand **15.** 8 hundred

Name Date

Lesson 4.2 Study Guide and Intervention
Negative Exponents

Extending the pattern below shows that $4^{-1} = \frac{1}{4}$ or $\frac{1}{4^1}$. $4^2 = 16$ $\div 4$ $4^1 = 4$ $\div 4$ $4^0 = 1$ $\div 4$ $4^{-1} = \frac{1}{4}$ This suggests the following definition. $a^{-n} = \frac{1}{a^n}$, for $a \neq 0$ and any integer n.	**Laws of Exponents** Product Laws $a^b \times a^c = a^{b+c}$ $a^c \times b^c = (a \times b)^c$ Quotient Laws $a^b \div a^c = a^{b-c}$ $a^c \div b^c = (a \div b)^c$ Power of a Power Law $(a^b)^c = a^{b \times c}$

Example 1 **Evaluate each expression.**

a. 5^{-2}

$$5^{-2} = \frac{1}{5^2} = \frac{1}{25}$$

b. $4 \cdot 2^{-1}$

$$4 \cdot 2^{-1} = 4 \cdot \frac{1}{2} = \frac{4}{2} = 2$$

Example 2 **Write each expression using only positive exponents.**

a. 3^{-4}

$$3^{-4} = \frac{1}{3^4}$$

b. $(y^{-2})^4$

$$y^{-2 \cdot 4} = y^{-8} = \frac{1}{y^8}$$

c. $6^7 \cdot 6^{-4}$

$$6^7 \cdot 6^{-4} = 6^{7+(-4)} = 6^3$$

Exercises

Evaluate each expression.

1. $-2 \cdot 6^{-2}$ **2.** -3^{-1} **3.** $7 \cdot 6^{-3}$ **4.** $3^3 \cdot 4^3$

5. $50 \cdot 5^{-2}$ **6.** $(-4)^{-3}$ **7.** $125 \div 5^4$ **8.** $8^2 \div 4^2$

Rewrite each expression using a single base or exponent.

9. $7^2 \cdot 7^{-4}$ **10.** $10^{-2} \div 10^4$ **11.** $n^4 \div n^{-8}$ **12.** $c^{12} \cdot c^{-3}$

Write each expression using only positive exponents.

13. 6^{-4} **14.** $(-7)^{-8}$ **15.** $b^{-6} \cdot b^{-4}$ **16.** $9^7 \div 9^{-5}$

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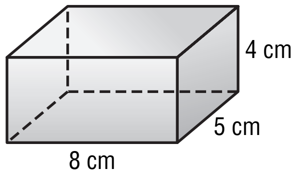
Lesson 5.1 Study Guide and Intervention

Surface Area and Volume

The volume V of a prism, a cylinder, or any three dimensional object is the area of the base B times the height h, or $V = Bh$.

The surface area of a prism is equal to the sum of the areas of its faces. For a rectangular prism with length l, width w, and height h, the surface area is $S = 2lw + 2lh + 2wh$. Remember that the area of a circle is equal to πr^2.

Example 1 **Find the volume of the prism to the right.**



$V = Bh$	Volume of a prism
$V = (l \cdot w)h$	The base is a rectangle, so $B = l \cdot w$.
$V = (8 \cdot 5)4$	$l = 8, w = 5, h = 4$
$V = 160$	Simplify.

The volume is 160 cubic centimeters.

Example 2 **Find the surface area of the prism above.**

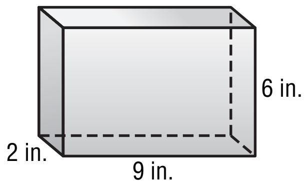
$SA = 2lw + 2lh + 2wh$	Surface area of a prism
$SA = 2(8)(5) + 2(8)(4) + 2(5)(4)$	$l = 8, w = 5, h = 4$
$SA = 184$	Simplify.

The surface area is 184 square centimeters.

Exercises

Find the volume of each solid. Round to the nearest tenth if necessary.

1.



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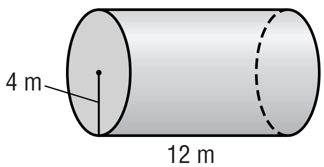

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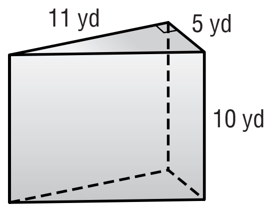
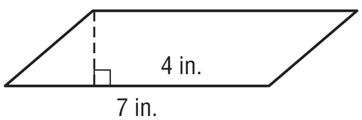


Find the surface area of each solid. Round to the nearest tenth if necessary.

4. rectangular prism: length, 2.3 in.; width, 7 in.; height, 8 in.

5. cylinder: radius, 4 cm; height, 8.2 cm

6. Find the area of the parallelogram below. If you built a structure 3 inches high with this parallelogram as its base, what would be its volume? What would be its surface area?



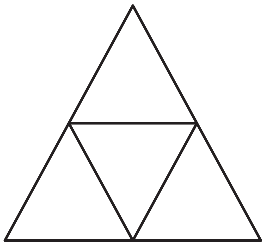
Lesson 5.2 Study Guide and Intervention
Nets and Solids

A net is a flat figure that represents all the sides of a solid figure.

The surface area of a solid can be calculated by finding the area of its net.

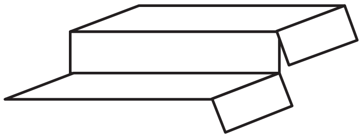
Example 1 **Decide whether the figure is a net. If it is a net, describe what shape it creates. If it is not a net, give an explanation.**

a.



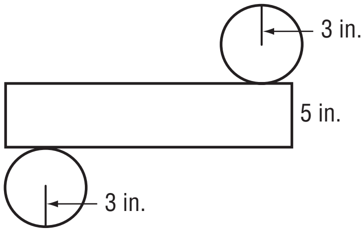
This is a net. It makes a solid with four triangular faces, which is called a tetrahedron.

b.



This is not a net. There are two overlapping sides and one side that does not have an end.

Example 2 **Use the net's measurements to find the surface area of the solid.**



This is the net of a cylinder. To find its surface area, add the areas of the circles and the area of the rectangle. The circumference of the circle ($2\pi r$) is equal to the length of the rectangle.

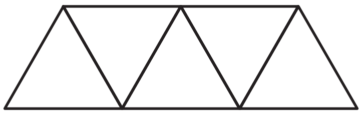
$(\pi \times 3^2) + (\pi \times 3^2) + (2 \times \pi \times 3 \times 5) = 18\pi + 30\pi = 48\pi$

The surface area is $48\pi \approx 150.8$ in.^{2}

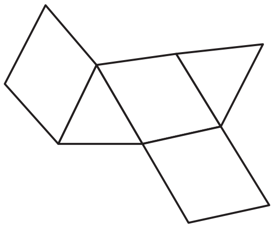
Exercises

If the figure is a net, describe what shape it creates. If it is not a net, give an explanation.

1.

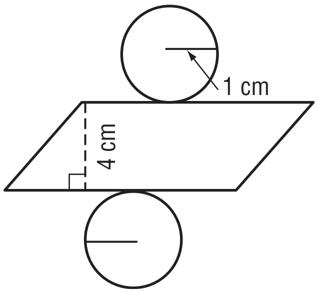


2.



Use the net's measurements to find the surface area of each solid.

3.



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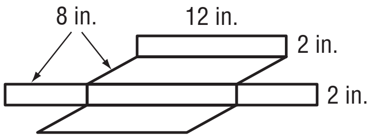

Name Date

Lesson 5.3 Study Guide and Intervention

Mass and Weight

In the metric system, the most commonly used units of mass are the milligram (mg), gram (g), and kilogram (kg). One milligram is 0.001 gram and 1 kilogram is 1,000 grams.

Metric Units of Mass		
Unit	**Model**	**Benchmark**
1 milligram (mg)	grain of salt	1 mg ≈ 0.00004 oz
1 gram (g)	small paper clip	1 g ≈ 0.04 oz
1 kilogram (kg)	six medium apples	1 kg ≈ 2 lb

Other small units of mass include the centigram, which is 0.01 gram, and the decigram, which is 0.1 gram. Larger units include the decagram, which is 10 grams, and the hectogram, which is 100 grams.

Example 1 **Which metric unit would be most appropriate to measure the mass of a portable radio?**

A portable radio has a mass greater than six apples. So, the kilogram is the appropriate unit.

Example 2 **A box of cereal contains 450 grams. How many kilograms is this?**

450 g = __?__ kg THINK 1,000 grams = 1 kilogram

450 ÷ 1,000 = 0.45 Divide to change grams to kilograms.

So, 450 grams = 0.45 kilograms.

Exercises

Write the metric unit that would be most appropriate to measure the mass of each of the following. Then estimate the mass.

1. peanut

2. eyelash

3. house cat

4. pencil

Convert each quantity to grams. Write your answers in scientific notation.

5. 35,000 centigrams

6. 7.2 milligrams

7. 1,672 hectograms

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Lesson 6.1 Study Guide and Intervention

Dependence

An organized list can help you find the probability of a combination of events.

Example 1 **A bag contains five cards labeled A, B, C, D, and E.**

a. You draw a card, record its letter, and return it to the bag. Then you draw again. Find the probability that both cards are vowels.

Make a list of all the possible ways you could draw the two cards.

A-A, A-B, A-C, A-D, A-E, B-A, B-B, B-C, B-D, B-E, C-A, C-B, C-C, C-D, C-E, D-A, D-B, D-C, D-D, D-E, E-A, E-B, E-C, E-D, E-E

There are 4 possible ways to draw two vowels. There are 25 possible ways to draw two cards. The probability that both cards are vowels is $\frac{4}{25}$.

b. You draw a card, put it aside, and then draw again. Find the probability that both cards are vowels.

Make a list of all the possible ways you could draw the two cards.

A-B, A-C, A-D, A-E, B-A, B-C, B-D, B-E, C-A, C-B, C-D, C-E, D-A, D-B, D-C, D-E, E-A, E-B, E-C, E-D

There are 2 possible ways to draw two vowels. There are 20 possible ways to draw two cards. The probability that both cards are vowels is $\frac{2}{20}$ or $\frac{1}{10}$.

Example 2 **You and a friend have a dime and a number cube that is numbered 1, 2, 3, 4, 5, and 6. If you toss heads and roll an even number, you score one point. If you toss tails and roll an odd number, your friend scores one point. Is this a fair game?**

Make a list of all the possible combinations.

H-1, H-2, H-3, H-4, H-5, H-6, T-1, T-2, T-3, T-4, T-5, T-6

There are 12 possiblities. The probability that you will get a point is $\frac{3}{12}$, or $\frac{1}{4}$.

The probability that your friend will get a point is $\frac{3}{12}$, or $\frac{1}{4}$. Since $\frac{1}{4} = \frac{1}{4}$, the game is fair.

Exercises

A bag contains six cards numbered 1, 2, 3, 4, 5, and 6.

1. You draw a card, replace it, and draw again. Find the probability that the second card is even.

2. You draw a card, put it aside, and draw again. Find the probability that the second card is less than 4.

Name Date

Lesson 6.2 Study Guide and Intervention
Make Predictions

A **sample** is a small group that is selected from a larger group, or **population**. Any ratios studied within a **representative sample** should be approximately proportional to the ratios within the population.

Example 1 **Marla and Stephan played a game called *What's in the Bag* with red, green, blue, and purple disks. They had a bag with 15 disks. They took three samples of 6 disks at a time. How many blue disks do you predict were in the group of 15?**

- **Sample 1: R G B R B P**
- **Sample 2: G B P B B R**
- **Sample 3: B P G R R R**

Step 1 Check the ratios within each sample, and predict an equivalent ratio within the population.

Sample 1: There are 2 blues out of 6 disks, so there might be 5 blues out of 15 disks.

Sample 2: There are 3 blues out of 6, so there might be about 7.5 blues out of 15 disks.

Sample 3: There is 1 blue out of 6, so there might be about 2.5 blues out of 15 disks.

Step 2 Average the results.
$(5 + 7.5 + 2.5) \div 3 = 5$, so there are probably 5 blue disks in the bag.

Example 2 **Jimmy wants to find out what the children in his town like to play on the most at the playground. He thought he would either send questionnaires to every household with children or survey every tenth student who enters a local elementary school. Which strategy do you think is better?**

Sending the questionnaires would result in the largest representative sample, but it is the least practical method. Surveying every tenth student would result in a good representative sample and is a practical method. Therefore, this strategy is better.

Exercises

1. Shopping Which strategy for a survey is better to determine whether people would like to have a fountain built inside a mall? Explain.

a. Poll every 15th shopper who enters the mall one day.

b. Poll every household within a 10-mile radius of the mall.

Name Date

Lesson 6.3 Study Guide and Intervention

Data Graphs

Example 1 **Make a circle graph for the males in the table.**

Preferred Landscaping Material		
Material	**Males**	**Females**
Chips	60	125
Mulch	140	110
Rocks	120	90
Straw	80	75

Step 1 Find the fraction of total males surveyed who prefer each material. Multiply each fraction by 360 to find the angle measure of the corresponding part of the circle graph.

Chips: $\frac{60}{400} = \frac{3}{20} \times 360 = 54°$

Mulch: $\frac{140}{400} = \frac{7}{20} \times 360 = 126°$

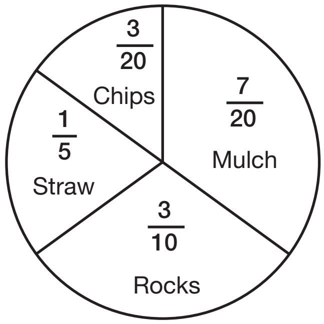
Rocks: $\frac{120}{400} = \frac{3}{10} \times 360 = 108°$

Straw: $\frac{80}{400} = \frac{1}{5} \times 360 = 72°$

Step 2 Draw a circle and a radius. Then use a protractor to draw a 54° angle to represent the fraction of males who prefer chips.

Step 3 From the new radius, draw a 126° angle for Mulch. Repeat for the other two sections. Label each section and give the graph a title.

Preferred Landscaping Material, Males

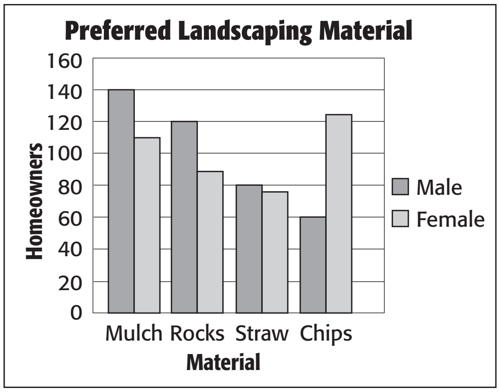


Example 2 **Make a double-bar graph for both data sets given in the table in Example 1.**

Step 1 Draw a set of vertical and horizontal axes. Mark every 20 homeowners on the vertical axis. Label each material on the horizontal axis.

Step 2 Using two shades of gray, create two adjacent bars in each category to represent the values from the table.

Step 3 Create a key to the side of the graph, and label the axes.



Exercises

1. According to the circle graph in Example 1, which two materials should a supply store order in large quantities?

2. Cher says the bar graph in Example 2 shows that about twice as many females as males prefer chips. Is this true? Explain.

Lesson 7.1 Study Guide and Intervention
Rational Numbers

To compare fractions, write them in decimal form or locate them on a number line. A rational number is a number that can be written as a ratio of two integers. Integers include positive counting numbers, their opposites, and zero. Natural numbers are counting numbers. Whole numbers are counting numbers plus zero.

Example 1 **Consider the numbers below. Identify to which set(s) the numbers belong.**

1. –8

Answer: –8 belongs to the integers and numbers, rational numbers, since it is a negative number that can be written as a ratio of $-\frac{8}{1}$.

2. $\frac{6}{7}$

Answer: $\frac{6}{7}$ belongs to the rational and since it is a ratio of two integers.

Example 2 **Which fraction is greater, $\frac{3}{4}$ or $\frac{4}{5}$?**

Method 1 Write each fraction as a decimal. Then compare decimals.

$$\frac{3}{4} = 0.75$$

$$\frac{4}{5} = 0.8$$

Since $0.8 > 0.75$, then $\frac{4}{5} > \frac{3}{4}$.

Method 2 Graph the numbers on a number line.

Since 0.8 is farther to the right on the line, it is the greater number.

Exercises

Consider the numbers below. They are natural numbers, whole numbers, integers, and rational numbers. Identify to which set(s) the numbers belong.

1. 102

2. $-\frac{4}{9}$

3. 6.057

4. 3^2

5. 0

6. –5

Identify which number is greater. Explain how you found your answer.

7. $\frac{1}{2}$ or 0.75

8. -2.4 or $-\frac{9}{4}$

9. -3^{-2} or $-\frac{1}{6}$

10. 0.64 or $\frac{1}{8}$

11. $\frac{4}{3}$ or 1.25

12. -0.7 or $-\frac{7}{8}$

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Lesson 7.2 Study Guide and Intervention
Irrational Numbers

The product of a number and itself is the **square** of the number. Numbers like 4, 25, and 2.25 are called **perfect squares** because they are squares of rational numbers. The factors multiplied to form perfect squares are called **square roots**. Both 5 • 5 and (–5)(–5) equal 25. So, 25 has two square roots, 5 and –5.

A **radical sign**, $\sqrt{\ }$, is the symbol used to indicate the positive square root of a number. So, $\sqrt{25} = 5$.

Example 1

1. Find the square of 5.

$5 \cdot 5 = 25$

2. Find the square of 16.

16 $\boxed{x^2}$ 256

3. Find $\sqrt{49}$.

$7 \cdot 7 = 49$, so $\sqrt{49} = 7$.

4. Find the two whole numbers that $\sqrt{17}$ is between. Do not use your calculator.

$\sqrt{16} = 4$ and $\sqrt{25} = 5$,
so $\sqrt{17}$ is between 4 and 5.

Example 2 **If a number is rational, it can be written as the ratio of two integers. Write $\sqrt{144}$ as the ratio of two integers.**

$$\sqrt{144} = 12 = \frac{12}{1}$$

Exercises

Find the square of each number.

1. 2 **2.** 9 **3.** 14

Find the two whole numbers that each square root lies between without using your calculator.

4. $\sqrt{115}$ **5.** $\sqrt{52}$ **6.** $\sqrt{37}$

Write each number as the ratio of two integers.

7. –1.25 **8.** $\sqrt{\frac{1}{4}}$ **9.** 2.5

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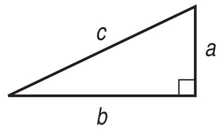
Lesson 7.3 Study Guide and Intervention
The Pythagorean Theorem

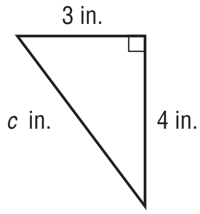
The sides of a right triangle have special names. The sides adjacent to the right angle are the **legs.** The side opposite the right angle is the **hypotenuse.**

The **Pythagorean Theorem** describes the relationship between the length of the hypotenuse and the lengths of the legs. In a right triangle, the square of the length of the hypotenuse equals the sum of the squares of the lengths of the legs.



$c^2 = a^2 + b^2$

Example **Find the missing measure of a right triangle if $a = 4$ inches and $b = 3$ inches.**



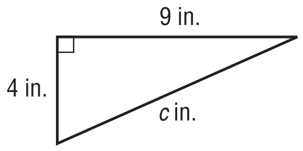
$c^2 = a^2 + b^2$	Pythagorean Theorem
$c^2 = 4^2 + 3^2$	Replace *a* with 4 and *b* with 3.
$c^2 = 16 + 9$	Evaluate 4^2 and 3^2.
$c^2 = 25$	Add.
$\sqrt{c^2} = \sqrt{25}$	Take the square root of each side.
$c = 5$	Simplify.

The length of the hypotenuse is 5 inches.

Exercises

Find the missing measure of each right triangle. Round to the nearest tenth if necessary.

1.



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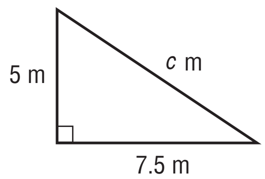

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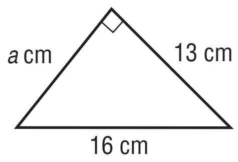

Lesson 8.1 Study Guide and Intervention
Rates

Rate describes how two unlike quantities are related or how they can be compared.

Example **a. Alita's car can travel 26 miles on one gallon of gasoline. What is the car's gas mileage in miles per gallon?**

The car's gas mileage is 26 miles per gallon.

b. Using m for the number of miles, write a rule that tells how many miles Alita can travel on g gallons of gasoline.

$m = 26g$

c. Copy and complete the table without using the rule. Then use your table to check that your rule is correct.

To find the number of miles traveled, multiply the number of gallons by 26.

Gallons	1	2	3	4	5
Miles	26	$2 \cdot 26 = 52$	$3 \cdot 26 = 78$	$4 \cdot 26 = 104$	$5 \cdot 26 = 130$

The table says the car travels 104 miles on 4 gallons of gas. Does that match the result if you use $g = 4$ in $m = 26g$?

$m = 26g$
$m = 26 \cdot 4$
$m = 104$

The results match. Your rule is correct.

Exercises

1. a. One liter is equivalent to 1,000 cubic centimeters. Rewrite this fact using the word *per*.

b. Write an algebraic rule to represent this relationship.

2. a. Each minute Oscar walks he burns 4.7 calories. Rewrite this fact using the word *per*.

b. Write an algebraic rule to find the total number of calories Oscar burns.

3. a. Lydia earns 23 points every time she plays basketball. Rewrite this fact using the word *per*.

b. Write an algebraic rule to represent this relationship.

c. Copy and complete the table without using the rule. Then use your table to check that your rule is correct.

Game, g	1	2	3	4	5
Points, p	23	46	69	92	115

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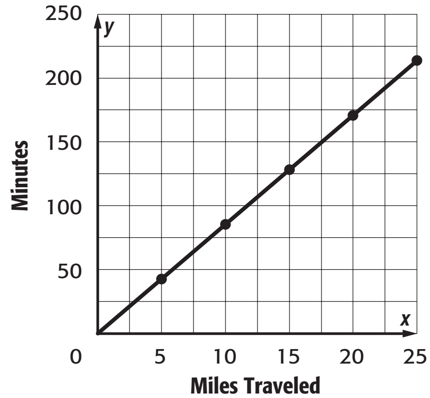
Lesson 8.2 Study Guide and Intervention

Speed and Slope

Speed relates distance traveled to the time it took to travel that distance. Speed is measured in units of length per unit of time.
Slope describes the steepness of a line. The slope of a line tells how much the y variable changes per unit change in the x variable.

Example

Daniel plans to run the next marathon at a speed of 8.5 minutes per mile.



a. Choose two points on the graph to find the slope of the line that passes through the points.

(10, 85) and (20, 170) $\frac{\text{rise}}{\text{run}} = \frac{\text{changes in } y}{\text{changes in } x} = \frac{(170 - 85)}{20 - 10} = \frac{85}{10} = 8.5$

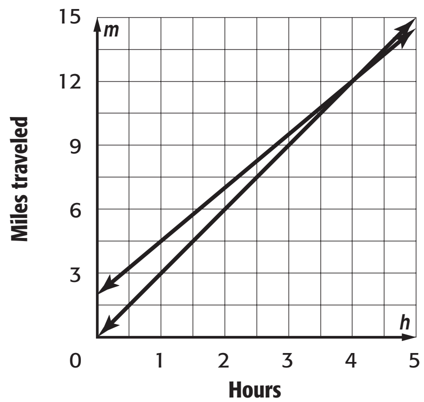
The slope of this line, 8.5, represents Daniel's speed of 8.5 minutes per mile.

b. What is the value of the y-intercept?

The y-intercept is the point where the line crosses the y-axis. In this situation it is (0, 0). After 0 minutes Daniel has run 0 miles.

Use the graph to solve the problems.

Mario walks every morning at a rate of 3 miles per hour. Antonio walks 2 miles every morning. Then he runs at a pace of 2.5 miles per hour.



1. Choose two points on each line to find the slope of the lines.

2. What do the slopes represent in this situation?

3. What are the y-intercepts of these lines? What do they represent?

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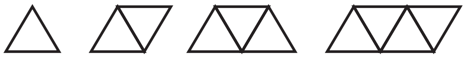
Lesson 8.3 Study Guide and Intervention

Recognize Linear Relationships

For every pattern, there is an input value that generates an output value. We can show patterns by using rules or graphs.

Example 1 

Complete the table. Then write a rule that relates the number of line segments to the number of triangles.

Number of triangles, *n* *(input values)*	1	2	3	4	5
Number of line segments, *s* *(output values)*	3	5	7	9	11

Notice that the output values increase by 2. That will be part of your rule.

$$2 \cdot 1 + 1 = 3 \text{ or } 2 \cdot n + 1 = s$$

Try the rule with other input values to make sure it works. It does, so you have found your rule.

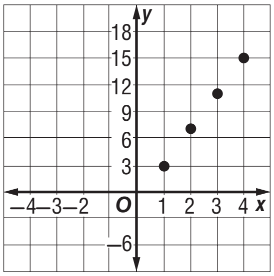
Example 2 **Create a graph to help you write a rule. Choose letters to represent each variable.**

(1, 3), (2, 7), (3, 11), (4, 15)

Try to link x and y.

$(1 \times 4) - 1 = 3$

Try the rule $y = 4x - 1$. It works for the rest of the points, so it must be the rule.



Exercises **Complete the table. Then describe a general rule that relates the input value to the output value.**

1.

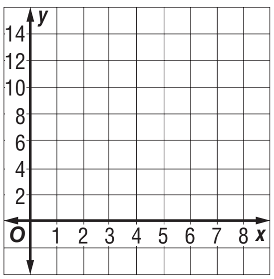
Input, *x*	2	3	4	5	6	7	8
Output, *y*	0	3	6				

2.

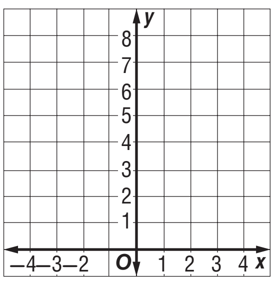
Input, *x*	1	2	3	4	5	6	7
Output, *y*	$1\frac{1}{2}$	2	$2\frac{1}{2}$				

Draw a graph using the points. Describe the rule for the graph in symbols. Explain the names of the symbols, or variables.

3. (1, –1), (2, 3), (3, 7), (4, 11)



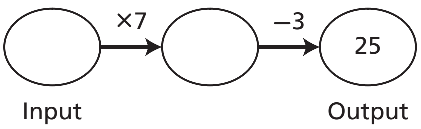
4. (0, 2), (1, 4), (2, 6), (3, 8)



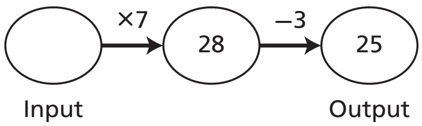
Name Date

Lesson 9.1 Study Guide and Intervention
Find a Solution Method

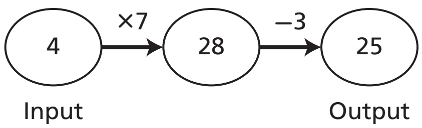
Example 1 **Use backtracking to solve $7v - 3 = 25$.**



Create a flowchart for the equation $7v - 3 = 25$. The input is v, or the value you want to find. The output is 25.



Since you need to subtract 3 to get 25, the value in the second oval must be 28.



Since you need to multiply by 7 to get 28, the value in the first oval must be 4.

The solution is 4. Check with substitution: $(4)7 - 3 = 28 - 3 = 25$.

Example 2 **Use guess-check-and-improve to solve $12 + x = 6 + 3x$.**

Guess	$12 + x$	$6 + 3x$	Difference
1	13	9	$13 - 9 = 4$

Begin with 1 as a guess for the solution. Substituting 1 for x gives 13 for the left side of the equation and 9 for the right side. The difference between 13 and 9 is 4, so you might try 2 or 3 as your second guess.

Guess	$12 + x$	$6 + 3x$	Difference
3	15	15	$15 - 15 = 0$

Substituting 3 for x gives 15 on both sides.

The solution is 3.

Exercises

Use backtracking to solve each equation.

1. $4y + 1 = 13$ **2.** $2(2x + 6) = 26$ **3.** $7 = \dfrac{-3c + 2}{-1}$

Use guess-check-and-improve to solve each equation.

4. $11 + 7n = 4$ **5.** $\dfrac{(15 + 2p)}{3} = 9$ **6.** $5(z + 2) = 6(2z - 3)$

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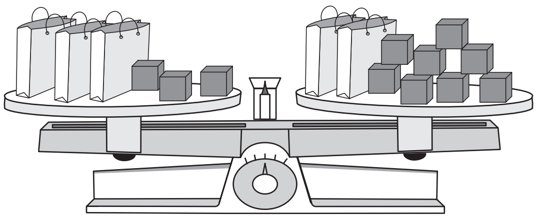
Lesson 9.2 Study Guide and Intervention

A Model for Solving Equations

Balance puzzles help you visualize the steps involved in solving equations.

- In any puzzle, each bag must hold the same number of blocks.
- The total number of blocks on each side must be the same.

Example 1 **Write an equation to fit the balance puzzle. Let x represent the number of blocks in each bag. Use the puzzle to find the value of x.**



Step 1 Use $3x$ to represent 3 bags and $2x$ to represent 2 bags.

3 bags and 3 blocks is $3x + 3$.

2 bags and 8 blocks is $2x + 8$.

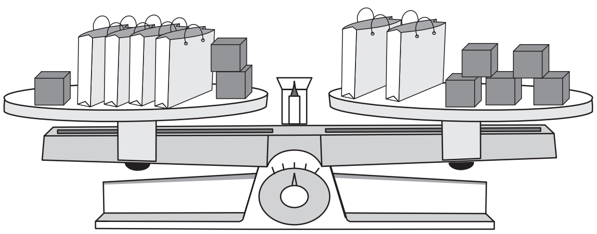
The equation is $3x + 3 = 2x + 8$.

Step 2 Remove 2 bags from each side and 3 blocks from each side.

Each bag has 5 blocks in it, so x is 5.

Example 2 **Draw a balance puzzle for $4x + 3 = 2x + 5$. Use your puzzle to solve the equation.**

Step 1 Let x represent the number of blocks in each bag.



Step 2 If you eliminate 2 bags and 3 blocks from each side, you will have 2 bags on the left side and 2 blocks on the right side. So, each bag holds 1 block.

The solution is 1. Check your solution: $4(1) + 3 = 7$; $2(1) + 5 = 7$.

Exercises

Solve.

1. Write an equation to fit a balance puzzle that has 5 bags and 6 blocks on its left side and 4 bags and 10 blocks on its right side.

2. Draw a balance puzzle for $2x + 9 = 6x + 1$. Use your puzzle to solve the equation.

Lesson 9.3 Study Guide and Intervention
Solve Equations

When solving an equation, make sure you perform the same **mathematical operation** on both sides. Solving an **inequality** means finding values for the variable that make the inequality true.

Example 1 **Solve $3x + 9 = 6x$.**

$3x + 9 = 6x$	Write the equation.
$3x + 9 - 3x = 6x - 3x$	Subtract $3x$ from each side.
$9 = 3x$	Combine like terms.
$9 \div 3 = 3x \div 3$	Divide each side by 3.
$3 = x$	

The solution is 3.

Example 2 **Solve and graph $2x \geq 4x + 6$.**

$2x \geq 4x + 6$	Write the inequality.
$2x - 4x \geq 4x + 6 - 4x$	Subtract $4x$ from each side.
$-2x \geq 6$	Combine like terms.
$-2x \div -2 \leq 6 \div -2$	Divide each side by -2. Reverse the direction of the inequality symbol when dividing by a negative number.
$x \leq -3$	Simplify.

Since the symbol in the inequality is $\leq$, place a closed circle on -3 and point the arrow to the left.

Exercises

Solve each equation.

1. $6t + 8 = 14t$

2. $k + 20 = 9k + 4$

3. $11m + 4 = 3m + 36$

Solve and graph each inequlity.

4. $s + 8 < 10$

5. $d - 3 \geq -11$

6. $4x > 10x - 18$

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Lesson 9.4 Study Guide and Intervention

Solve Equations with Parentheses

Example 1 **Simplify and solve the equation $2(6m - 1) = 8m$.**

$2(6m - 1) = 8m$	Write the equation.
$12m - 2 = 8m$	Apply the distributive property.
$12m - 12m - 2 = 8m - 12m$	Subtract $12m$ from each side.
$-2 = -4m$	Simplify.
$\frac{-2}{4} = \frac{-4m}{-4}$	Divide each side by –4.
$\frac{1}{2} = m$	Simplify.

Example 2 **Evaluate 7.8 – (1.3 + 9.6).**

Method 1

7.8 – (1.3 + 9.6)	Write the expression.
7.8 – 10.9	Add 1.3 and 9.6.
–3.1	Simplify.

Method 2

7.8 – (1.3 + 9.6)	Write the expression.
7.8 – 1.3 – 9.6	Apply the distributive property.
6.5 – 9.6	Subtract 1.3 from 7.8.
–3.1	Simplify.

Example 3 **Rewrite each expression without parentheses. Simplify.**

a. $3 - (6x - 6)$

$3 - 6x + 6$	Rewrite the expression.
$9 - 6x$	Simplify.

b. $7g - (4h + 9g)$

$7g - 4h - 9g$	Rewrite the expression.
$-2g - 4h$	Combine like terms.

Exercises

Solve each equation. Check your solution.

1. $2(s + 11) = 5(s + 2)$ **2.** $7y - 1 = 2(y + 3) - 2$ **3.** $1 + 2(b + 6) = 5(b - 1)$

Evaluate each expression.

4. $48 - (21 - 37)$ **5.** $1.9 - (3 + 1.1)$ **6.** $41 - (107 - 77)$

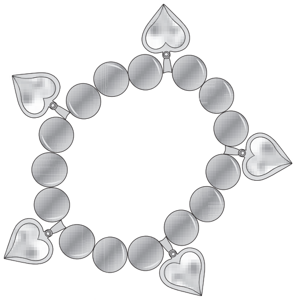
Rewrite each expression without parentheses. Simplify.

7. $40 - (10f - 19)$ **8.** $16x - (6 + 9x)$ **9.** $9n - (15n - m)$

Name **Date**

Lesson 10.1 Study Guide and Intervention
Ratios

Example 1 **Lee Ann made the bracelet shown.**



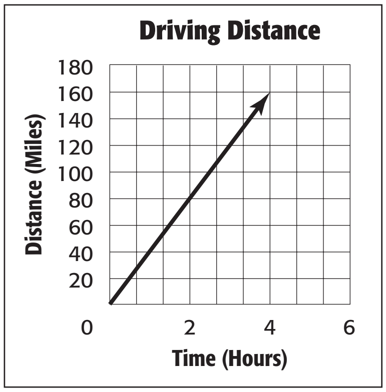
a. Find the ratio of charms to beads.

There are 5 charms and 15 beads, so the ratio is $\frac{5}{15}$ or $\frac{1}{3}$.

b. Lee Ann wants to make a necklace with charms and beads in the same pattern. She plans to use 42 beads. How many charms will she need?

One-third of 42 is 14. She will need 14 charms for the necklace.

Example 2 **Jack took a cross-country trip with his family. The graph shows the progress of the trip.**



a. At what rate is Jack traveling?

He travels 160 miles in 4 hours, so his rate is $\frac{160 \text{ miles}}{4 \text{ hours}}$ or $\frac{40 \text{ miles}}{1 \text{ hour}}$.

He is traveling at a rate of 40 miles per hour.

b. How many miles would you expect Jack to travel in 6 hours?

Multiply 40 miles per hour by 6 hours.

Jack will probably travel 240 miles in 6 hours.

Exercises

1. Of 2,000 beads in a beaded rug, 350 are blue. What is the ratio of blue beads to all beads?

2. Kelsey bikes 16 miles in 2 hours. At what rate is she traveling?

Name Date

Lesson 10.2 Study Guide and Intervention
Proportions and Similarity

A **proportional relationship** is a relationship in which all pairs of corresponding values have the same ratio. You can use proportions to solve similarity problems.

Example 1 **Solve $\frac{a}{10} = \frac{28}{35}$.**

Method 1 Solve the equation.

$\frac{a}{10} = \frac{28}{35}$ Write the proportion.

$\frac{a}{10} = 0.8$ Divide 28 by 35.

$10 \cdot \frac{a}{10} = 0.8 \cdot 10$ Multiply both sides by 10.

Method 2 Multiply or divide.

Note that 35 ÷ 10 = 3.5. Dividing both parts of $\frac{28}{35}$ by 3.5 gives $\frac{28 \div 3.5}{35 \div 3.5} = \frac{8}{10}$. So, $a = 8$.

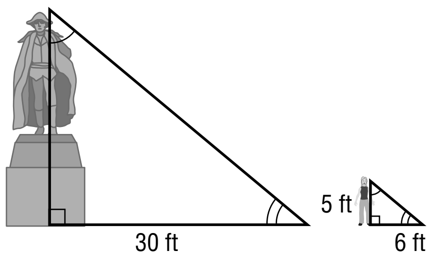
Example 2 **A map shows a scale of 1 inch = 40 miles. The distance between two places on the map is 3.25 inches. What is the actual distance?**

Let x represent the actual distance. Write and solve a proportion.

$$\begin{array}{r} \text{map} \rightarrow \\ \text{actual} \rightarrow \end{array} \frac{1 \text{ inch}}{40 \text{ miles}} = \frac{3.25 \text{ inches}}{x \text{ miles}} \begin{array}{l} \leftarrow \text{map} \\ \leftarrow \text{actual} \end{array}$$

Multiplying both parts of $\frac{1}{40}$ by 3.25 gives $\frac{1 \times 3.25}{40 \times 3.25} = \frac{3.25}{130}$.
The actual distance is 130 miles.

Example 3 **A statue casts a shadow 30 feet long. At the same time, a person who is 5 feet tall casts a shadow that is 6 feet long. How tall is the statue?**



Let x represent the actual distance. Write and solve a proportion.

$$\begin{array}{r} \text{person} \rightarrow \\ \text{person's shadow} \rightarrow \end{array} \frac{5 \text{ feet}}{6 \text{ feet}} = \frac{x \text{ feet}}{30 \text{ feet}} \begin{array}{l} \leftarrow \text{statue} \\ \leftarrow \text{statue's shadow} \end{array}$$

Multiplying both parts of $\frac{5}{6}$ by 5 gives $\frac{5 \times 5}{6 \times 5} = \frac{25}{30}$. The statue is 25 feet tall.

Exercises

1. A walking path is 18 feet long. Sam draws a map that includes this path. If he uses a scale of 2 inches = 3 feet, how long will the path be on the map?

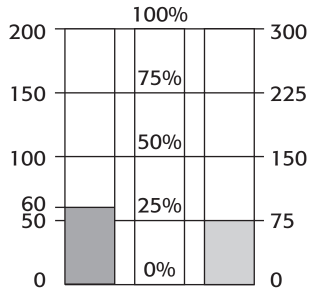
2. Emily measures the shadow of a building to be 26 feet. Emily is 4.5 feet tall, and her shadow is 3 feet long. How tall is the building?

Name **Date**

Lesson 10.3 Study Guide and Intervention

Percents and Proportions

Example 1 **Use the percent diagram to determine the greater number or percent.**



a. 60 out of 200 or 75 out of 300

According to the diagram, 75 out of 300 is 25%, and 60 out of the 200 is slightly over 25%. So, 60 out of 200 is a greater percentage.

b. *P*% of 200 or *P*% of 300

Choose any percent on the diagram. The percent is at the same level on the two scales, but the number on the 300 side is greater than the number on the 200 side. So, *P*% of 300 is a greater number.

c. *t* out of 200 or *t* out of 300

Suppose $t = 150$. This number is 75% on the 200 side and 50% on the 300 side. Notice that this would be true for any value of t. So, t out of 200 is a greater percentage.

Example 2 **Express each question as a proportion and solve it.**

a. What is 15% of 200?

$\frac{n}{200} = \frac{15}{100}$	Write a proportion.
$200 \cdot \frac{n}{200} = \frac{15}{100} \cdot 200$	Multiply.
$n = 30$	
So, 30 is 15% of 200.	Simplify.

b. What percent of 25 is 3?

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

$100 \cdot \frac{3}{25} = \frac{p}{100} \cdot 100$

$12 = p$

So, 3 is 12% of 25.

Example 3 **Consider the ratios $\frac{12}{15}$ and $\frac{15}{18}$. Determine which ratio is greater by finding the percentages they represent.**

$\frac{12}{15} = 0.8$	Divide.	$\frac{15}{18} \approx 0.833...$
$0.8 = 80\%$	Move the decimal 2 places to the right.	$0.833... \approx 83.3\%$

Since $83.3\% > 80\%$, $\frac{15}{18}$ is the greater ratio.

Exercises

Find each number. Round to the nearest tenth if necessary.

1. What number is 25% of 20?

2. What percent of 50 is 20?

Determine which is greater.

3. *P*% of 50 or *P*% of 45

4. $\frac{7}{9}$ or $\frac{11}{12}$

Name Date

Lesson 10.4 Study Guide and Intervention

Rates

A ratio that compares two quantities with different kinds of units is called a **rate**. When a rate is simplified so that it is given in terms of one unit, it is called a **unit rate**. You can use **exchange rates** to find equivalent **currencies.**

Example 1 **Alita drove her car 78 miles and used 3 gallons of gas. What is the car's gas mileage in miles per gallon?**

$$\frac{78 \text{ miles}}{3 \text{ gallons}} = \frac{x \text{ miles}}{1 \text{ gallon}}$$ Write a proportion.

$$1 \text{ gallon} \cdot \frac{78 \text{ miles}}{3 \text{ gallons}} = \frac{x \text{ miles}}{1 \text{ gallon}} \cdot 1 \text{ gallon}$$ Multiply each side by 1 gallon.

$$26 = x$$ Simplify, dividing out the common units.

So, the car's gas mileage is 26 miles per gallon.

Example 2 **Joe is shopping for cereal. The 12-ounce box costs $2.54, and the 18-ounce box costs $3.50. Which box costs less per ounce?**

Divide each price by the number of ounces.

12-ounce box	$2.54 ÷ 12 ounces ≈ $0.21 per ounce
18-ounce box	$3.50 ÷ 18 ounces ≈ $0.19 per ounce

So, the 18-ounce box costs less per ounce.

Example 3 **Via went shopping in Brazil. The exchange rate was 1 U.S. dollar equals 1.09984 Brazilian reals. She paid 142.50 reals for a necklace. What was the approximate cost of the necklace in U.S. dollars?**

$$\frac{1 \text{ dollar}}{1.09984 \text{ reals}} = \frac{x \text{ dollar}}{142.5 \text{ reals}}$$ Write a proportion.

$$142.5 \text{ reals} \cdot \frac{1 \text{ dollar}}{1.09984 \text{ reals}} = \frac{x \text{ dollar}}{142.5 \text{ reals}} \cdot 142.5 \text{ reals}$$ Multiply each side by 142.5 reals.

$$129.56 = x$$ Simplify, rounding to the nearest hundredth.

So, the necklace costs about $129.56.

Exercises

1. Juanita paid $156 for 3 books. Find the unit rate.
2. Which is the better buy: 3 pounds of nuts for $12.95 or 5 pounds of nuts for $21.45?
3. Jane paid 21 euros for dinner in France. The exchange rate was 1 U.S. dollar equals 0.66175 euros. What was the approximate cost in U.S. dollars?