May 2026

Dear incoming High School Algebra Student,

I am looking forward to working with you next year! In order to retain the skills you have learned this year and prepare you for our curriculum next year, I am sending you a summer math packet to complete.

Attached is the packet to be completed by the first day of school. This will be your first grade of the year. Please read all instructions on each page and complete the odd numbered problems for each topic. Make sure to **show all work neatly** when appropriate. Use notebook paper if needed. **COMPLETE ONLY THE ODD NUMBERED PROBLEMS ON EACH PAGE.**

If you are having trouble with a concept in the packet, you may use your current math notebook or access any of the websites below for review.

Khan Academy
IXL
Math Antics

Have a great summer and I will see you next year!

Blessings,
Mrs. Schicitano

Name _____ Class _____ Date _____

1-1 Reteaching

You can represent mathematical phrases and real-world relationships using symbols and operations. This is called an algebraic expression.

For example, the phrase *3 plus a number* n can be expressed using symbols and operations as $3 + n$.

Problem

What is the phrase *5 minus a number* d as an algebraic expression?

$$\underbrace{5}_{5} \quad \underbrace{\text{minus}}_{-} \quad \underbrace{\text{a number } d}_{d}$$

The phrase *5 minus a number* d, rewritten as an algebraic expression, is $5 - d$.

The left side of the table below gives some common phrases used to express mathematical relationships, and the right side of the table gives the related symbol.

Phrase	Symbol
sum	+
difference	−
product	×
quotient	÷
less than	−
more than	+

Exercises

Write an algebraic expression for each word phrase.

1. 5 plus a number d

2. the product of 5 and g

3. 11 fewer than a number f

4. 17 less than h

5. the quotient of 20 and t

6. the sum of 12 and 4

Write a word phrase for each algebraic expression.

7. $h + 6$

8. $m - 5$

9. $q \times 10$

10. $\frac{35}{r}$

11. $h + m$

12. $5n$

Name _____ Class _____ Date _____

1-1 Reteaching (continued)

Multiple operations can be combined into a single phrase.

What is the phrase *11 minus the product of 3 and d* as an algebraic expression?

The phrase *11 minus the product of 3 and a number d,* rewritten as an algebraic expression, is $11 - 3d$.

Exercises

Write an algebraic expression for each phrase.

13. 12 less than the quotient of 12 and a number z

14. 5 greater than the product of 3 and a number q

15. the quotient of $5 + h$ and $n + 3$

16. the difference of 17 and $\frac{22}{t}$

Write an algebraic expression or equation to model the relationship expressed in each situation below.

17. Jane is building a model boat. Every inch on her model is equivalent to 3.5 feet on the real boat her model is based on. What would be the mathematical rule to express the relationship between the length of the model, m, and the length of the boat, b?

18. Lyn is putting away savings for his college education. Every time Lyn puts money in his fund, his parents put in $2. What is the expression for the amount going into Lyn's fund if Lyn puts in L dollars?

Name _____ Class _____ Date _____

1-2 Reteaching

Exponents are used to represent repeated multiplication of the same number. For example, $4 \times 4 \times 4 \times 4 \times 4 = 4^5$. The number being multiplied by itself is called the base; in this case, the base is 4. The number that shows how many times the base appears in the product is called the exponent; in this case, the exponent is 5. 4^5 is read *four to the fifth power.*

Problem

How is $6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6$ written using an exponent?

The number 6 is multiplied by itself 7 times. This means that the base is 6 and the exponent is 7. $6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6$ written using an exponent is 6^7.

Exercises

Write each repeated multiplication using an exponent.

1. $4 \times 4 \times 4 \times 4 \times 4$

2. $2 \times 2 \times 2$

3. $1.1 \times 1.1 \times 1.1 \times 1.1 \times 1.1$

4. $3.4 \times 3.4 \times 3.4 \times 3.4 \times 3.4 \times 3.4$

5. $(-7) \times (-7) \times (-7) \times (-7)$

6. $11 \times 11 \times 11$

Write each expression as repeated multiplication.

7. 4^3

8. 5^4

9. 1.5^2

10. $\left(\frac{2}{7}\right)^4$

11. x^7

12. $(5n)^5$

13. Trisha wants to determine the volume of a cube with sides of length s. Write an expression that represents the volume of the cube.

Name _____ Class _____ Date _____

1-2 Reteaching (continued)

Order of Operations and Evaluating Expressions

The order of operations is a set of guidelines that make it possible to be sure that two people will get the same result when evaluating an expression. Without this standard order of operations, two people might evaluate an expression differently and arrive at different values. For example, without the order of operations, someone might evaluate all expressions from left to right, while another person performs all additions and subtractions before all multiplications and divisions.

You can use the acronym P.E.M.A. (**P**arentheses, **E**xponents, **M**ultiplication and Division, and **A**ddition and Subtraction) to help you remember the order of operations.

Problem

How do you evaluate the expression $3 + 4 \times 2 - 10 \div 5$?

$3 + 8 - 10 \div 5$ $= 3 + 8 - 2$	There are no parentheses or exponents, so first, do any multiplication or division from left to right.
$= 11 - 2$ $= 9$	Do any addition or subtraction from left to right.

Exercises

Simplify each expression.

14. $(5 + 3)^2$

15. $(8 - 5)(14 - 6)$

16. $(15 - 3) \div 4$

17. $\left(\frac{22 + 3}{5}\right)$

18. $40 - 15 \div 3$

19. $20 + 12 \div 2 - 5$

20. $(4^2 + 5^2)^2$

21. $4 \times 5 - 3^2 \times 2 \div 6$

Write and simplify an expression to model the relationship expressed in the situation below.

22. Manuela has two boxes. The larger of the two boxes has dimensions of 15 cm by 25 cm by 20 cm. The smaller of the two boxes is a cube with sides that are 10 cm long. If she were to put the smaller box inside the larger, what would be the remaining volume of the larger box?

Name _____ Class _____ Date _____

1-3 Reteaching

A number that is the product of some other number with itself, or a number to the second power, such as $9 = 3 \times 3 = 3^2$, is called a perfect square. The number that is raised to the second power is called the square root of the product. In this case, 3 is the square root of 9. This is written in symbols as $\sqrt{9} = 3$. Sometimes square roots are whole numbers, but in other cases, they can be estimated.

Problem

What is an estimate for the square root of 150?

There is no whole number that can be multiplied by itself to give the product of 150.

$10 \times 10 = 100$

$11 \times 11 = 121$

$12 \times 12 = 144$

$13 \times 13 = 169$

You cannot find the exact value of $\sqrt{150}$, but you can estimate it by comparing 150 to perfect squares that are close to 150.

150 is between 144 and 169, so $\sqrt{150}$ is between $\sqrt{144}$ and $\sqrt{169}$.

$\sqrt{144} < \sqrt{150} < \sqrt{169}$

$12 < \sqrt{150} < 13$

The square root of 150 is between 12 and 13. Because 150 is closer to 144 than it is to 169, we can estimate that the square root of 150 is slightly greater than 12.

Exercises

Find the square root of each number. If the number is not a perfect square, estimate the square root to the nearest integer.

1. 100	**2.** 49	**3.** 9
4. 25	**5.** 81	**6.** 169
7. 15	**8.** 24	**9.** 40

10. A square mat has an area of 225 cm^2. What is the length of each side of the mat?

Name _____ Class _____ Date _____

1-3 Reteaching (continued)

The real numbers can be separated into smaller, more specific groups, called subsets. Each of these subsets has certain characteristics. For example, a rational number can be expressed as a fraction of two integers, with the denominator of the fraction not equal to 0. Irrational numbers cannot be expressed as a fraction of two integers.

Every real number belongs to at least one subset of the real numbers. Some real numbers belong to multiple subsets.

Problem

To which subsets of the real numbers does 17 belong?

17 is a natural number, a whole number, and an integer.

But 17 is also a rational number because it can be written as $\frac{17}{1}$, a fraction of two integers with the denominator not equal to 0.

A number cannot belong to both the subset of rational numbers and the subset of irrational numbers, so 17 is not an irrational number.

Exercises

List the subsets of the real numbers to which each of the given numbers belongs.

11. 5

12. 116

13. $\sqrt{3}$

14. 17.889

15. –25

16. –68

17. $\frac{-17}{20}$

18. 0

19. $\sqrt{16}$

20. $\sqrt{20}$

21. $\sqrt{6.25}$

22. $\frac{77}{10}$

Name _____ Class _____ Date _____

1-4 Reteaching

Equivalent algebraic expressions are expressions that have the same value for all values for the variable(s). For example $x + x$ and $2x$ are equivalent expressions since, regardless of what number is substituted in for x, simplifying each expression will result in the same value. Certain properties of real numbers lead to the creation of equivalent expressions.

Commutative Properties

The commutative properties of addition and multiplication state that changing the order of the addends does not change the sum and that changing the order of factors does not change the product.

Addition: $a + b = b + a$ Multiplication: $a \cdot b = b \cdot a$

To help you remember the commutative properties, you can think about the root word "commute." To commute means to move. If you think about commuting or moving when you think about the commutative properties, you will remember that the addends or factors move or change order.

Problem

Do the following equations illustrate commutative properties?

a. $3 + 4 = 4 + 3$ **b.** $(5 \times 3) \times 2 = 5 \times (3 \times 2)$ **c.** $1 - 3 = 3 - 1$

3 + 4 and 4 + 3 both simplify to 7, so the two sides of the equation in part (a) are equal. Since both sides have the same two addends but in a different order, this equation illustrates the Commutative Property of Addition.

The expression on each side of the equation in part (b) simplifies to 30. Both sides contain the same 3 factors. However, this equation does not illustrate the Commutative Property of Multiplication because the terms are in the same order on each side of the equation.

1 – 3 and 3 – 1 do not have the same value, so the equation in part (c) is not true. There is not a commutative property for subtraction. Nor is there a commutative property for division.

Associative Properties

The associative properties of addition and multiplication state that changing the grouping of addends does not change the sum and that changing the grouping of factors does not change the product.

Addition: $(a + b) + c = a + (b + c)$ Multiplication: $(a \cdot b) \cdot c = a \cdot (b \cdot c)$

Name _____ Class _____ Date _____

1-4 Reteaching (continued)

Problem

Do the following equations illustrate associative properties?

a. $(1 + 5) + 4 = 1 + (5 + 4)$

b. $4 \times (2 \times 7) = 4 \times (7 \times 2)$

$(1 + 5) + 4$ and $1 + (5 + 4)$ both simplify to 10, so the two sides of the equation in part (a) are equal. Since both sides have the same addends in the same order but grouped differently, this equation illustrates the Associative Property of Addition.

The expression on each side of the equation in part (b) simplifies to 56. Both sides contain the same 3 factors. However, the same factors that were grouped together on the left side have been grouped together on the right side; only the order has changed. This equation does not illustrate the Associative Property of Multiplication.

Other properties of real numbers include:

a. Identity property of addition:	$a + 0 = 0$	$12 + 0 = 12$
b. Identity property of multiplication:	$a \cdot 1 = a$	$32 \cdot 1 = 32$
c. Zero property of multiplication:	$a \cdot 0 = 0$	$6 \cdot 0 = 0$
d. Multiplicative property of negative one:	$-1 \cdot a = -a$	$-1 \cdot 7 = -7$

Exercises

What property is illustrated by each statement?

1. $(m + 7.3) + 4.1 = m + (7.3 + 4.1)$

2. $5p \cdot 1 = 5p$

3. $12x + 4y + 0 = 12x + 4y$

4. $(3r)(2s) = (2s)(3r)$

5. $17 + (-2) = (-2) + 17$

6. $-(-3) = 3$

Simplify each expression. Justify each step.

7. $(12 + 8x) + 13$

8. $(5 \cdot m) \cdot 7$

9. $(7 - 7) + 12$

Name _____ Class _____ Date _____

1-5 Reteaching

You can add real numbers using a number line or using the following rules.

Rule 1: To add two numbers with the same sign, add their absolute values. The sum has the same sign as the addends.

Problem

What is the sum of –7 and –4?

Use a number line.

Start at zero.
Move 7 spaces to the left to represent -7.
Move another 4 spaces to the left to represent -4.

The sum is -11

Use the rule.

$-7 + (-4)$	The addends are both negative.
$\|-7\| + \|-4\|$	Add the absolute values of the addends.
$7 + 4 = 11$	$\|-7\| = 7$ and $\|-4\| = 4$.
$-7 + (-4) = -11$	The sum has the same sign as the addends.

Rule 2: To add two numbers with different signs, subtract their absolute values. The sum has the same sign as the addend with the greater absolute value.

Problem

What is the sum of –6 and 9?

Use the rule.

$9 + (-6)$	The addends have different signs.
$\|9\| - \|-6\|$	Subtract the absolute values of the addends.
$9 - 6 = 3$	$\|9\| = 9$ and $\|-6\| = 6$.
$9 + (-6) = 3$	The positive addend has the greater absolute value.

Name _____ Class _____ Date _____

1-5 Reteaching (continued)

Exercises

Find each sum.

1. $-4 + -12$ **2.** $-3 + 15$ **3.** $-9 + 1$

4. $13 + (-7)$ **5.** $8 + (-14)$ **6.** $-11 + (-5)$

7. $4.5 + (-1.1)$ **8.** $-5.1 + 8.3$ **9.** $6.4 + 9.8$

Addition and subtraction are inverse operations. To subtract a real number, add its opposite.

What is the difference $-5 - (-8)$?

$-5 - (-8) = -5 + 8$ The opposite of -8 is 8.

$= 3$ Use Rule 2.

The difference $-5 - (-8)$ is 3.

Exercises

Find each difference.

10. $8 - 20$ **11.** $6 - (-12)$ **12.** $-4 - 9$

13. $-8 - (-14)$ **14.** $-11 - (-4)$ **15.** $17 - 25$

16. $3.6 - (-2.4)$ **17.** $-1.5 - (-1.5)$ **18.** $-1.7 - 5.4$

19. The temperature was 5^0C. Five hours later, the temperature had dropped 10^0C. What is the new temperature?

20. Reasoning Which is greater, $52 + (-77)$ or $52 - (-77)$? Explain.

Name _____ Class _____ Date _____

1-6 Reteaching

Multiplying and Dividing Real Numbers

You need to remember two simple rules when multiplying or dividing real numbers.

1. The product or quotient of two numbers with the same sign is positive.
2. The product or quotient of two numbers with different signs is negative.

Problem

What is the product $-6(-30)$?

$-6(-30) = 180$ –6 and –30 have the same sign so the product is positive.

Problem

What is the quotient $72 \div (-6)$?

$72 \div (-6) = -12$ 72 and –6 have different signs so the quotient is negative.

Exercises

Find each product or quotient.

1. $-5(-6)$ **2.** $7(-20)$ **3.** -3×22

4. $44 \div 2$ **5.** $81 \div (-9)$ **6.** $-55 \div (-11)$

7. $-62 \div 2$ **8.** $25 \cdot (-4)$ **9.** $(-6)^2$

10. $-9.9 \div 3$ **11.** $-7.7 \div (-11)$ **12.** $-1.4(-2)$

13. $-\frac{1}{2} \times \frac{1}{3}$ **14.** $-\frac{2}{3}\left(-\frac{3}{5}\right)$ **15.** $\frac{3}{4} \cdot \left(-\frac{1}{3}\right)$

16. The temperature dropped 2°F each hour for 6 hours. What was the total change in temperature?

17. Reasoning Since $5^2 = 25$ and $(-5)^2 = 25$, what are the two values for the square root of 25?

Name _____ Class _____ Date _____

1-6 Reteaching (continued)

The product of 7 and $\frac{1}{7}$ is 1. Two numbers whose product is 1 are called reciprocals. To divide a number by a fraction, multiply by its reciprocal.

Problem

What is the quotient $\frac{2}{3} \div \left(-\frac{5}{7}\right)$?

$\frac{2}{3} \div \left(-\frac{5}{7}\right) = \frac{2}{3} \times \left(-\frac{7}{5}\right)$ To divide by a fraction, multiply by its reciprocal.

The signs are different so the answer is negative.

Exercises

Find each quotient.

18 $\frac{1}{2} \div \frac{1}{3}$

19. $-6 \div \frac{2}{3}$

20. $-\frac{2}{5} \div \left(-\frac{2}{3}\right)$

21. $\frac{1}{2} \div \left(-\frac{1}{4}\right)$

22. $\left(-\frac{5}{7}\right) \div \left(-\frac{1}{2}\right)$

23. $-\frac{2}{3} \div \frac{1}{4}$

24. Writing Another way of writing $\frac{a}{b}$ is a ÷b Explain how you could evaluate $\frac{\frac{1}{2}}{\frac{1}{6}}$

What is the value of this expression?

Name _____ Class _____ Date _____

1-7 Reteaching

The Distributive Property states that the product of a sum and another factor can be rewritten as the sum of two products, each term in the sum multiplied by the other factor. For example, the Distributive Property can be used to rewrite the product $3(x + y)$ as the sum $3x + 3y$. Each term in the sum $x + y$ is multiplied by 3; then the new products are added.

Problem

What is the simplified form of each expression?

a. $4(x + 5)$
$= 4(x) + 4(5)$ Distributive Property
$= 4x + 20$ Simplify.

b. $(2x - 3)(-3)$
$= 2x(-3) - 3(-3)$ Distributive Property
$= -6x + 9$ Simplify.

The Distributive Property can be used whether the factor being multiplied by a sum or difference is on the left or right.

The Distributive Property is sometimes referred to as the Distributive Property of Multiplication over Addition. It may be helpful to think of this longer name for the property, as it may remind you of the way in which the operations of multiplication and addition are related by the property.

Exercises

Use the Distributive Property to simplify each expression.

1. $6(z + 4)$ **2.** $2(-2 - k)$ **3.** $(5x + 1)4$ **4.** $(7 - 11n)10$

5. $(3 - 8w)4.5$ **6.** $(4p + 5)2.6$ **7.** $4(y + 4)$ **8.** $6(q - 2)$

Write each fraction as a sum or difference.

9. $\frac{2m - 5}{9}$ **10.** $\frac{8 + 7z}{11}$ **11.** $\frac{24f + 15}{9}$ **12.** $\frac{12d - 16}{6}$

Simplify each expression.

13. $-(6 + j)$ **14.** $-(-9h - 4)$ **15.** $-(-n + 11)$ **16.** $-(6 - 8f)$

Name _____ Class _____ Date _____

1-7 Reteaching (continued)

The previous problem showed how to write a product as a sum using the Distributive Property. The property can also be used to go in the other order, to convert a sum into a product.

Problem

How can the sum of like terms $15x + 6x$ be simplified using the Distributive Property?

Each term of $15x + 6x$ has a factor of x. Rewrite $15x + 6x$ as $15(x) + 6(x)$. Now use the Distributive Property in reverse to write $15(x) + 6(x)$ as $(15 + 6)x$, which simplifies to $21x$.

Exercises

Simplify each expression by combining like terms.

17. $16x + 12x$ **18.** $25n - 17n$ **19.** $-4p + 6p$

20. $-15a - 9a$ **21.** $-9k^2 - 5k^2$ **22.** $12t^2 - 20t^2$

By thinking of or rewriting numbers as sums or differences of other numbers that are easier to use in multiplication, the Distributive Property can be used to make calculations easier.

Problem

How can you multiply 78 by 101 using the Distributive Property and mental math?

78×101	Write the product.
$78 \times (100 + 1)$	Rewrite 101 as sum of two numbers that are easy to use in multiplication.
$78(100) + 78(1)$	Use the Distributive Property to write the product as a sum.
$7800 + 78$	Multiply.
7878	Simplify.

Exercises

Use mental math to fintd each product.

23. 5.1×7 **24.** 24.95×4 **25.** 999×11 **26.** 12×95

Name _____ Class _____ Date _____

1-8 Reteaching

An Introduction to Equations

An equation is a mathematical sentence with an equal sign. An equation can be true, false, or open. An equation is true if the expressions on both sides of the equal sign are equal, for example $2 + 5 = 4 + 3$. An equation is false if the expressions on both sides of the equal sign are not equal, for example $2 + 5 = 4 + 2$.

An equation is considered open if it contains one or more variables, for example $x + 2 = 8$. When a value is substituted for the variable, you can then decide whether the equation is true or false for that particular value. If an open sentence is true for a value of the variable, that value is called a solution of the equation. For $x + 2 = 8$, 6 is a solution because when 6 is substituted in the equation for x, the equation is true: $6 + 2 = 8$.

Problem

Is the equation true, false, or open? Explain.

a. $15 + 21 = 30 + 6$ The equation is true, because both expressions equal 36.

b. $24 \div 8 = 2 \cdot 2$ The equation is false, because $24 \div 8 = 3$ and $2 \cdot 2 = 4$; $3 \neq 4$.

c. $2n + 4 = 12$ The equation is open, because there is a variable in the on the left side.

Tell whether each equation is true, false, or open. Explain.

1. $2(12) - 3(6) - 12$

2. $3x + 12 = -19$

3. $14 - 19 = -5$

4. $2(-8) + 4 = 12$

5. $7 - 9 + 3 = x$

6. $(28 + 12) \div -2 = -20$

7. $14 - (-8) - 14 = 8$

8. $(13 - 16) \div 3 = 1$

9. $42 \div 7 + 3 = 9$

Problem

Is $x = -3$ a solution of the equation $4x + 5 = -7$?

$4x + 5 = -7$

$4(-3) + 5 = -7$ Substitute -3 for x.

$-7 = -7$ Simplify.

Since $-7 = -7$, -3 is a solution of the equation $4x + 5 = -7$.

Tell whether the given number is a solution of each equation.

10. $4x - 1 = -27; -7$

11. $18 - 2n = 14; 2$

12. $21 = 3p - 5; 9$

13. $k = (-6)(-8) - 14; -62$

14. $20v + 36 = -156; -6$

15. $8y + 13 = 21; 1$

16. $-24 - 17t = -58; 2$

17. $-26 = \frac{1}{3}m + 5; -7$

18. $\frac{1}{4}g - 8 = \frac{3}{2}; 38$

Name _____ Class _____ Date _____

1-8 Reteaching (continued)
An Introduction to Equations

A table can be used to find or estimate a solution of an open equation. You will have to choose a value to begin your table. If you choose the value that makes the equation true, you have found the solution and are done. If your choice is not the solution, make another choice based on the values of both sides of the equation for your first choice. If you choose one value that makes one side of the equation too high and then another value that makes that same side too low, you know that the solution must lie between the two values you chose. It may not be possible to determine an exact solution for each equation; estimating the solution to be between two integers may be all that is possible in some cases.

Problem

What is the solution of $6n + 8 = 28$?

If $n = 2$, then the left side of the equation is $6(2) + 8$ or 20, which is too low.

If $n = 5$, then the left side of the equation is $6(5) + 8$ or 38, which is too high.

The solution must lie between 2 and 5, so keep trying values between them.

If $n = 3$, then the left side of the equation is $6(3) + 8$ or 26, which is too low.
If $n = 4$, then the left side of the equation is $6(4) + 8$ or 32, which is too high.
The solution must lie between 3 and 4, but there are no other integers between 3 and 4.

You can give an estimate for the solution of $6n + 8 = 28$ as being between the integers 3 and 4.

Write an equation for each sentence.

19. 13 times the sum of a number and 5 is 91.

20. Negative 8 times a number minus 15 is equal to 30.

21. Jared receives $23 for each lawn he mows. What is an equation that relates the number of lawns w that Jared mows and his pay p?

22. Shariff has been working for a company 2 years longer than Patsy. What is an equation that relates the years of employment of Shariff S and the years of employment of Patsy P?

Use mental math to find the solution of each equation.

23. $h + 6 = 13$ **24.** $-11 = n + 2$ **25.** $6 - k = 14$ **26.** $5 = -8 + t$

27. $\frac{z}{5} = -2$ **28** $\frac{j}{-6} = 12$ **29.** $8c = -48$ **30.** $-15a = -45$

Use a table to find the solution of each equation.

31. $-3b - 12 = 15$ **32.** $15y + 6 = 21$ **33.** $-8 = 5y + 22$ **34.** $6t - 1 = -49$

Name _____ Class _____ Date _____

1-9 Reteaching

Tables, equations, and graphs are some of the ways that a relationship between two quantities can be represented. You can use the information provided by one representation to produce one of the other representations; for example, you can use data from a table to produce a graph. You can also use any of the representations to draw conclusions about the relationship.

Problem

Are (2, 11) and (5, 3) solutions of the equation $y = 3x + 5$?

For each ordered pair, you can substitute the x- and y- coordinates into the equation for x and y and then simplify to see if the values satisfy the equation.

For (2, 11):		For (5, 3):
$11 = 3(2) + 5$	Substitute for x and y.	$3 = 3(5) + 5$
$11 = 11$	Multiply and then add.	$3 \neq 20$

Since both sides of the equation have the same value, the ordered pair (2, 11) is a solution of the equation $y = 3x + 5$. Since the two sides of the equation have different values, the ordered pair (5, 3) is not a solution of the equation $y = 3x + 5$.

Problem

The table shows the relationship between the number of hours Kaya works at her job and the amount of pay she receives. Extend the pattern. How much money would Kaya earn if she worked 40 hours?

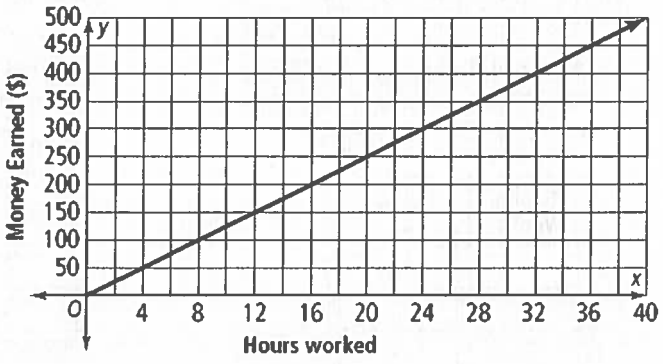
Hours Worked	Money Earned ($)
3	37.50
6	75
9	112.50
12	150

Method 1: Write an equation.

$y = 12.50x$	Kaya earns $12.50 per hour.
$= 12.50(40)$	Substitute 40 for x.
$= 500$	Simplify.

She would earn $500 in 40 hours.

Method 2: Draw a graph.



She would earn $500 in 40 hours.

Name _____ Class _____ Date _____

1-9 Reteaching (continued)

Patterns, Equations, and Graphs

Exercises

Tell whether the equation has the given ordered pair as a solution.

1. $y = x - 7$; $(2, -5)$
2. $y = x + 6$; $(-5, 11)$
3. $y = -x + 1$; $(-1, 0)$
4. $y = -5x$; $(-3, -15)$
5. $y = x - 8$; $(7, -1)$
6. $y = x + \frac{3}{4}$; $(-1, -\frac{1}{4})$

Use a table, an equation, and a graph to represent each relationship.

7. Tickets to the fair cost $17.
8. Brian is 5 years older than Sam.

Use the table to draw a graph and answer the question.

9. The table shows Jake's earnings for the number of cakes he baked. What are his earnings for baking 75 cakes?

Cakes	Earnings ($)
5	120
10	240
15	360

Use the table to write an equation and answer the question.

10. The table shows the number of miles that Kate runs on a weekly basis while training for a race. How many total miles will she have run after 15 weeks?

Training Weeks	Miles Run
1	40
2	80
3	120

11. The table shows the amount of money Kevin receives for items that he sells. How much will he earn if he sells 30 items?

Items Sold	Earnings ($)
15	1125
20	1500
25	1875

Name _____ Class _____ Date _____

2-1 Reteaching

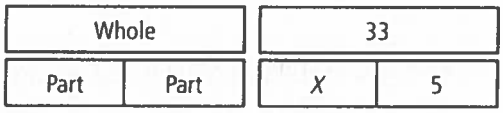
You can use the properties of equality to solve equations. Subtraction is the inverse of addition.

Problem

What is the solution of $x + 5 = 33$?

In the equation, $x + 5 = 33$, 5 is added to the variable. To solve the equation, you need to isolate the variable, or get it alone on one side of the equal sign. Undo adding 5 by subtracting 5 from each side of the equation.

Drawing a diagram can help you write an equation to solve the problem.



Solve	$x + 5 = 33$	
	$x + 5 - 5 = 33 - 5$	Undo adding 5 by subtracting 5.
	$x = 28$	Simplify. This isolates x.
Check	$x + 5 = 33$	Check your solution in the original equation. Substitute 28 for x.
	$28 + 5 \stackrel{?}{=} 33$	
	$33 = 33$ ✓	

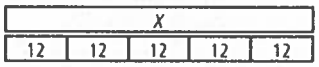
The solution to $x + 5 = 33$ is 28.

Division is the inverse of multiplication.

Problem

What is the solution of $\frac{x}{5} = 12$?

In the equation, $\frac{x}{5} = 12$, the variable is divided by 5. Undo dividing by 5 by multiplying by 5 on each side of the equation.



Solve	$\frac{x}{5} = 12$	
	$\frac{x}{5} \cdot 5 = 12 \cdot 5$	Undo dividing by 5 by multiplying by 5.
	$x = 60$	Simplify. This isolates x.

The solution to $\frac{x}{5} = 12$ is 60.

2-1 Reteaching (continued)

Exercises

Solve each equation using addition or subtraction. Check your answer.

1. $-3 = n + 9$ **2.** $f + 6 = -6$ **3.** $m + 12 = 22$

4. $r + 2 = 7$ **5.** $b + 1.1 = -11$ **6.** $t + 9 = 4$

Define a variable and write an equation for each situation. Then solve.

7. A student is taking a test. He has 37 questions left. If the test has 78 questions, how many questions has he finished?

8. A friend bought a bouquet of flowers. The bouquet had nine daisies and some roses. There were a total of 15 flowers in the bouquet. How many roses were in the bouquet?

Solve each equation using multiplication or division. Check your answer.

9. $\frac{z}{8} = 2$ **10.** $-26 = \frac{c}{3}$ **11.** $\frac{q}{11} = -6$

12. $-\frac{a}{3} = 18$ **13** $-25 = \frac{g}{5}$ **14.** $20.4 = \frac{s}{2.5}$

15. A student has been typing for 22 minutes and has typed a total of 1496 words. Write and solve an equation to determine the average number of words she can type per minute.

Name _____ Class _____ Date _____

2-2 Reteaching

Properties of equality and inverse operations can be used to solve equations that involve more than one step to solve. To solve a two-step equation, identify the operations and undo them using inverse operations. Undo the operations in the reverse order of the order of operations.

Problem

What is the solution of $5x - 8 = 32$?

$5x - 8 + 8 = 32 + 8$	To get the variable term alone on the left side, add 8 to each side.
$5x = 40$	Simplify.
$\frac{5x}{5} = \frac{40}{5}$	Divide each side by 5 since x is being multiplied by 5 on the left side. This isolates x.
$x = 8$	Simplify.
Check $5x - 8 = 32$	Check your solution in the original equation.
$5(8) - 8 = 32$	Substitute 8 for x.
$32 = 32$ ✓	Simplify.

To solve $-16 = \frac{x}{3} + 5$ you can use subtraction first to undo the addition, and then use multiplication to undo the division.

Problem

What is the solution of $-16 = \frac{x}{3} + 5$?

$-16 - 5 = \frac{x}{3} + 5 - 5$	To get the variable term alone on the right, subtract 5 from each side.
$-21 = \frac{x}{3}$	Simplify.
$3(-21) = 3\left(\frac{x}{3}\right)$	Since x is being divided by 3, multiply each side by 3 to undo the division. This isolates x.
$-63 = x$	Simplify.

Name _____ Class _____ Date _____

2-2 Reteaching (continued)

Solve each equation. Check your answer.

1. $4f - 8 = 20$

2. $25 - 6b = 55$

3. $-z + 7 = -8$

4. $\frac{w}{-9} + 7 = 10$

5. $25 = 8 + \frac{n}{2}$

6. $\frac{y-8}{3} = -7$

Solve each equation. Justify each step.

7. $6d - 5 = 31$

8. $\frac{p-7}{-2} = 5$

Define a variable and write an equation for each situation. Then solve.

9. Ray's birthday is 8 more than four times the number of days away from today than Jane's birthday. If Ray's birthday is 24 days from today, how many days until Jane's birthday?

10. Jerud weighs 15 pounds less than twice Kate's weight. How much does Kate weigh if Jerud weighs 205 pounds?

11. A phone company charges a flat fee of $17 per month, which includes free local calling plus $0.08 per minute for long distance calls. The Taylor's phone bill for the month is $31.80. How many minutes of long distance calling did they use during the month?

12. A delivery company charges a flat rate of $3 for a large envelope plus an additional $0.25 per ounce for every ounce over a pound the package weighs. The postage for the package is $5.50. How much does the package weigh? (Hint: remember the first pound is included in the $3.)

Name _____ Class _____ Date _____

2-3 Reteaching

To solve multi-step equations, use properties of equality, inverse operations, the Distributive Property, and properties of real numbers to isolate the variable. Like terms on either side of the equation should be combined first.

Problem

a) What is the solution of $-3y + 8 + 13y = -52$?

$-3y + 13y + 8 = -52$	Group the terms with y together so that the like terms are grouped together.
$10y + 8 = -52$	Add the coefficients to combine like terms.
$10y + 8 - 8 = -52 - 8$	To get the variable term by itself on the left side, subtract 8 from each side.
$10y = -60$	Simplify.
$\frac{10y}{10} = \frac{-60}{10}$	Divide each side by 10 since y is being multiplied by 10 on the left side. This isolates y.
$y = -6$	Simplify.

b) What is the solution of $-2(3n - 4) = -10$?

$26n + 8 = -10$	Distribute the –2 into the parentheses by multiplying each term inside by –2.
$-6n + 8 - 8 = -10 - 8$	To get the variable term by itself on the left side, subtract 8 from each side.
$-6n = -18$	Simplify.
$\frac{-6n}{-6} = \frac{-18}{-6}$	Divide each side by –6 since n is being multiplied by –6 on the left side. This isolates n.
$n = 3$	Simplify.

Solve each equation. Check your answer.

1. $4 - 6h - 8h = 60$

2. $-32 = -7n - 12 + 3n$

3. $14 + 12 = -15x + 2x$

4. $8(-3d + 2) = 88$

5. $-22 = -(x - 4)$

6. $35 = -5(2k + 5)$

7. $3m + 6 - 2m = -22$

8. $4(3r + 2) - 3r = -10$

9. $-18 = 15 - 3(6t + 5)$

10. $-5 + 2(10b - 2) = 31$

11. $7 = 5x + 3(x - 2) + 5$

12. $-18 = 3(-z + 6) + 2z$

13. Reasoning Solve the equation $14 = 7(2x - 4)$ using two different methods. Show your work. Which method do you prefer? Explain.

Name _____ Class _____ Date _____

2-3 Reteaching (continued)

Equations with fractions can be solved by using a common denominator or by eliminating the fractions altogether.

Problem

What is the solution of $\frac{x}{4}-\frac{2}{3}=\frac{7}{12}$?

Method 1 Get a common denominator first.	Method 2 Multiply by the common denominator first.
$\frac{3}{3}\left(\frac{x}{4}\right)-\frac{4}{4}\left(\frac{2}{3}\right)=\frac{7}{12}$	$12\left(\frac{x}{4}-\frac{2}{3}\right)=12\left(\frac{7}{12}\right)$
$\frac{3x}{12}-\frac{8}{12}=\frac{7}{12}$	$^{3}\cancel{12}\left(\frac{x}{\cancel{4}}\right)-^{4}\cancel{12}\left(\frac{2}{\cancel{3}}\right)=\cancel{12}\left(\frac{7}{\cancel{12}}\right)$
$\frac{3x}{12}=\frac{15}{12}$	$3x - 8=7$
$\frac{3x}{12}\cdot=\frac{12}{3}=\frac{15}{12}\cdot\frac{12}{3}$	$3x = 15$
$x=5$	$x = 5$

Decimals can be cleared from the equation by multiplying by a power of ten with the same number of zeros as the number of digits to the right of the decimal. For instance, if the greatest number of digits after the decimal is 3, like 4.586, you multiply by 1000.

Problem

What is the solution of $2.8x - 4.25 = 5.55$?

$100(2.8x - 4.25 = 5.55)$	Multiply by 100 because the most number of digits after the decimal is two.
$280x - 425 = 555$	Simplify by moving the decimal point to the right 2 places in each term.
$280x = 980$	Add 425 to each side to get the term with the variable by itself on the left side.
$x = 3.5$	Divide each side by 280 to isolate the variable.

Solve each equation. Check your answer.

14. $\frac{x}{16}-\frac{1}{2}=\frac{3}{8}$

15. $\frac{2a}{3}+\frac{8}{9}=4$

16 $\frac{3n}{7}-1=\frac{1}{8}$

17. $-1.68j + 1.24 = 13$ **18.** $4.6 = 3.5w - 6.6$ **19.** $5.23y + 3.02 = -2.21$

Name _____ Class _____ Date _____

2-4 Reteaching

Solving Equations With Variables on Both Sides

To solve equations with variables on both sides, you can use the properties of equality and inverse operations to write a series of simpler equivalent equations.

What is the solution of $2m - 4 + 5m = 13 - 6m - 4$?

$7m - 4 = -6m + 9$	Add the terms with variables together on the left side and the constants on the right side to combine like terms.
$7m - 4 + 6m = -6m + 9 + 6m$	To move the variables to the left side, add $6m$ to each side.
$13m - 4 = 9$	Simplify.
$13m - 4 + 4 = 9 + 4$	To get the variable term alone on the left, add 4 to each side.
$13m = 13$	Simplify.
$\frac{13m}{13} = \frac{13}{13}$	Divide each side by 13 since x is being multiplied by 13 on the left side. This isolates x.
$m = 1$	Simplify.

What is the solution of $3(5x - 2) = -3(x + 6)$?

$15x - 6 = -3x - 18$	Distribute 3 on the left side and -3 on the right side into the parentheses by multiplying them by each term inside.
$15x - 6 + 6 = -3x - 18 + 6$	To move all of the terms without a variable to the right side, add 6 to each side.
$15x = -3x - 12$	Simplify.
$15x + 3x = -3x - 12 + 3x$	To get the variable terms to the left side, add $3x$ to each side.
$18x = -12$	Simplify.
$\frac{18x}{18} = -\frac{12}{18}$	Divide each side by 18 since x is being multiplied by 18 on the left side. This isolates x.
$x = -\frac{2}{3}$	Simplify and reduce the fraction.

Solve each equation. Check your answer.

1. $-5x + 9 = -3x + 1$

2. $14 + 7n = 14n + 28$

3. $22(g - 1) = 2g + 8$

4. $-d + 12 - 3d = 5d - 6$

5. $4(m - 2) = -2(3m + 3)$

6. $-(4y - 8) = 2(y + 4)$

7. $5a - 2(4a + 5) = 7a$

8. $11w + 2(3w - 1) = 15w$

9. $4(3 - 5p) = -5(3p + 3)$

Name _____ Class _____ Date _____

2-4 Reteaching (continued)

An equation that is true for every value of the variable for which the equation is defined is an identity. For example, $x - 5 = x - 5$ is an identity because the equation is true for any value of x. An equation has no solution if there is no value of the variable that makes the equation true. The equation $x + 6 = x + 3$ has no solution.

What is the solution of each equation?

a) $3(4x - 2) = -2(-6x + 3)$

Distribute 3 on the left side and -2 on the right side into the parentheses by multiplying them by each term inside.

$12x - 6 = 12x - 6$

$12x - 6 - 12x = 12x - 6 - 12x$ To get the variable terms to the left side, subtract $12x$ from each side.

$-6 = -6$ Simplify.

Because $-6 = -6$ is always true, there are infinitely many solutions of the original equation. The equation is an identity.

b) $2n + 4(n - 2) = 8 + 6n$

Distribute 4 into the parentheses by multiplying it by each term inside.

$2n + 4n - 8 = 8 + 6n$

$6n - 8 = 8 + 6n$ Add the variable terms on the left side to combine like terms.

$6n - 8 - 6n = 8 + 6n - 6n$ To get the variable terms to the left side, subtract $6n$ from each side.

$-8 = 8$ Simplify.

Since $-8 \neq 8$, the equation has no solution.

Determine whether each equation is an *identity* or whether it has *no solution*.

10. $-3(2x + 1) = 2(-3x - 1)$ **11.** $4(-3x + 4) = -2(6x - 8)$ **12.** $3n + 3(-n + 3) = 3$

Solve each equation. If the equation is an identity, write *identity*. If it has no solution, write *no solution*.

13. $-(4n + 2) = -2(2n - 1)$ **14.** $2(-d + 4) = 2d + 8$ **15.** $-k - 18 = -5 - k - 13$

16. Open-Ended Write three equations with variables on both sides of the equal sign with one having no solution, one having exactly one solution, and one being an identity.

Name _____ Class _____ Date _____

2-5 Reteaching

A literal equation is an equation that involves two or more variables. When you work with literal equations, you can use the methods you have learned in this chapter to isolate any particular variable. To solve for specific values of a variable, simply substitute the values into your equation and simplify.

What is the solution of $4x - 5y = 3$ for y? What is the value of y when $x = 10$?

$4x - 5y - 4x = 3 - 4x$	To get the y-term by itself on the left side, subtract $4x$ from each side.
$-5y = -4x + 3$	Simplify.
$\frac{-5y}{-5} = \frac{-4x+3}{-5}$	Divide each side by -5 since y is being multiplied by -5 on the left side. This isolates y.
$y = \frac{4}{5}x - \frac{3}{5}$	Simplify by dividing each term by -5. Notice, this changes the sign of each term.
$y = \frac{4}{5}(10) - \frac{3}{5}$	To find the value of y when $x = 10$, substitute 10 in for x.
$y = 7\frac{2}{5}$	Simplify by multiplying first, then subtracting.

When you rewrite literal equations, you may have to divide by a variable or variable expression. When you do so in this lesson, assume that the variable or variable expression is not equal to zero because division by zero is not defined.

Solve the equation $ab - bc = cd$ for b.

$b(a - c) = cd$	Since b is a factor of each term on the left side, it can be factored out using the Distributive Property.
$\frac{b(a-c)}{a-c} = \frac{cd}{a-c}$	To get b by itself, divide each side by $a - c$ since b is being multiplied by $a - c$. Remember $a - c \neq 0$.
$b = \frac{cd}{a-c}$	Simplify.

Solve each equation for y. Then find the value of y for each value of x.

1. $y + 5x = 2; -1, 0, 1$

2. $6x = 2y - 4; 1, 2, 4$

3. $6x - 3y = -9; -2, 0, 2$

4. $4y = 5x - 8; -2, -1, 0$

5. $3y + 2x = -5; 0, 2, 3$

6. $5x = 8y - 6; -1, 0, 1$

7. $3(y - 2) + x = 1; -1, 0, 1$

8. $\frac{x+2}{y-3} = 1; -1, 0, 1$

9. $\frac{y+4}{x-5} = -3; -2, 2, 4$

Name _____ Class _____ Date _____

2-5 Reteaching (continued)

A formula is an equation that states a relationship among quantities. Formulas are special types of literal equations. Some common formulas are shown below. Notice that some of the formulas use the same variables, but the definitions of the variables are different. For instance, r is the radius in the area and circumference of a circle and the rate in the distance formula.

Formula Name	Formula
Perimeter of a rectangle	$P = 2l + 2w$
Circumference of a circle	$C = 2\pi r$
Area of a rectangle	$A = lw$
Area of a triangle	$A = \frac{1}{2}bh$
Area of a circle	$A = \pi r^2$
Distance traveled	$d = rt$

Each of the formulas can be solved for any of the other unknowns in the equation to produce a new formula. For example, $r = \frac{C}{2\pi}$ is a formula for the radius of a circle in terms of its circumference.

What is the length of a rectangle with width 24 cm and area 624 cm^2?

$A = lw$	Formula for the area of a rectangle.
$\frac{A}{w} = \frac{lw}{w}$	Since you are trying to get l by itself, divide each side by w.
$l = \frac{A}{w}$	Simplify.
$l = \frac{624}{24}$	Substitute 624 for A and 24 for w.
$l = 26$ cm	Simplify.

Solve each problem. Round to the nearest tenth, if necessary. Use 3.14 for π.

10. A triangle has base 6 cm and area 42 cm^2. What is the height of the triangle?

11. What is the radius of a circle with circumference 56 in.?

12. A rectangle has perimeter 80 m and length 27 m. What is the width?

13. What is the length of a rectangle with area 402 ft^2 and width 12 ft?

14. What is the radius of a circle with circumference 27 in.?

Name _____ Class _____ Date _____

2-6 Reteaching

A unit rate is a rate with denominator 1. For example, $\frac{12 \text{ in.}}{1 \text{ ft}}$ is a unit rate. Unit rates can be used to compare quantities and convert units.

Problem

Which is greater, 74 inches or 6 feet?

It is helpful to convert to the same units. Conversion factors, a ratio of two equivalent measures in different units, are used to do conversions.

Multiply the original quantity by the conversion factor(s) so that units cancel out, leaving you with the desired units.

$$6\cancel{\text{ft}} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 72 \text{ in.}$$

Since 72 in. is less than 74 in., 74 in. is greater than 6 ft.

Rates, which involve two different units, can also be converted. Since rates involve two different units, you must multiply by two conversion factors to change both of the units.

Problem

Jared's car gets 26 mi per gal. What is his fuel efficiency in kilometers per liter? You need to convert miles to kilometers and gallons to liters. This will involve multiplying by two conversion factors.

There are 1.6 km in 1 mi. The conversion factor is either $\frac{1.6 \text{ km}}{1 \text{ mi}}$ or $\frac{1 \text{ mi}}{1.6 \text{ km}}$.

Since miles is in the numerator of the original quantity, use $\frac{1.6 \text{ km}}{1 \text{ mi}}$ as the conversion factor so that miles will cancel.

$$26\frac{\cancel{\text{mi}}}{\text{gal}} \times \frac{1.6 \text{ km}}{1 \ \cancel{\text{mi}}}$$

There are 3.8 L in 1 gal. The conversion factor is either $\frac{3.8 \text{ L}}{1 \text{ gal}}$ or $\frac{1 \text{ gal}}{3.8 \text{ L}}$.

Since gallons is in the denominator of the original quantity, use $\frac{1 \text{ gal}}{3.8 \text{ L}}$ as the conversion factor so that gallons will cancel.

$$26\frac{\cancel{\text{mi}}}{\cancel{\text{gal}}} \times \frac{1.6 \text{ km}}{1 \ \cancel{\text{mi}}} \times \frac{1 \ \cancel{\text{gal}}}{3.8 \text{ L}} \approx 10.9\frac{\text{km}}{\text{L}}$$

Jared's vehicle gets 10.9 kilometers per liter.

Name _____ Class _____ Date _____

2-6 Reteaching (continued)

Exercises

Convert the given amount to the given unit.

1. 12 hours; minutes

2. 1000 cm; km

3. 45 ft; yd

4. 32 cups; gallons

5. 30 m; cm

6. 15 lbs; kilograms

7. 42 in.; cm

8. 10 miles; km

9. 25 ft; in.

10. Serra rode 15 mi in 1.5 hr. Phaelon rode 38 mi in 3.5 h. Justice rode 22 mi in 2.25 hr. Who had the fastest average speed?

11. Mr. Hintz purchased 12 gallons of drinking water for his family for $14.28. He knows that this should last for 2 weeks. What is the average cost per day for drinking water for the family?

12. The price for a particular herb is 49 cents for 6 ounces. What is the price of the herb in dollars per pound?

Copy and complete each statement.

13. 45 mi/h = ____ ft/s

14. 7 g/s = ____ kg/min

15. 50 cents/min = ____ $/h

16. 22 m/h = ____ cm/s

17. 15 km/min = ____ mi/h

18. 6 gal/min = ____ qt/h

19. Writing Describe the conversion factor you would use to convert feet to miles. How do you determine which units to place in the numerator and the denominator?

20. Writing Describe a unit rate. How do you determine the unit rate if the rate is not given as a unit rate. Illustrate using an example.

Name _____ Class _____ Date _____

2-7 Reteaching

A proportion is an equation that states that two ratios are equal. If a quantity in a proportion is unknown, you can solve a proportion to find the unknown quantity as shown below.

Problem

What is the solution of $\frac{3}{4} = \frac{x}{14}$?

There are two methods for solving proportions—using the Multiplication Property of Equality and the Cross Products Property.

1) The Multiplication Property of Equality says that you can multiply both sides of an equation by the same number without changing the value.

$\frac{3}{4} = \frac{x}{14}$

$14\left(\frac{3}{4}\right) = \left(\frac{x}{14}\right)14$ To isolate x, multiply each side by 14.

$\frac{42}{4} = x$ Simplify.

$10.5 = x$ Divide 42 by 4.

2) The Cross Products Property says that you can multiply diagonally across the proportion and these products are equal.

$\frac{3}{4} = \frac{x}{14}$

$(4)(x) = (3)(14)$ Multiply diagonally across the proportion.

$4x = 42$ Multiply.

$\frac{4x}{4} = \frac{42}{4}$ To isolate x, divide each side by 4.

$x = 10.5$ Simplify.

Real world situations can be modeled using proportions.

Problem

A bakery can make 6 dozen donuts every 21 minutes. How many donuts can the bakery make in 2 hours?

A proportion can be used to answer this question. It is key for you to set up the proportion with matching units in both numerators and both denominators.

For this problem, you know that 2 hours is 120 minutes and 6 dozen is 72 donuts.

Correct:

$$\frac{72 \text{ donuts}}{21 \text{ min}} = \frac{x \text{ donuts}}{120 \text{ min}}$$

Incorrect:

$$\frac{72 \text{ donuts}}{21 \text{ min}} = \frac{120 \text{ min}}{x \text{ donuts}}$$

Name _____ Class _____ Date _____

2-7 Reteaching (continued)

This proportion can be solved using the Multiplication Property of Equality or the Cross Products Property.

Problem

Solve this proportion using the cross products.

$$\frac{72 \text{ donuts}}{21 \text{ min}} = \frac{x \text{ donuts}}{120 \text{ min}}$$

$21x = (72)(120)$	Cross Products Property
$21x = 8640$	Multiply.
$\frac{21x}{21} = \frac{8640}{21}$	Divide each side by 21.
$x = 411.43$	Simplify.

Since you cannot make 0.43 donuts, the correct answer is 411 donuts.

Exercises

Solve each proportion using the Multiplication Property of Equality.

1. $\frac{3}{4} = \frac{n}{7}$
2. $\frac{1}{3} = \frac{t}{10}$
3. $\frac{n}{5} = \frac{8}{20}$
4. $\frac{z}{6} = \frac{9}{8}$
5. $\frac{15}{5} = \frac{a}{11}$
6. $\frac{7}{2} = \frac{d}{8}$

Solve each proportion using the Cross Products Property.

7. $\frac{3}{5} = \frac{b}{8}$
8. $\frac{12}{m} = \frac{8}{3}$
9. $\frac{z}{2} = \frac{9}{6}$
10. $\frac{14}{v} = \frac{7}{3}$
11. $\frac{-4}{-9} = \frac{f}{-12}$
12. $\frac{13}{h} = \frac{2}{-6}$

13. A cookie recipe calls for a half cup of chocolate chips per 3 dozen cookies. How many cups of chocolate chips should be used for 10 dozen cookies?

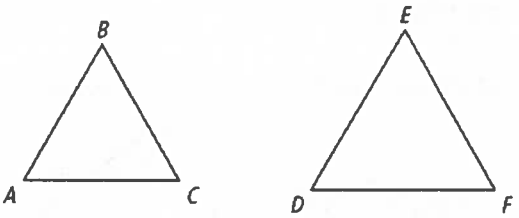
Solve each proportion using any method.

14. $\frac{x-3}{-2} = \frac{4}{5}$
15. $\frac{12}{10} = \frac{y+6}{13}$
16. $\frac{5}{x-3} = \frac{2}{-6}$

Name _____ Class _____ Date _____

2-8 Reteaching

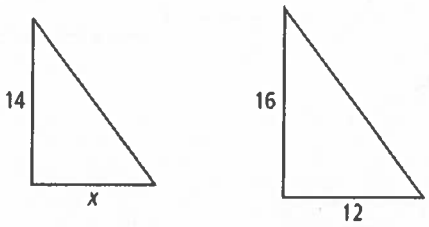
In similar figures, the measures of corresponding angles are equal, and the ratios of corresponding side lengths are equal. It is important to be able to identify the corresponding parts in similar figures.



Since $\angle A \cong \angle D$, $\angle B \cong \angle E$, and $\angle C \cong \angle F$, $\frac{AB}{DE} = \frac{BC}{EF}$, $\frac{AB}{DE} = \frac{AC}{DF}$. This fact can help you to find missing lengths.

Problem

What is the missing length in the similar figures?



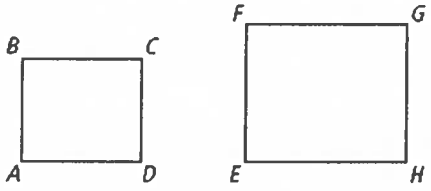
First, determine which sides correspond. The side with length 14 corresponds to the side with length 16. The side with length x corresponds to the side with length 12. These can be set into a proportion.

$\frac{14}{16} = \frac{x}{12}$	Write a proportion using corresponding lengths.
$(16)\,x = (14)\,(12)$	Cross Products Property
$16x = 168$	Multiply.
$x = 10.5$	Divide each side by 16 and simplify.

Exercises

The figures in each pair are similar. Identify the corresponding sides and angles.

1.



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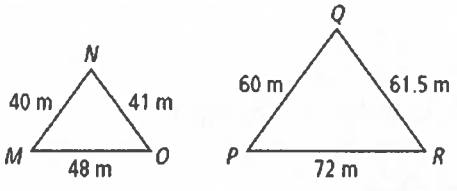


Name _____ Class _____ Date _____

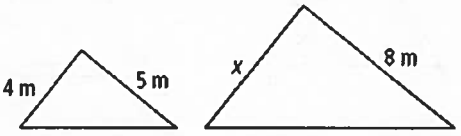
2-8 Reteaching (continued)

Proportions and Similar

Exercises

The figures in each pair are similar. Find the missing length.

3.



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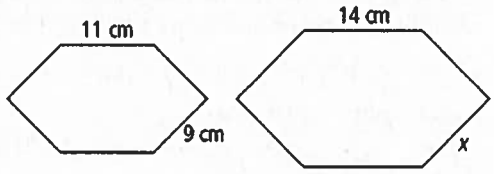

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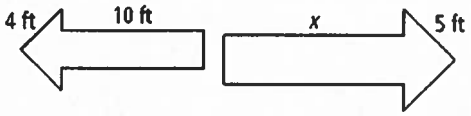

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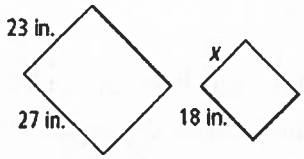


Problem

A map shows the distance between two towns is 3.5 inches where the scale on the map is 0.25 in. : 5 mi. What is the actual distance between the towns?

Map scale: $\frac{\text{map distance}}{\text{actual distance}}$

If you let x be the actual distance between the towns, you can set up and solve a proportion to answer the question.

$$\frac{0.25 \text{ in.}}{5 \text{ mi}} = \frac{3.5 \text{ in.}}{x \text{ mi}}$$

$$0.25 = 17.5$$

$$x = 70$$

The towns are 70 miles apart.

Exercises

The scale of a map is 1.5 in. : 50 mi. Find the actual distance corresponding to each map distance.

7. 10 in. **8.** 4.25 in. **9.** 6.75 in.

10. The blueprints of an octagonal shaped hot tub are drawn with a 1 in. : 5 ft scale. In the drawing the sides are 3.5 inches long. What is the perimeter of the hot tub?

Name _____ Class _____ Date _____

2-9 Reteaching

Percents compare whole quantities, represented by 100%, and parts of the whole.

Problem

What percent of 90 is 27?

There are two ways presented for finding percents.

1) You can use the percent proportion $\frac{a}{b} = \frac{p}{100}$. The percent is represented by $\frac{p}{100}$. The base, b, is the whole quantity and must be the denominator of the other fraction in the proportion. The part of the quantity is represented by a.

$\frac{27}{90} = \frac{p}{100}$	Substitute given values into the percent proportion. Since you are looking for percent, p is the unknown.
$27(100) = (90)(p)$	Cross Products Property
$2700 = 90p$	Multiply.
$30 = p$	Divide each side by 90 and simplify.

27 is 30% of 90.

2) The other way to find percents is to use the percent equation. The percent equation is $a = p\% \times b$, where p is the percent, a is the part, and b is the base.

$27 = p\% \times 90$	Substitute 27 for a and 90 for b.
$0.3 = p\%$	Divide each side by 90.
$30\% = p\%$	Write the decimal as a percent.

27 is 30% of 90.

Exercises

Find each percent.

1. What percent of 125 is 50?
2. What percent of 14 is 35?
3. What percent of 24 is 18?
4. What percent of 50 is 75?

Problem

75% of 96 is what number?

In this problem you are given the percent p and the whole quantity (base) b.

$a = p\% \times b$	Write the percent equation.
$a = 75\% \times 96 = 72$	Substitute 75 for p and 96 for b. Multiply.

2-9 Reteaching (continued)

Problem

28% of what number is 42?

You are given the percent p and the partial quantity a. You are looking for the base b.

$a = p\% \times b$	Write the percent equation.
$42 = 28\% \times b$	Substitute 28 for p and 42 for a.
$42 = 0.28 \times b$	Write 28% as a decimal, 0.28.
$150 = b$	Divide each side by 0.28.

Exercises

Find each part.

5. What is 32% of 250?

6. What is 78% of 130?

Find each base.

7. 45% of what number is 90?

8. 70% of what number is 35?

Problems involving simple interest can be solved using the formula $I = Prt$, where I is the interest, P is the principal, r is the annual interest rate written as a decimal, and t is the time in years.

Problem

You deposited \$2200 in a savings account that earns a simple interest rate of 2.8% per year. You want to keep the money in the account for 3 years. How much interest will you earn?

$I = Prt$	Simple Interest Formula
$I = (2200)(2.8\%)(3)$	Substitute 2200 for P, 2.8% for r, and 3 for t.
$I = 184.8$	Multiply.

You will earn \$184.80 in interest.

Exercises

9. If you deposit \$11,000 in a savings account that earns simple interest at a rate of 3.5% per year, how much interest will you have earned after 5 years?

10. If you deposit \$500 in a savings account that earns simple interest at a rate of 4.25% per year, how much interest will you have earned after 10 years?

Name _____ Class _____ Date _____

2-10 Reteaching

A percent change occurs when the original amount changes and the change is expressed as a percent of the original amount. There are two possibilities for percent change: percent increase or perent decrease. The following formula can be used to find percents of increase/decrease.

$$\text{percent change} = \frac{\text{amount of increase or decrease}}{\text{original amount}}$$

Problem

In its first year, membership of the community involvement club was 32 members. The second and third years there were 28 members and 35 members respectively. Determine the percent change in membership each year.

From the first to the second year, the membership went down from 32 to 28 members, representing a percent decrease. The amount of decrease can be found by subtracting the new amount from the original amount.

$$\text{percent change} = \frac{\text{original amount - new amount}}{\text{original amount}}$$

Percent Change Formula for percent decrease.

$$= \frac{32-28}{32}$$

Substitute 32 for the original number and 28 for the new number.

$$= \frac{4}{32} = 0.125$$

Subtract. Then divide.

Membership decreased by 12.5% from the first year to the second year.

From the second to the third year, the membership increased from 28 to 35 members, representing a percent increase. The amount of increase can be found by subtracting the original amount from the new amount.

$$\text{percent change} = \frac{\text{original amount - new amount}}{\text{original amount}}$$

Percent Change Formula for percent increase.

$$= \frac{32-28}{32}$$

Substitute 28 for the original number and 35 for the new number.

$$= \frac{7}{32} \approx 0.22$$

Subtract. Then divide.

Membership increased by about 22% from the second year to the third year.

Exercises

Tell whether each percent change is an increase or decrease. Then find the percent change. Round to the nearest percent.

1. Original amount: 25
New amount: 45

2. Original amount: 17
New amount: 10

3. Original amount: 22
New amount: 21

Name _____ Class _____ Date _____

2-10 Reteaching (continued)

Errors can occur when making measurements or estimations. Percents can be used to compare estimated or measured values to exact values. This is called relative error. Relative error can be determined with the following formula comparing the estimated value and the actual value.

$$\text{percent error} = \frac{|\text{measured or estimated value - actual value}|}{\text{actual value}}$$

Problem

Mrs. Desoto estimated that her class would earn an average of $126 per person for the fundraiser. When the money was counted after the fundraiser ended, each student had raised an average of $138 per person. What is the percent error?

There are two values given in this situation. The estimated value is $126 per person. The actual value that each person raised was $138.

$$\text{percent error} = \frac{|\text{measured or estimated value - actual value}|}{\text{actual value}}$$ Percent Error Formula

$$= \frac{|126 - 138|}{138}$$ Substitute 126 for the estimated value and 138 for the actual value.

$$= \frac{|-12|}{138}$$ Subtract.

$$= \frac{12}{138}$$ $|-12| = 12$

$$\approx 0.09$$ Divide.

There was a 9% error in her estimation.

Exercises

Find the percent error in each estimation. Round to the nearest percent.

4. You estimate that your baby sister weighs 22 lbs. She is actually 26 lbs.

5. You estimate that the bridge is 60 ft long. The bridge is actually 53 ft long.

6. You estimate the rope length to be 80 ft. The rope measures 72 ft long.

7. A carpenter estimates the roof to be 375 ft^2. The rectangular roof measures 18 feet wide by 22 feet long. What is the percent error?

May 2026

Dear incoming 8th Grade Accelerated Student,

I am looking forward to working with you next year! In order to retain the skills you have learned this year, I am sending you a summer math packet to complete.

Attached is the packet to be completed by the first day of school. This will be your first grade of the year. Make sure to **show all work neatly** when appropriate. Please complete only the **ODD NUMBERED PROBLEMS** on each page.

If you are having trouble with a concept in the packet, you may use your current math notebook or access any of the websites below for review.

Khan Academy
IXL
Math Antics

Have a great summer and I will see you next year!

Blessings,
Mrs. Schicitano

7-1 Ratios, Rates, and Unit Rates

Name _____ Date _____

A *ratio* is a way of comparing two numbers by division.

Word Form 6 to 8 *Ratio Form* 6 : 8

Fraction Form $\frac{6}{8}$

- To write a ratio in simplest form, divide the numerator and denominator by the GCF of the terms.

$\frac{6}{8} = \frac{6 \div 2}{8 \div 2} = \frac{3}{4}$

Think
The GCF of 6 and 8 is 2.

The ratio $\frac{3}{4}$ is in simplest form.

A *rate* is a ratio that compares two quantities.

- To find a *unit rate*, divide each term by the value in the denominator.

$\frac{240 \text{ miles} \div 6}{6 \text{ hours} \div 6} = \frac{40 \text{ miles}}{1 \text{ hour}} \rightarrow$ 40 miles per hour

- To find *equal rates*, multiply or divide both terms by the same nonzero number.

$\frac{240 \text{ miles}}{6 \text{ hours}} = \frac{240 \text{ miles} \bullet 2}{6 \text{ hours} \bullet 2} = \frac{480 \text{ miles}}{12 \text{ hours}}$

$\frac{240 \text{ miles}}{6 \text{ hours}} = \frac{240 \text{ miles} \div 3}{6 \text{ hours} \div 3} = \frac{80 \text{ miles}}{2 \text{ hours}}$

Write a ratio in three different forms for each situation. Express in simplest form.

1. 9 out of 10 people use Sure Glue

9 to 10; 9 : 10; $\frac{9}{10}$

2. the number of consonants to the number of vowels in your first name

_____

3. The number of even digits to the number of odd digits in 9,241,657

_____

4. 6 workers in $1\frac{2}{3}$ days

_____

Write a ratio as a fraction in simplest form for each situation. Change to like units when necessary.

5. 25¢ out of every dollar goes to entertainment

$\frac{25¢}{\$1} = \frac{0.25 \div 0.25}{1.00 \div 0.25} = \frac{1}{4}$

6. 8 apples in a basket of 2 dozen apples

_____

7. 6 rainy days out of 15 days

_____

8. 12 years to 36 years

_____

9. one day to one week

_____

10. days in March to days in June

_____

11. 12 out of 16 correct

_____

12. 18 girls to 12 boys

_____

13. 1 quarter to 2 nickels

_____

14. 6 inches out of 1 yard

_____

Find the unit rate.

15. 12 pages in 3 hours

$\frac{12 \text{ pages}}{3 \text{ hours}} = \frac{4 \text{ pages}}{1 \text{ hour}}$; 4 pages per hour

16. 105 wheel revolutions in 3 minutes

17. 500 yards in 40 seconds

18. 100 meters in 10 seconds

19. 180 kilometers traveled in 2 hours

20. 510 words read in 3 minutes

21. \$4.80 per dozen flowers

22. \$1.92 for 6 cans

Find two rates equal to each given rate.

23. $\frac{9 \text{ in. of snow}}{1 \text{ day}}$

$\frac{18 \text{ in. of snow}}{2 \text{ days}}$; $\frac{27 \text{ in. of snow}}{3 \text{ days}}$

24. $\frac{3 \text{ miles}}{1 \text{ hour}}$

25. $\frac{1.5 \text{ laps}}{1 \text{ minute}}$

26. $\frac{6.25 \text{ points}}{1 \text{ day}}$

27. $\frac{16 \text{ boxes}}{40 \text{ people}}$

28. $\frac{\$14}{42 \text{ tickets}}$

29. $\frac{20 \text{ adults}}{50 \text{ children}}$

30. $\frac{6 \text{ movies}}{24 \text{ hours}}$

31. $\frac{6.4 \text{ degrees}}{1.4 \text{ hours}}$

32. $\frac{5 \text{ packages}}{2.5 \text{ pounds}}$

33. $\frac{3\frac{1}{3} \text{ cups}}{2 \text{ pies}}$

34. $\frac{4\frac{1}{2} \text{ quarts}}{27 \text{ servings}}$

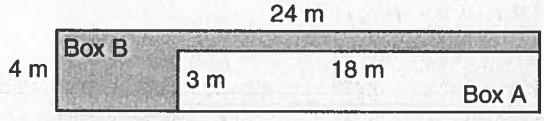
Solve. Show your work.

35. Justin is 7 years old and his grandfather is 77 years old. What is the ratio of Justin's age to his grandfather's age? Express the answer as a fraction in simplest form.

36. There are 13 stripes and 50 stars on the American flag. What is the ratio of the number of stripes on the American flag to the sum of the number of stars and the number of stripes?

CHALLENGE

37. What is the ratio of the perimeter of Box A to the perimeter of Box B? What is the ratio of their areas? Express the answers as fractions in simplest form.



7-2 Proportions

Name _____ Date _____

A *proportion* is an equation that shows two ratios or rates are equal.

Cross-Products Rule: Two ratios form a proportion if their cross products are equal.

$\frac{0.3}{0.4} \times \frac{0.6}{0.8}$

$0.3 \bullet 0.8 \stackrel{?}{=} 0.4 \bullet 0.6$ ← Multiply the extremes and the means.

$0.24 = 0.24$

So $\frac{0.3}{0.4} = \frac{0.6}{0.8}$ is a proportion.

Use the *Cross-Products Rule* to find the missing term in a proportion.

$\frac{\frac{1}{2}}{a} = \frac{\frac{1}{3}}{12}$ $\quad \frac{\frac{1}{2}}{a} \times \frac{\frac{1}{3}}{12}$

$\frac{1}{2} \bullet 12 = \frac{1}{3} \bullet a$ ← Multiply the extremes and the means.

$\frac{6}{\frac{1}{3}} = \frac{\frac{1}{3}a}{\frac{1}{3}}$ ← Divide each side by one third.

$18 = a$

So $\frac{\frac{1}{2}}{18} = \frac{\frac{1}{3}}{12}$.

Determine if each set of ratios forms a proportion. Write = or ≠. Justify your answer.

1. $\frac{7}{9}$ ___ $\frac{21}{27}$

$7 \bullet 27 \stackrel{?}{=} 9 \bullet 21$

$189 = 189$

2. $\frac{28}{35}$ ___ $\frac{4}{5}$

3. $\frac{8}{7}$ ___ $\frac{96}{49}$

4. 6 : 138 ___ 4 : 92

5. 12 : 60 ___ 4 : 24

6. $\frac{23}{29}$ ___ $\frac{46}{58}$

7. 10 : 90 ___ 45 : 5

8. 9 : 27 ___ 3 : 9

9. $\frac{4.2}{5.6}$ ___ $\frac{0.6}{0.8}$

10. $\frac{1.44}{1.32}$ ___ $\frac{1.2}{1.1}$

11. $\frac{8\frac{1}{2}}{5}$ ___ $\frac{25\frac{1}{2}}{7\frac{1}{2}}$

12. $\frac{2\frac{1}{3}}{1\frac{2}{5}}$ ___ $\frac{11\frac{2}{3}}{7}$

Solve each proportion. Check your work to justify your solutions.

13. $\frac{27}{63} = \frac{n}{7}$

$27 \bullet 7 = 63n$

$189 = 63n$

$\frac{189}{63} = \frac{63n}{63}$

$n = 3$

Check: $\frac{27}{63} \stackrel{?}{=} \frac{3}{7}$

$27 \bullet 7 \stackrel{?}{=} 63 \bullet 3$

$189 = 189$ True

14. $\frac{48}{x} = \frac{6}{12}$

15. $\frac{a}{15} = \frac{18}{45}$

16. $\frac{21}{b} = \frac{147}{105}$

17. $\frac{42}{24} = \frac{a}{4}$

18. $\frac{72}{64} = \frac{18}{r}$

19. $\frac{4.8}{1.32} = \frac{c}{1.1}$

20. $\frac{b}{\frac{1}{3}} = \frac{4}{2}$

Solve each proportion. Check your work to justify your solutions.

21. $\frac{n}{0.24} = \frac{0.05}{0.03}$

$n \cdot 0.03 = 0.24 \cdot 0.05$

$\frac{0.03n}{0.03} = \frac{0.012}{0.03}$

$n = 0.4$

Check: $\frac{0.4}{0.24} \stackrel{?}{=} \frac{0.05}{0.03}$

$0.4 \cdot 0.03 \stackrel{?}{=} 0.24 \cdot 0.05$

$0.012 = 0.012$ True

22. $\frac{2.4}{3.7} = \frac{1.2}{t}$

23. $\frac{r}{2\frac{1}{2}} = \frac{1}{2}$

24. $\frac{2}{b} = \frac{\frac{5}{6}}{\frac{1}{3}}$

25. $\frac{\frac{3}{7}}{\frac{2}{3}} = \frac{\frac{1}{4}}{c}$

26. $\frac{a}{0.25} = \frac{0.8}{0.5}$

27. $\frac{3.6}{c} = \frac{1.2}{2.1}$

28. $\frac{x}{36} = \frac{24}{50}$

29. $\frac{6}{r} = \frac{4}{25}$

30. $\frac{n+3}{4} = \frac{9}{2}$

31. $\frac{t+6}{5} = \frac{t-2}{10}$

32. $\frac{6r-3}{7} = \frac{3}{4}$

Solve. Check to justify your work.

33. If 3 cans of orange juice cost \$2.15, what will 9 cans cost?

34. If $6\frac{1}{4}$ yards of fabric costs \$25.50, what will $2\frac{1}{2}$ yards cost?

35. If 4 boxes of stationery cost \$24.40, what will 6 boxes cost?

36. If 2.5 meters of fabric cost \$15.60, what will 2.25 meters cost?

CRITICAL THINKING

Using each set of numbers, write a proportion. Check to justify your answer.

37. 35, 70, 50, 25

38. 2.7, 10, 0.3, 90

39. 96, 17, 3, 544

7-3 Conversion Factors and Measurement Systems

Name _____ Date _____

A *conversion factor* is a rate of equal quantities that is used to convert from one unit of measure to another.

- You can represent measurement rates with a proportion.

Light travels at 186,282 miles per second. How far will light travel in 24 seconds?

To find the distance, write and solve a proportion.

$$\frac{186{,}282 \text{ mi}}{1 \text{ s}} = \frac{m}{24 \text{ s}}$$

$186{,}282 \cdot 24 = 1 \cdot m$ ← Cross multiply.

$4{,}470{,}768 = m$

Light travels 4,470,768 miles in 24 seconds.

- You can use a conversion factor to rename metric and customary units of measure.

How many ounces are in 500 pounds?

Think
Use a *conversion factor*.
16 oz = 1 lb

$$\frac{16 \text{ oz}}{1 \text{ lb}} = \frac{x}{500 \text{ lb}}$$ ← Set up a proportion.

$16 \cdot 500 = x \cdot 1$ ← Cross multiply.

$8000 = x$ ← Simplify.

There are 8000 ounces in 500 pounds.

Write a proportion to represent the situation. Then solve.

1. A cubit equals 21 inches. How many inches are in 300 cubits?

$\frac{21 \text{ in.}}{1 \text{ cubit}} = \frac{x}{300 \text{ cubits}}$; $21(300) = x$

There are 6300 inches in 300 cubits.

2. A kilowatt-hour is 3,600,000 joules. How many joules are in 7 kilowatt hours?

_____

3. One horsepower is equal to about 746 watts of power. How many watts of power does a 400 horsepower engine generate?

_____

4. There are 640 acres in one square mile. How many square miles are in 1000 acres?

_____

5. There are 5280 ft in one mile. How many feet are in 6 miles?

_____

6. How many square yards are in 43,560 square feet?

_____

Solve. Check to justify your work.

7. There are 4 cups in a quart. How many cups are in 14 quarts?

_____

8. There are 4 quarts in a gallon. How many quarts are in 21 gallons?

_____

Solve. Check to justify your work.

9. There are 2 cups in a pint. How many cups are in a half pint?

10. One gallon of water weighs 8.3 pounds. How many pounds do 3 gallons of water weigh?

11. There are 16.5 feet in a rod. How many rods are there if you have 148.5 feet?

12. How many miles have you traveled if you have gone 1320 ft?

Problem Solving

13. A gallon of water weighs 8.3 pounds. To the nearest tenth, about how many gallons of water weigh 62 pounds?

14. Within 1 inch there are 2.54 centimeters. How many centimeters are in 1 foot?

15. Density is the amount of mass of an object per unit volume. A piece of iron weighs 45 ounces and has a volume of 10 cubic inches. Given that each ounce has a mass of 28.35 grams, determine the density of iron in grams per cubic inch.

16. A chunk of oak firewood has a mass of about 2.85 kilograms and a volume of 4100 cubic centimeters. Determine the density of oak in grams per cubic centimeter. Round the density to the nearest thousandth.

WRITE ABOUT IT

17. Monique says that because there are 3 feet in 1 yard, there must be 3 square feet in 1 square yard. Do you agree? Explain.

7-4 Dimensional Analysis

Name _____ Date _____

Dimensional analysis is the process of analyzing units to decide which conversion factor(s) to use.

A football field is 100 yards long. How many centimeters is this?

Method 1 Multiply by each conversion factor separately, and divide like units. Start with yards. End with centimeters.

100 yd = ? cm

$$100 \text{ yd} = \frac{100 \text{ yd}}{1} \cdot \frac{36 \text{ in.}}{1 \text{ yd}} = 3600 \text{ in.}$$

$$3600 \text{ in.} = \frac{3600 \text{ in.}}{1} \cdot \frac{2.54 \text{ cm}}{1 \text{ in.}} = 9144 \text{ cm}$$

Method 2 Multiply by several conversion factors. Set up the conversion factors in sequence, so that those with like units cancel. Start with yards. End with centimeters.

100 yd = ? cm

$$100 \text{ yd} = \frac{100 \text{ yd}}{1} \cdot \frac{36 \text{ in.}}{1 \text{ yd}} \cdot \frac{2.54 \text{ cm}}{1 \text{ in.}}$$

$$= \frac{100 \cdot 36 \cdot 2.54 \text{ cm}}{1 \cdot 1 \cdot 1} = 9144 \text{ cm}$$

So a football field is 9144 cm long.

You can also use dimensional analysis to estimate conversions in measurement and find equal rates.

Use dimensional analysis to rename each unit of measure.

1. 144 in. = ? yd

$$144 \text{ in.} = \frac{144 \text{ in.}}{1} \cdot \frac{1 \text{ ft}}{12 \text{ in.}} \cdot \frac{1 \text{ yd}}{3 \text{ ft}}$$

$$\frac{144 \text{ yd}}{36} = 4 \text{ yards}$$

2. 300 yd = ? in.

3. 4 gal = ? pt

4. 3.25 mi = ? in.

5. 1 mi ≈ ? m

6. 35,000 oz ≈ ? T

7. 4.75 qt = ? fl oz

8. 64 c ≈ ? L

9. 440 yd = ? m

Use dimensional analysis to find a reasonable estimate.

10. 570 min ≈ ? h

$$570 \approx 600 \longrightarrow \frac{600 \text{ min}}{1} \cdot \frac{1 \text{ h}}{60 \text{ min}}$$

$$\frac{600 \text{ h}}{60} = 10 \text{ h}$$

11. 323 fl oz ≈ ? c

12. 3,569,000 mm ≈ ? km

Use dimensional analysis to find the value of x that makes an equal rate.

13. $\frac{55 \text{ mi}}{1 \text{ h}} = \frac{x \text{ ft}}{1 \text{ min}}$

$\frac{55 \text{ mi}}{1 \text{ h}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{1 \text{ h}}{60 \text{ min}}$

$\frac{290{,}400 \text{ ft}}{60 \text{ min}} = \frac{4840 \text{ ft}}{1 \text{ min}}$

$x = 4840$

14. $\frac{\$575}{1 \text{ day}} = \frac{x \text{ dollars}}{1 \text{ min}}$

15. $\frac{40 \text{ kg}}{1 \text{ m}} = \frac{x \text{ g}}{1 \text{ cm}}$

16. $\frac{x \text{ mi}}{1 \text{ h}} = \frac{144 \text{ ft}}{1 \text{ s}}$

17. $\frac{72 \text{ lb}}{1 \text{ ft}^3} = \frac{x \text{ T}}{1 \text{ yd}^3}$

18. $\frac{65 \text{ kg}}{1 \text{ L}} = \frac{x \text{ g}}{1 \text{ cm}^3}$

Problem Solving

19. A gallon of water weighs 8.3 pounds. A cubic foot of water weighs about 62 pounds. To the nearest tenth, about how many gallons of water would fill a cubic foot?

20. The density of copper is 8.94 g per cubic centimeter. Express the density of copper in kilograms per cubic centimeter. What is the density in kilograms per liter? (*Hint*: 1 cubic centimeter has a volume of 1 millimeter.)

21. The average respiratory rate for an adult is 16 breaths per minute. About how many times does an adult breathe in one week? A year? (*Hint*: 1 week = 7 days; 1 year = 365 days)

22. Light travels at 186,282 miles per second. Based on a 365-day year, how many miles will light travel in one year? Express your answer in scientific notation to the nearest thousandth.

CRITICAL THINKING

The United Kingdom once used the following money system.
1 pound = 20 shillings
1 shilling = 12 pence
1 penny = 2 halfpence (*pence* is the plural of *penny*)
1 pence = 4 farthings

Use dimensional analysis to rename each unit of measure.

23. 1 pound = _____ farthings

24. 12 pounds = _____ pence

7-5 Direct Proportions

Name _____ Date _____

If it takes 6 hours to travel 360 miles, how many miles can you travel in 2 hours?

Method 1 Write and solve a proportion using ratios of unlike units.

$$\frac{\text{miles}}{\text{hours}} = \frac{\text{miles}}{\text{hours}}$$

$$\frac{360}{6} = \frac{m}{2}$$

$360 \cdot 2 = 6 \cdot m$ ← Find cross products.

$720 = 6m$ ← Simplify.

$\frac{720}{6} = \frac{6m}{6}$ ← Divide by 6.

$120 = m$ ← solution

Method 2 Write and solve a proportion using ratios of like units.

$$\frac{\text{miles}}{\text{miles}} = \frac{\text{hours}}{\text{hours}}$$

$$\frac{360}{m} = \frac{6}{2}$$

$360 \cdot 2 = 6m$ ← Find cross products.

$720 = 6m$ ← Simplify cross products.

$\frac{720}{6} = \frac{6m}{6}$ ← Divide by 6.

$120 = m$ ← solution

Method 3 Write a proportional relationship as an equation.

$$m = 2 \cdot \frac{d \text{ (distance in miles)}}{t \text{ (time in hours)}}$$

$m = 2 \cdot \frac{360}{6}$ ← Rate is $d \div t$.

$m = 2 \cdot 60$ ← Simplify.

$m = 120$ ← solution

You can travel 120 miles in 2 hours.

Use a proportion or equation to solve each problem. Round to the nearest cent where necessary.

1. 9 gallons of ice cream cost $50.40 to make. How much will it cost to make 15 gallons?

$\frac{9}{50.40} = \frac{15}{c}$; $9c = 756$

$\frac{9c}{9} = \frac{756}{9}$; $c = 84$

It will cost $84.

2. If 15 tickets for a baseball game cost $97.50, how many tickets can be bought for $71.50?

3. The Grant family's $2\frac{1}{2}$-week vacation cost $1540.15. How much would a $5\frac{1}{2}$-week vacation cost at the same rate?

4. A plane can travel 5000 kilometers in 6 hours. How far can it travel in 1.5 hours?

5. A plane traveled 1800 kilometers in 2.5 hours. At this rate, how long will it take to travel 2000 kilometers? Round to the nearest hour.

6. A car travels 85 kilometers in $1\frac{1}{6}$ hours. At this rate, how far will it travel in $4\frac{1}{5}$ hours?

Use a proportion or equation to solve each problem. Round to the nearest cent where necessary.

7. Four bars of soap cost $1.12. What would you pay for 2 dozen bars? (1 dozen = 12)

8. An ad says that 6 lemons cost $1.86. What will 8 lemons cost?

9. Kevin rides his bicycle 3 miles in a half hour. How long will it take him to ride 5.5 miles?

10. A track star runs 100 yards in 12.5 seconds. At this rate, how far can the star run in one and one half minutes?

Problem Solving

11. A room is 14 feet long and 8 feet wide. A scale drawing of the room is 12 centimeters long. How wide is the scale drawing?

12. One pound of a snack food mixes 3 peanuts for every 8 pieces of popcorn. If a crate of snack food has 30 pounds of popcorn, how many pounds of snack food are in the crate?

13. The ratio of advertising time to total air time of a weekly TV show is 3 : 16. If a weekly TV show is 60 minutes long, how much time is devoted to advertising?

14. A large group and a smaller group of campers go on a trip and agree to pay the expenses using the ratio 9 to 7, where the first term represents the larger group, and the second term represents the smaller group. If the smaller group pays $107.45, what will the larger group pay?

WRITE ABOUT IT

15. Bob painted 15.08 meters of fence in 5.2 hours and Jake painted 19.72 meters in 6.8 hours. Each feels that the other is not working fast enough. Explain why both are working at the same rate.

7-8 Scale Drawings and Scale Models

Name _____ Date _____

To find the scale of a *scale drawing,* write and solve a proportion.

What is the scale of a map if 12 centimeters in the map represents 3.6 kilometers?

Let n = the actual distance.

$$\frac{\text{scale distance}}{\text{actual distance}} \rightarrow \frac{1 \text{ cm}}{n \text{ km}} = \frac{12 \text{ cm}}{3.6 \text{ km}}$$

$$3.6 = 12n$$

$$\frac{3.6}{12} = \frac{12n}{12}$$

$$0.3 = n$$

The scale is 1 cm = 0.3 km.

To find the *scale factor* for a *scale model,* write the scale as a ratio of like units.

A model of a 42-foot long truck is 6-inches long. Find the scale factor from the truck to the model.

$$\frac{6 \text{ in.}}{42 \text{ ft}} = \frac{6 \text{ in.}}{(42 \bullet 12) \text{ in.}} = \frac{6 \text{ in.}}{504 \text{ in.}} = \frac{1}{84}$$

The scale factor for the model is $\frac{1}{84}$.

Solve for n. Check your work to justify your solutions.

1. *scale:* 3 cm : 4 km
scale measure: n cm
actual measure: 0.16 km

$$\frac{3 \text{ cm}}{4 \text{ km}} = \frac{n \text{ cm}}{0.16 \text{ km}}$$

$$0.48 = 4n$$

$$\frac{0.48}{4} = \frac{4n}{4}$$

$$0.12 = n$$

scale measure: 0.12 cm

2. *scale:* 1 cm : 4 km
scale measure: 27.5 cm
actual measure: n km

_____

3. *scale:* 2 cm : 5 km
scale measure: n cm
actual measure: 12 km

_____

4. *scale:* 2 in. : 3.5 mi
scale measure: 7.2 in.
actual measure: n mi

_____

5. *scale:* 0.3 cm : 1.7 km
scale measure: n cm
actual measure: 11.9 km

_____

6. *scale:* 0.5 in. : 1.75 km
scale measure: 2 in.
actual measure: n km

_____

7. *scale:* n mm : 38 ft
scale measure: 24.5 mm
actual measure: 133 ft

_____

8. *scale:* $1\frac{3}{4}$ cm : n mi
scale measure: 7 cm
actual measure: 250 mi

_____

9. *scale:* n in. : 6.75 km
scale measure: 23 in.
actual measure: 62.1 km

_____

Find the scale factor.

10. 4-in. model of a 24-ft tree

$\frac{4 \text{ in.}}{24 \text{ ft}} = \frac{4 \text{ in.}}{(24 \cdot 12) \text{ in.}} = \frac{4 \text{ in.}}{288 \text{ in.}}$

$\frac{1}{72}$

11. 15-in. model of a 100-ft plane

12. 14-cm model of a 2-m bike

13. 6-ft model of a 24-yd statue

14. 4.5-ft model of a 40-yard field

15. 1-yd model of a 33-ft sailboat

16. 6-ft model of a 246-in. lighthouse

17. 1-m model of a 3-cm beetle

18. 6-in. model of a 1-yd statuette

Problem Solving

19. On a map, 1.5 centimeters represents a distance of 45 kilometers. If two points on the map are 0.8 centimeters apart, what is the actual distance between the two points?

20. On a map, a line segment $\frac{1}{2}$-inch long represents an actual distance of 250 miles. What is the actual length of a road that has a length of $5\frac{1}{4}$ inches on the map?

21. The scale of a map is $\frac{3}{4}$ in. = 12 mi. What is the actual area, in square miles, of a park represented on this map by a square whose side is 1 inch?

22. A model of an old oak tree was built using the scale 2 in. : 20 ft. If the tree's actual height is 82 feet, what is the height of the model?

SPIRAL REVIEW

Write in scientific notation.

23. 63,700

24. 0.003

25. 92,900,000

26. 0.0000072

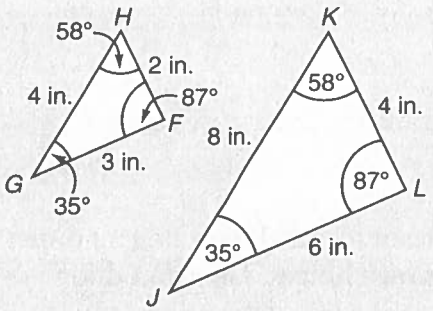
27. 34,000,000

28. 0.00043

7-9 Similarity

Name _____ Date _____

Determine whether the two triangles are *similar*.



- Compare corresponding angles:

  $\angle G \cong \angle J, \angle H \cong \angle K, \angle F \cong \angle L$

- Compare the ratios of the lengths of the corresponding sides:

  $\frac{GH}{JK} = \frac{4 \text{ in.}}{8 \text{ in.}} = \frac{1}{2}, \frac{HF}{KL} = \frac{2 \text{ in.}}{4 \text{ in.}} = \frac{1}{2}, \frac{FG}{LH} = \frac{3 \text{ in.}}{6 \text{ in.}} = \frac{1}{2}$

  So $\frac{GH}{JK} = \frac{HF}{KL} = \frac{FG}{LJ} = \frac{1}{2}$.

$\triangle GHF$ is similar to $\triangle JKL$. $\triangle GHF \sim \triangle JKL$.

The *scale factor* of two similar figures is the ratio formed by the lengths of their corresponding sides.

Original photo : 10 cm long and 6 cm wide
Enlarged photo: x cm long and 15 cm wide

How long will the enlarged photo be?

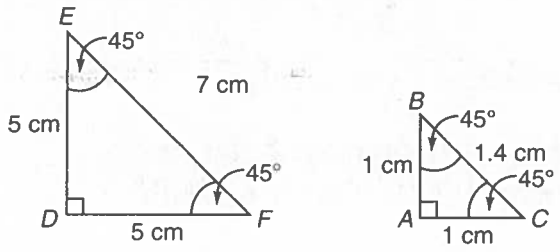
$$\frac{\text{enlarged width}}{\text{actual width}} = \frac{15}{6} = \frac{5}{2} \leftarrow \text{scale factor}$$

$$\text{enlarged photo length} = \frac{5}{2} \cdot 10 \text{ cm} = 25 \text{ cm}$$

So the length of the enlarged photo is 25 cm.

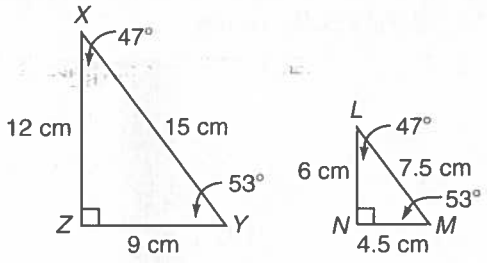
Show that the triangles are similar. Name the corresponding parts.

1.



_____

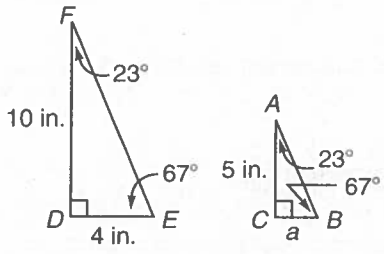
2.



_____

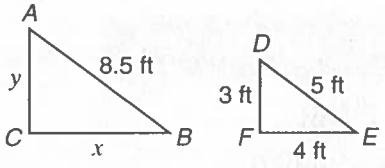
Use proportions to find the missing dimensions of these similar figures.

3.



_____

4.



_____

Use the scale factor to find the missing dimension.

5. original width = 11 in.; original length = 5.5 in.
enlarged width = 27.5 in.; enlarged length = ?

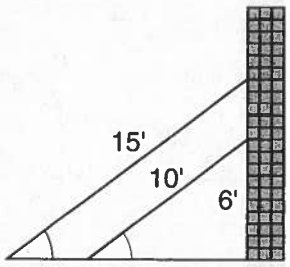
6. original depth = 1.5 ft; original width = ?
enlarged depth = 6 ft; enlarged width = 13 ft

Problem Solving

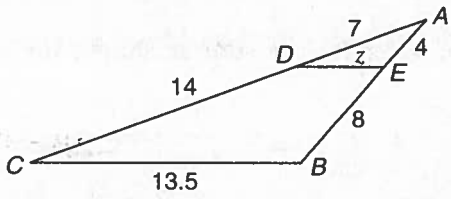
7. A pizzeria makes rectangular pizzas. The small and large pizzas are similar. The width of a small pizza is 10 inches and the length is 14 inches. The width of a large pizza is 15 inches. What is its length?

8. The Olabisi's want to build their dog a house similar to their own house. The front door of their house measures $3\frac{1}{2}$ feet by 8 feet. If the scale factor from the actual house to the dog house is to be $\frac{1}{6}$, what should the dimensions of the dog's front door be?

9. A 10-foot ladder and a 15-foot ladder are placed against the same wall and make congruent angles with the ground. If the 10-foot ladder reaches a height of 6 feet against the wall, how far up the wall does the 15-foot ladder reach?



10. Ben was shown the following figure during a state mathematics test.



How can he find the missing length of segment ED? What is its length?

CRITICAL THINKING

True or false? Explain.

11. All squares are similar.

12. All rectangles are similar.

Practice Chapter 7 Test

Name _____ Date _____

Find the unit rate. Round to the nearest cent.

1. \$15 for 48 stickers

2. 5 ounces for 2.5 servings

3. 50 ride tickets for \$10

Find two ratios equal to the given ratio.

4. 8 : 32

5. 14 : 63

6. 2.5 : 7.5

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

Compare. Write = or ≠.

8. $\frac{6}{12}$ _____ $\frac{10}{18}$

9. $\frac{18}{27}$ _____ $\frac{14}{21}$

10. $\frac{20}{25}$ _____ $\frac{5}{7}$

Solve.

11. $\frac{5}{6} = \frac{30}{y}$

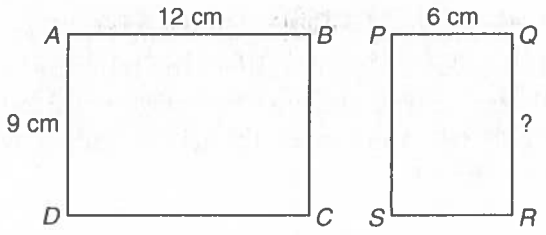
12. $\frac{1}{8} = \frac{b}{40}$

13. $\frac{c}{0.4} = \frac{1.2}{1.6}$

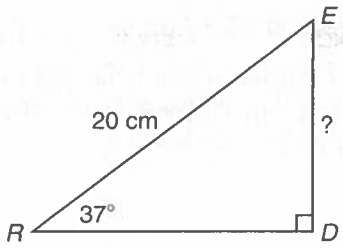
14. $\frac{\frac{1}{4}}{x} = \frac{1\frac{1}{2}}{3}$

Find the unknown measure.

15. rectangle $ABCD \sim$ rectangle $SPQR$. Find QR.

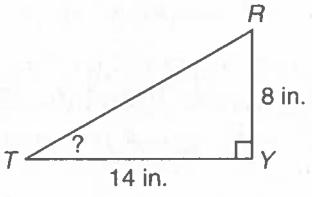


16. Find ED to the nearest tenth.



17. In $\triangle ABC$, $m\angle C = 90°$, $m\angle A = 25°$, $AC = 11$ in. Find AB to the nearest tenth. Draw a picture.

18. Find the measure of $\angle T$ to the nearest tenth.



Solve. Show your work.

19. Three members of the Green Lawn Corporation can mow a lawn in 45 minutes. How long will it take 9 members working at the same rate?

20. On a map, 1 centimeter represents 80 kilometers. If two cities are 260 kilometers apart, how many centimeters apart are they on the map?

21. What is the scale factor of a photograph in which a 6-foot tall man is 1.5 inches high?

22. Stephen wants to make a scale model of a triangular traffic sign to use with his train set. The actual sign measures 3 feet by 3 feet by 5 feet. The largest side of his model sign will be 2.5 inches. What is the length of the other sides?

23. Stan drove 90 miles in 1.5 hours. How long will it take him to drive 300 miles?

24. Divide 540 into three parts having a ratio of 5 : 6 : 7.

25. From the top of a 120-foot lighthouse, the angle of sight of a boat at sea is 26°. Find, to the nearest foot, the distance from the boat to the foot of the lighthouse.

26. A 20-foot ladder leans against a building. If the ladder is 8 feet from the building, find, to the nearest degree, the measure of the angle that the foot of the ladder makes with the ground.

Tell About It

Explain how you solve each problem. Show all your work.

27. Jordan mixes 2 parts pineapple juice with 3 parts orange juice to make Island Punch. How many liters of each are needed to make 15 liters of punch?

28. The perimeter of a triangle is 91 centimeters. If the sides are in the ratio 2 : 4 : 7, find the length of each side of the triangle.

Cumulative Review: Chapters 1–7

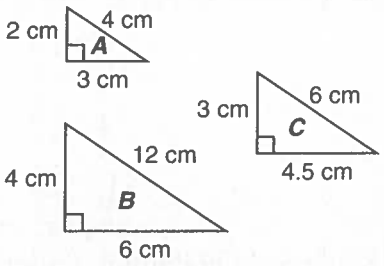
Name _____ Date _____

Choose the correct answer.

1. The sum of 2.5×10^3 and 2.05×10^4 is:

A. $2.25\ 10^3$
B. 2.3×10^4
C. 2.255×10^3
D. 2.3×10^3

2. Which triangles are similar?



F. *A* and *B*
G. *B* and *C*
H. *A* and *C*
J. None

3. Solve for n: $n - \frac{2}{3} = 6\frac{3}{4}$

A. $1\frac{5}{12}$ **B.** $7\frac{5}{12}$
C. $8\frac{5}{7}$ **D.** not given

4. What is the square root of 25?

F. 5
G. 50
H. 625
J. not given

5. If $165.00 is divided among 3 school clubs in the ratio of 2 : 3 : 6, what is the difference between the least and the greatest amounts received?

A. $30.00 **B.** $60.00
C. $45.00 **D.** $90.00

6. What number when doubled and added to 25 yields 65?

F. 20 **G.** 22.5
H. 40 **J.** 45

7. The product of 0.000000000000089 and 234,050,000,000 is

A. 20.83045×10^2
B. 2.083045×10^{-12}
C. 2.083045×10^{-2}
D. 2.083045×10^{12}

8. Two numbers are in the ratio of 3 : 4. If 9 is subtracted from their sum, the result is 40. What is the greater number?

F. 35
G. 21
H. 28
J. 49

9. On a scale drawing, 48 feet is represented by 12 inches. How many feet are represented by $\frac{1}{4}$ inch?

A. 8 ft **B.** 4 ft
C. 2 ft **D.** 1 ft

10. A baseball team played x games, losing 4 of them and winning the rest. What is the ratio of games won to games lost?

F. $\frac{x}{4}$ **G.** $\frac{4}{x}$
H. $\frac{4}{x-4}$ **J.** $\frac{x-4}{4}$

11. Find the slope of the line that passes through points (4, 5) and (−1, 3).

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

12. After reading a low of −16°F at 10 P.M., the temperature began rising an average of 3 degrees an hour. What was the thermometer reading at 1 A.M.?

F. −25°F **G.** −7°F
H. 7°F **J.** 9°F

13. Find the value of the expression $\frac{4(a-b)}{3c}$ when $a = 6.5$, $b = 3$, and $c = 2\frac{1}{3}$.

A. 6 **B.** 12
C. 2 **D.** 3

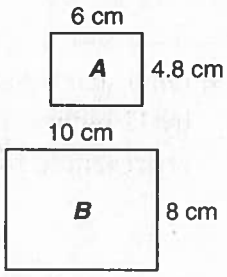
14. Solve for n: $\frac{n}{6} = \frac{3}{4}$

F. 4.5 **G.** 4.8
H. 18 **J.** 20

15. The sum of two integers is 3. When the lesser integer is subtracted from the greater integer, the difference is 9. What are the integers?

A. 9 and −6 **B.** −6 and 3
C. −6 and −3 **D.** 6 and −3

16. What is the scale factor from figure B to figure A?



F. $1\frac{1}{3}$ **G.** $2\frac{1}{12}$
H. 0.6 **J.** $1\frac{2}{3}$

17. Which is a rational number between −12 and −11.25?

A. −12.45 **B.** −11.45
C. 11.45 **D.** not given

18. Find the length of the hypotenuse of a right triangle with legs measuring 9 centimeters and 12 centimeters.

F. 11.25 cm **G.** 15 cm
H. 22.5 cm **J.** not given

19. The decimal equivalent of $\frac{7}{8}$ is

A. 0.78 **B.** 0.785
C. 0.875 **D.** 0.87

20. The reciprocal of $-2\frac{2}{3}$ is

F. $-\frac{8}{3}$ **G.** $2\frac{1}{2}$
H. $-\frac{3}{8}$ **J.** $\frac{3}{22}$

21. Choose the number equal to $2^3 \cdot 5 \cdot 7$.

A. 125
B. 96
C. 280
D. 210

22. Find the unit price of 32 pens for $1.28.

F. $0.03 **G.** $0.04
H. $0.32 **J.** $0.42

Tell About It

Explain how you solve each problem. Show all your work.

23. If a winning candidate received 8 votes for every 3 received by the loser, how many votes did each receive if the total number of votes was 5390?

24. Two planes take off at a New York airport. The first plane climbs at an angle of 45° with respect to the ground and reaches an altitude of 5600 feet. The second plane climbs at an angle of 60° with respect to the ground and reaches an altitude of 8200 feet. To the nearest foot, which plane covers a longer ground distance?

Dear incoming 8th grade student, May 2026

I am looking forward to working with you next year! In order to retain the skills you have learned this year, I am sending you a summer math packet to complete.

Attached is the packet to be completed by the first day of school. This will be your first grade of the year. Make sure to **show all work neatly** when appropriate. **DO NOT USE CALCULATORS**. If you are having trouble with a concept in the packet, you may use your current math notebook or access any of the websites below for review.

Khan Academy
IXL
Math Antics
Prodigy

Have a great summer and I will see you next year!

Blessings,
Mrs. Schicitano

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 1

SET A

1. Which is equivalent to the fraction below?

$$\frac{5}{8}$$

A. 0.58

B. 0.625

C. 0.675

D. 1.6

2. A theater has 34 rows of seats. If there are 17 seats in each row, how many seats are in the theater?

3. Which numbers are divisible by 3? Check all that apply.

☐ 78	☐ 139	☐ 203
☐ 397	☐ 414	☐ 657

4. What is the value of the expression below in simplest form?

$$\frac{12}{4^3}$$

A. 1

B. 27

C. $\frac{3}{16}$

D. $\frac{3}{8}$

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 1

SET B

1. The table below gives the weight of three packages. What is the difference between the combined weight of Package A and Package B and the weight of Package C?

Package	A	B	C
Weight (oz)	2.93	1.7	5.04

2. Which set of numbers has a greatest common factor of 12?

A. 3 and 4

B. 6 and 18

C. 32 and 48

D. 36 and 96

3. What is the product of 2.5 and 7.08?

4. Which number has a 7 in the hundredths place?

A. 108.0754

B. 702.1625

C. 65.5172

D. 149.7028

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 2

SET A

1. Alyssa filled her car tank with 16.8 gallons of gas. If gas costs $2.85 per gallon, how much did she pay? Round to the nearest cent.

2. Which expression results in the greatest value?

A. -20 + (-3)

B. -17 + 12

C. -14 + (-18)

D. -8 + 9

3. Bus A stops at a certain bus stop every 25 minutes. Bus B stops at the same stop every 40 minutes. If both buses are at the bus stop at 9:30 a.m., when is the next time they will be there together again?

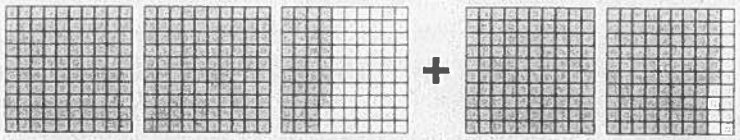
A. 12:20 p.m.

B. 12:50 p.m.

C. 1:10 p.m.

D. 1:30 p.m.

4. What is the value of the expression modeled by the decimal grids below?



A. 4.24

B. 4.32

C. 4.38

D. 4.46

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 2

SET B

1. On a certain day, Miquel had a credit of $75 in his checking account and spent $240. Which represents the total change in his account that day?

A. $315

B. $365

C. -$135

D. -$165

2. Which fraction is equivalent to 0.008?

A. $\frac{2}{250}$

B. $\frac{4}{250}$

C. $\frac{2}{25}$

D. $\frac{4}{25}$

3. If the fractions below are equivalent, what are possible values for m and n?

$$\frac{16}{36}, \frac{m}{n}$$

A. $m = 4, n = 6$

B. $m = 12, n = 32$

C. $m = 20, n = 42$

D. $m = 24, n = 54$

4. In which quadrant is the point (7, -2) located on the coordinate plane?

A. Quadrant I

B. Quadrant II

C. Quadrant III

D. Quadrant IV

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

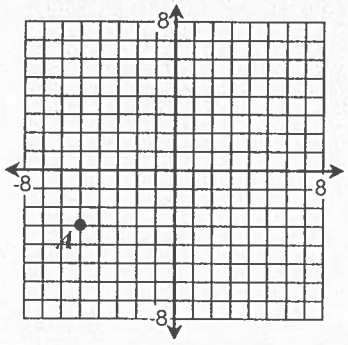
WEEK 3

SET C

1. Write the fraction below as an improper fraction in simplest form.

$$7\frac{1}{16}$$

2. Give the coordinates of point A on the graph below.



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3. Mrs. Green made treat bags using 132 chocolates and 72 lollipops. She made the greatest number of bags possible using all the candy, and the combination of chocolates and lollipops in each bag is the same. How many total pieces of candy are in each bag?

A. 12
B. 15
C. 17
D. 18

4. A bakery made $5\frac{1}{3}$ dozen donuts. If they sold $3\frac{5}{6}$ dozen, how many do they have remaining?

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

MATH 7 REVIEW

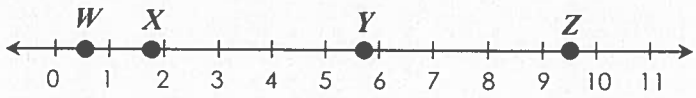
Name: _____

Date: _____ Per: _____

WEEK 3

SET D

1. Which point is closest to the value of $\frac{9}{5}$?



A. W
B. X
C. Y
D. Z

2. Which value when placed in the box makes the statement true?

$$-16 - \boxed{?} = -2$$

A. -14
B. -18
C. 14
D. 18

3. Which values could be placed in the box to make the 5-digit number divisible by 6? Check all that apply.

$$17{,}95\boxed{?}$$

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

4. Dion purchased 1.2 pounds of grapes. If the grapes cost $2.09 per pound, how much did he pay to the nearest cent?

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 5

SET A

1. What is the greatest common factor of 54 and 96?

2. A hockey team has won 27 of their first 40 games. What percent of the games have they won?

   A. 62.5%
   B. 64.5%
   C. 67.5%
   D. 71.5%

3. How many $\frac{5}{8}$-inch-thick slices of bread can be cut from a loaf of bread that is $16\frac{1}{2}$ inches long?

   A. 25
   B. 26
   C. 27
   D. 28

4. Josh's mom gave him money to spend at an amusement park. So far, he's used $\frac{3}{10}$ of the money on games and $\frac{1}{4}$ of the money on rides. What fraction of the money does he have left? Give your answer as a fraction in simplest form.

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 5

SET B

1. Which product results in a 5 in the tens place?

   A. 12.16 × 1.25
   B. 1.5 × 0.9
   C. 21.45 × 0.4
   D. 67.2 × 0.75

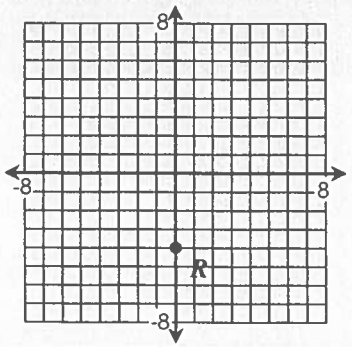
2. The depth of a lake at a dock is 8 feet. The deepest part of the lake is 52 feet deeper than this point. Which expression can be used to find the depth of the lake at its deepest point relative to the surface of the water?

   A. -8 – (-52)
   B. 8 – (-52)
   C. -52 + 8
   D. -52 + (-8)

3. 1.6% falls between which two values?

   A. 0.001 and 0.02
   B. 0.1 and 0.2
   C. 1.5 and 1.7
   D. 0.15 and 0.17

4. Give the coordinates of point R on the graph below.



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MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 6

SET C

1. Which has the least value?

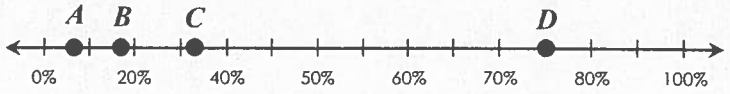
A. $(-15)^2$

B. $(-3)^5$

C. $(-6)^3$

D. $(-4)^4$

2. Which is closest to the location of $\frac{3}{40}$ as a percent on number line below?



A. A

B. B

C. C

D. D

3. What is the value of a in the expression below?

$$0.000000149 = 1.49 \times 10^{a}$$

$a =$

4. Beginning from the surface of the water, a submarine descended at a rate of 72 feet per minute for 6 minutes, then ascended 18 feet. What is the location of the submarine relative to the surface of the water?

A. -66 feet

B. -96 feet

C. -414 feet

D. -450 feet

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 6

SET D

1. Between which two values does **5.8** lie?

A. $\sqrt{5}$ and $\sqrt{6}$

B. $\sqrt{5}$ and $\sqrt{10}$

C. $\sqrt{10}$ and $\sqrt{12}$

D. $\sqrt{25}$ and $\sqrt{36}$

2. Four values are given in the table below. Which correctly lists the values from least to greatest?

A	B	C	D
$\frac{2}{25}$	0.01×10^2	3%	$\frac{2}{9}$

A. B, D, A, C

B. C, A, D, B

C. B, C, D, A

D. C, D, B, A

3. Beth rode her bike for $7\frac{7}{8}$ miles, then ran $\frac{2}{3}$ of the distance she cycled. What was the total distance she cycled and ran?

A. $12\frac{3}{4}$ miles

B. $12\frac{5}{8}$ miles

C. $13\frac{1}{4}$ miles

D. $13\frac{1}{8}$ miles

4. What is the quotient of 30 and 0.08?

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 8

SET A

1. Which value is greater than 8.5%?

A. 0.0009

B. 0.12

C. 0.0475

D. 0.0086

2. Simplify the expression below.

$$7k - 10 + 2k - 2$$

3. If $m = -6 - (-2)$, find the value of the expression below.

$$m^2 - 5m$$

A. -4

B. 104

C. 24

D. 36

4. The value of a stock opened at -4 points. After 8 hours, the value of the stock was -52 points. What was the average change in the value of the stock each hour?

A. 6 points per hour

B. 8 points per hour

C. -6 points per hour

D. -8 points per hour

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 8

SET B

1. Which value has an absolute value greater than $\frac{7}{3}$?

A. $-\frac{12}{5}$

B. $-\frac{15}{8}$

C. $\frac{9}{4}$

D. $\frac{11}{6}$

2. Find the value of the expression below.

$$25.6 - 7.8 \div 0.4$$

A. 5.8

B. 6.1

C. 42.9

D. 44.5

3. Justin bought 9 bags of trail mix, with $4\frac{2}{3}$ cups of trail mix in each bag. If he is equally placing the trail mix into 12 bowls, how many cups of trail mix will go in each bowl?

A. $2\frac{3}{4}$ cups

B. $2\frac{7}{9}$ cups

C. $3\frac{1}{2}$ cups

D. $3\frac{1}{3}$ cups

4. Which expression is equivalent to the phrase "the quotient of n less than 7, and 4"

A. $\frac{n}{4} - 7$

B. $7 - \frac{n}{4}$

C. $\frac{n-7}{4}$

D. $\frac{7-n}{4}$

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 9

SET A

1. Which values when placed in the box will make the value of the expression negative? Check all that apply.

$$-7 - \boxed{?}$$

☐ -15	☐ -7	☐ -3
☐ 0	☐ 5	☐ 15

2. Find the value of the expression below when $r = 5$ and $s = -2$.

$$r^2 + 8rs - s^2$$

A. -51

B. -59

C. -66

D. -74

3. Write the expression below in factored form.

$$16k + 72$$

4. In which list are all values greater than $\frac{5}{12}$?

A. $\left\{\frac{11}{25}, 0.9\%, \frac{3}{10}\right\}$

B. $\left\{5\times10^{-2}, 0.42, \frac{3}{8}\right\}$

C. $\left\{\frac{3}{5}, 8\%, \frac{9}{20}\right\}$

D. $\left\{1.2\times10^{1}, \frac{4}{9}, \frac{7}{16}\right\}$

MATH 7 REVIEW

Name: _____

Date: _____ Per: _____

WEEK 9

SET B

1. Travis bought b bags of mulch at \$7 each and used a \$5 coupon off his order. Which expression represents the total cost?

A. $7(b - 5)$

B. $7 - 5b$

C. $7b - 5$

D. $7b + 5$

2. Kara lives $\frac{13}{20}$ miles from the bus stop. Her friend Liam lives $\frac{5}{8}$ miles from the bus stop. Which statement is true?

A. Kara lives $\frac{1}{40}$ miles closer to the bus stop.

B. Liam lives $\frac{1}{40}$ miles closer to the bus stop.

C. Kara lives $\frac{3}{40}$ miles closer to the bus stop.

D. Liam lives $\frac{3}{40}$ miles closer to the bus stop.

3. Carole has 84 ounces of blue paint and 192 ounces of yellow paint that she is mixing into bowls to create green paint. What is the greatest number of bowls she can use if the green mixture in each bowl is the same?

A. 8

B. 12

C. 16

D. 24

4. Which expression is equivalent to $a + a + b + b + c + c$?

A. $2abc$

B. $a^2 + b^2 + c^2$

C. $2(a + b + c)$

D. $a^2b^2c^2$

8th Grade ELA Independent Summer Reading Assignment for 2026~2027

Eighth Grade is an exciting year in ELA as we work to help you establish habits and develop practices that will prepare you for high school level material. It is our goal to support you through this period of growth and guide you towards becoming more independent and confident in your reading and writing.

While reading, I would like you to write down your thoughts (also known as "annotations") on Post-its. Your Post-its can show any type of thinking about the text that you have. This includes questions, opinions, predictions… *Please write neatly.* Your teacher will look at your Post-it annotations and will take these into consideration in grading. **This will be your 1st graded assignment in 8th grade ELA!** **

The **date for submission** of your FIRST independent reading book report will be the first day of school, **Monday, August 10th**. You will be required to submit:

- **your novel (with annotations)**
- **the hand-written book report form (attached)**
- **and your typed final report.** This report should be 12-point font, double-spaced, Times New Roman font, and should include and expand upon the information contained in the hand-written report.

Happy Reading! See you in August!
Ms. Borho, 8th Grade ELA Teacher

Name: _____Date: _____

Middle School Hand-written Outline for
Book Report

This template will outline the information you need to include in your book report. As you read the **book, fill in** the sections of this outline. You will receive a grade for this template and for the final typed report, in conjunction with the annotated novel that should be submitted at the same time. When you go to write your book report, **be sure to include the information completed on the following pages. The final report must be typed and double spaced**. Be sure to turn in both **this outline, your annotated novel, and the typed book report**.

I. Introductory paragraph

Book Title:_____

Author: _____

Three or more facts about the author:

- _____
- _____
- _____
- _____

II. Paragraph 2: A 1-2 sentence overview of the plot/ story and a vivid description of the story's setting and its significance to the overall plot.

1-2 sentence overview _____

_____

_____

- 2-3 sentences describing the book's **setting** as well as the setting's significance or importance to the story

  _____

_____

_____

_____

III. Paragraph 3: A detailed description of all the major characters and their relevance to the story

- _____

  _____
- _____

  _____
- _____

  _____
- _____

  _____
- _____

  _____

IV. Paragraph 4: Main Events (Give a **<u>detailed</u>** and well-organized description of the story's key events.)

- _____

  _____
- _____

  _____

- _____

  _____

- _____

  _____

- _____

  _____

- _____

  _____

V. Paragraph 5: Most interesting part, and why

Start with: "The part of the book I found to be most interesting was around p. ____, when…" (and describe what happened), and then give TWO reasons why you found this part to be so interesting.

Topic sentence:

_____

_____

_____

Reason 1

- _____

  _____

Reason 2

- _____

  _____

VI. Paragraph 6: Personal opinion- Whether you liked or disliked the book, and <u>why</u>

Topic sentence:

_____

_____

Your reasoning:

_____

_____

_____

_____

_____

****<u>REMINDERS</u>****

- **Correct for spelling, grammar, and punctuation.**
- **Indent paragraphs**
- **Strong topic sentence for each paragraph**
- **Typed paper should be 12 pt. font, double-spaced.**
- **Remember you must also submit your annotated novel and this outline with your report.**