Holt Mathematics

Course 3

Ready to Go On? Intervention and Enrichment with Answers

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CONTENTS

CONTENTS, *CONTINUED*

CONTENTS, *CONTINUED*

CONTENTS, *CONTINUED*

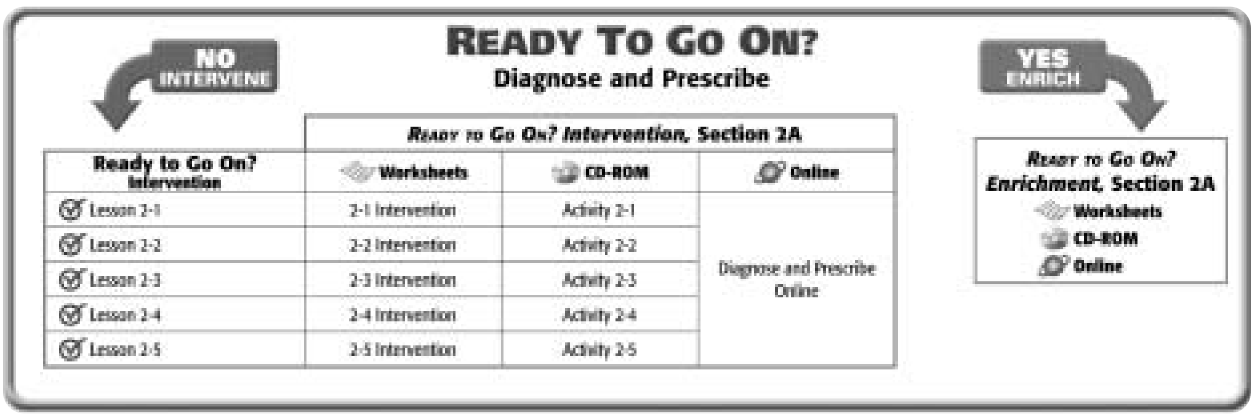
Using the Ready to Go On? Intervention and Enrichment in Your Class

The *Ready to Go On? Intervention* helps students to perform successfully by providing opportunities for you to address students' weaknesses before the students are given summative assessments. The *Ready to Go On? Intervention* provides skills and problem-solving intervention for students having difficulty mastering concepts taught in the lessons.

Ready to Go On? Intervention

After teaching each section of lessons, have students complete the *Ready to Go On?* page in the student book. This page targets the lesson skills necessary for success in the chapter. For students requiring help, use the appropriate *Skills Intervention* or *Problem Solving Intervention* worksheets. Each worksheet provides step-by-step scaffolding prompts to help students understand the lesson concepts and skills.

A chart at the end of each section correlates the lessons with the appropriate intervention and enrichment materials. The chart appears in the Teacher Edition. A sample is shown below.


READY TO GO ON?
Diagnose and Prescribe

NO INTERVENE

	Ready to Go On? Intervention, Section 2A		
Ready to Go On? Intervention	Worksheets	CD-ROM	Online
Lesson 2-1	2-1 Intervention	Activity 2-1	Diagnose and Prescribe Online
Lesson 2-2	2-2 Intervention	Activity 2-2	
Lesson 2-3	2-3 Intervention	Activity 2-3	
Lesson 2-4	2-4 Intervention	Activity 2-4	
Lesson 2-5	2-5 Intervention	Activity 2-5	

YES ENRICH

Ready to Go On? Enrichment, Section 2A
Worksheets
CD-ROM
Online

Assessment

Use the *Section Quizzes* to assess the student's proficiency after you have provided Intervention, or use the *Section Quizzes* to assess the student's retention on the new concepts taught in the lessons.

Enrichment

For those students who show proficiency on the *Ready to Go On? Section Quizzes,* provide them with the appropriate *Enrichment* worksheets. The worksheets extend the concepts taught in the lessons.

Other Materials Available for Ready to Go On? Intervention and Enrichment

- *Ready to Go On? Intervention and Enrichment* is available in different formats:

  Ready to Go On? Intervention and Enrichment [CD-ROM]—allows teachers to assign the *Ready to Go On? Pre- and Post-Tests* to whole classes or individual students. The Reports show which students are having difficulty on particular lesson skills. Teachers can choose to have Intervention materials automatically assigned to students requiring help.

  Ready to Go On? Intervention and Enrichment Online—provides diagnostic assessment and intervention. The *Ready to Go On? Pre-Test Reports* show which students are having difficulty on particular lesson skills. Teachers can choose to have the Intervention materials automatically assigned to students requiring help. Once students have completed the Intervention, the system automatically assigns the appropriate *Ready to Go On? Post-Tests.* The *Ready to Go On? Post-Test Reports* show which students are proficient and which students need more help.

Student's Name ____________________

Individual Lesson Skills Checklist

Chapter	Lesson	Prescription	Skill Mastered

Name ________________________________ Date __________ Class ___________

LESSON 1-1

Ready to Go On? Skills Intervention

Variables and Expressions

A **variable** represents a value that can change. A **constant** is a value that cannot change. The value of a variable can be **substituted** into an **algebraic expression** to **evaluate** the expression. A number multiplied by a variable is called a **coefficient.**

Vocabulary
variable
constant
substitute
algebraic expression
evaluate
coefficient

Evaluating Algebraic Expressions with One Variable
Evaluate the expression for the given value of the variable.
$b + 9$ for $b = 5$

____ + 9	What value do you substitute for b?
____	Add.

Evaluating Algebraic Expressions with Two Variables
Evaluate each expression for the given values of the variables.

A. $a + 4b$ for $a = 10$ and $b = 2.5$

____ + 4______	What values do you substitute for a and b?
____ + ____	What operation do you perform first? ________________________
____	Add.

B. $3.5m - 2n$ for $m = 8$ and $n = 5$

3.5____ − 2____	What values do you substitute for m and n?
____ − ____	Find each product.
____	Subtract.

Geometry Application
If m is the number of sides in a regular polygon, then $180(m - 2)$ can be used to find the sum of the angle measures. Find the sum of the angle measures in an octagon.

$180(m - 2)$	How many sides does an octagon have? ____
180(____ − 2)	Substitute the value for m.
180(____)	What step do you complete next? ___________________________
______	What is the product?

The sum of the angle measures in an octagon is ______.

Name ______________________ Date __________ Class __________

LESSON 1-2

Ready to Go On? Skills Intervention

Algebraic Expressions

Word phrases can be written as algebraic expressions.

Translating Word Phrases into Math Expressions

Write an algebraic expression for the phrase the product of 12 and a number x.

What operation does "the product" tell you to use?

____

What two numbers are being used? ______________

Write a math expression. ______________

Translating Math Expressions into Word Phrases

Write a word phrase for the algebraic expression $8 - 6b$.

Write $6b$ in words. ______________

Write $8 - 6b$ in words. ______________

Writing and Evaluating Expressions in Word Problems

James is shopping at the fruit market. Each kiwi fruit costs 22 cents. The total James pays for k kiwi fruits is the product of k and 22 cents. Write an expression to determine how much James paid. Then evaluate the expression if James buys 6 kiwi fruits.

What operation is needed? ______________

Write an expression. ______________

Evaluate the expression for k = ______. 22______ = ______

James spends ______ cents or $______ on kiwis.

Writing a Word Problem from a Math Expression

Write a word problem that can be evaluated by the algebraic expression $64 \div p$, and evaluate the expression for $p = 16$.

Write the word problem.

____

____

____

Evaluate the expression for $p = 16$. 64 ÷ ______ = ______

Each person will get ______ slices of pizza.

Name ______________________________ Date __________ Class __________

LESSON 1-3

Ready to Go On? Skills Intervention
Integers and Absolute Value

Vocabulary
integer
opposite
additive inverse
absolute value

Integers are the set of whole numbers and their **opposites.**

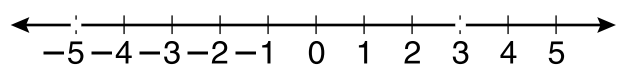
Opposites, or **additive inverses**, are numbers that are the same distance from 0 on opposite sides of the number line. The **absolute value** of a number is its distance from 0. The absolute value of a number x, written as $|x|$, is always positive because distance is always positive.

Comparing and Ordering Integers

A. Use <, >, or = to compare integers.

3 ☐ −5

Place the numbers on a number line.



_____ is to the left of _____.

−5 _____ 3

B. Write the integers in order from least to greatest.

−6, 3, −9

Compare each pair of integers.

−6 _____ 3, −6 _____ −9, and 3 _____ −9

Write the integers from least to greatest. ____________________

Finding Additive Inverses
Find the additive inverse of each integer.

A. 4

_____ is the same distance from 0 as 4 is on the number line.

B. −16

_____ is the same distance from 0 as –16 is on the number line.

Evaluating Absolute-Value Expressions
Evaluate each expression.

A. $|5| + |-8|$

The absolute value of 5 is its distance from 0 or _____.

The absolute value of −8 is its distance from 0 or _____.

_____ + _____ = _____

B. $|30 - 30|$

30 – 30 = _____

The absolute value of _____ is _____.

Name ________________________________ Date __________ Class __________

LESSON 1-4

Ready to Go On? Skills Intervention

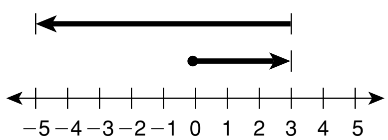
Adding Integers

The set of whole numbers, including zero, and their opposites are called integers. Absolute value is the distance from 0 on a number line.

Using a Number Line to Add Integers

Use a number line to find the sum.

3 + (−8)



From zero, you will move in which direction first? ________

How many units? ________ From there, you will move in which direction? ________ Why? ____________________

____

How many units? ________ You finish at ________.

So, 3 + (−8) = ________.

When adding integers with the *same* sign, find the sum of the absolute values. The answer should have the same sign as the integers.

When adding integers with *different* signs, find the difference of the absolute values. The answer should have the sign of the integer with the greater absolute value.

Using Absolute Value to Add Integers

Add.

A. −4 + (−6)

−4 + (−6)

____

What is the sum of 4 and 6? ________

Are the signs the same or different? ____________

The sign of the answer should be ____________.

B. 2 + (−7)

2 + (−7)

____

What is the difference of 7 and 2? ____________

Is your answer positive or negative? ____________

How do you know? ______________

Evaluating Expressions with Integers

Evaluate *t* + 17 for *t* = −6.

t + 17

________ + 17

What do you substitute for *t*? __________

What is the difference of 17 and 6? __________

−6 + 17 = ________

Is 17 greater than or less than 6? ________

So, the sign should be __________.

Name ______________________________ Date ___________ Class ___________

LESSON 1-4

Ready to Go On? Problem Solving Intervention

Adding Integers

You can use integers to keep track of changes when there are increases and decreases.

Check number 203 is missing from Rachel's records. She knows that she had $278 in her account before check number 201. After check number 204 her balance was still $278. What is the amount of the missing check?

Number	Date	Description	Amount
201	4/3	Oil change	−$23
202	4/5	Donation	−$100
Deposit	4/6	Deposit	+$385
203	4/9	?	?
204	4/10	Electric bill	−$76

Understand the Problem

1. What does balance mean in this situation?

____

Make a Plan

2. By how much did Rachel's balance change from 4/3 to 4/10? _______________

3. What must be the sum of the integers in the Amount column if you include check number 203? _______________

4. How can adding the integers that are shown in the Amount column help you find the missing amount?

____

____

Solve

5. What is the sum of the known integers in the Amount column?

____

6. What integer must be added to 186 to get 0? _______________

7. What was the amount of check number 203? _______________

Check

8. Show that with check number 203, the amounts add up to 0.

____

Name ______________________________________ Date ___________ Class ____________

LESSON 1-5

Ready to Go On? Skills Intervention

Subtracting Integers

Subtracting an integer is the same as adding its opposite.

$a - b = a + (-b)$ $\qquad$ $a - (-b) = a + b$

Subtracting Integers

A. $-7 - 9$ — What is the opposite of 9? __________

$-7 - 9 = -7 +$ ______ — What is 7 + 9? __________

$=$ ______ — Are the signs the same or different? _________

Is the answer positive or negative? __________

B. $3 - (-5)$ — What is the opposite of -5? ________

$3 - (-5) = 3 +$ ______ — What is 3 + 5? __________

$=$ ______ — The signs are the same, so the answer is __________.

Evaluating Expressions with Integers

Evaluate each expression for the given value of the variable.

A. $9 - w$ for $w = -7$

$9 - w$ — What do you substitute for w? ________

$9 -$ ________ — What is the opposite of -7? __________

$9 +$ ________ — What is 9 + 7? __________

________ — Is the answer positive or negative? __________

B. $-6 - k$ for $k = -11$

$-6 - k$ — What do you substitute for k? __________

$-6 -$ ________ — What is the opposite of -11? __________

$-6 +$ ________ — Which is larger, 11 or 6? __________

________ — Is the answer positive or negative? __________

Sports Application

A diver dives from a 15-m platform into a pool. He descends a total of 18 m. How far does the diver go under water?

What is the platform height? ______ How far does the diver dive? ______

Subtract the dive distance from the height of the platform.

15 __________ = ______ — Is your answer "+" or "−"? ______

The diver goes ______ m under water.

Name ______________________________ Date ___________ Class ____________

LESSON **1-5**

Ready to Go On? Problem Solving Intervention

Subtracting Integers

When you subtract integers, be careful with signs.

What two integers have a sum of −35 and a difference of 13?

Understand the Problem

1. If you add the two integers you are trying to find, what should you get? ______________________

2. If you subtract one of the integers from the other and take the absolute value, what should you get? ______________________

Make a Plan

3. Why might guess and check be a good strategy to use?

____

4. Explain why the integers cannot both be positive and why one can't be negative and the other positive.

____

____

Solve

5. Try two negative integers that add up to −35 and see if their difference is 13. Try −30 and −5. ______________________

6. Should you next try integers that are closer together or further apart than −30 and −5? Explain.

____

7. Keep using guess and check to solve the problem. What are the two integers? ______________________

Check

8. Show that the two integers meet all the conditions stated in the problem.

____

Solve.

9. Find two integers with a sum of −8 and a difference of 12. ______________________

10. Make up your own integer puzzle and have a friend try it.

Name ______________________________ Date __________ Class __________

LESSON **1-6**

Ready to Go On? Skills Intervention

Multiplying and Dividing Integers

The product or quotient of two numbers with the same sign is positive.
$(+) \cdot (+) = (+)$ or $(-) \cdot (-) = (+)$

The product or quotient of two numbers with different signs is negative.
$(+) \cdot (-) = (-)$ or $(-) \cdot (+) = (-)$

Multiplying and Dividing Integers
Multiply or divide.

A. $8(-5)$ Are the signs the same or different? ________

_____ Multiply. Is the answer positive or negative? ________

B. $\frac{-54}{-6}$ Are the signs the same or different? ________

_____ Divide. Is the answer positive or negative? ________

Using the Order of Operations with Integers
Simplify.

A. $-7(9 - 4)$ What step do you perform first? ______________________

$-7($_____$)$ Are the signs the same or different? ________

_____ Multiply. Is the answer positive or negative? ________

B. $\frac{(19 - 100)}{-9}$ What step do you perform first? ______________________

$\frac{(\_\_\_\_\_)}{-9}$ Are the signs the same or different? ________

_____ Divide. Is the answer positive or negative? ________

Economics Application
Mandy makes and sells bracelets. She spends \$3 on materials for each bracelet and sells the bracelets for \$5 each. If she makes and sells 15 bracelets in a week, find her total net profit.

_____(15) + _____(15) Add the amount she spends and the amount she earns.

_____ + _____ Multiply.

_____ Add.

Her total net profit is _____.

Name ______________________ Date __________ Class ___________

LESSON **1-6**

Ready to Go On? Problem Solving Intervention

Multiplying and Dividing Integers

You can multiply and divide integers to solve some problems.

Last week the daily high temperature in Chillburn was −7°F for the first 3 days and −4°F for next 2 days. On Saturday it was 0°F and on Sunday 1°F. What was the mean daily high temperature for the week?

Understand the Problem

1. How do you find the mean of a set of data values?

____

____

2. How many data values are in the set in the problem? ______________

Make a Plan

3. What two integers can you multiply to find the sum for the first 3 days? ______________

4. Write an expression with multiplication for the sum of the 7 data values. ______________

Solve

5. Evaluate the expression you wrote in Exercise 4 to find the sum of the 7 daily high temperatures.

____

6. Write and evaluate a numerical expression to find the mean daily high temperature for the week.

____

Check

7. Explain why your answer is reasonable.

____

____

Solve

8. Suppose the temperature for Saturday was incorrect. If the mean daily high temperature for the week was actually −3°F, what was the correct high temperature on Saturday? ______________

Name ______________________ Date ____________ Class ____________

SECTION 1A

Ready to Go On? Quiz

1-1 Variables and Expressions

Evaluate each expression for the given values of the variables.

1. $9x + 2y$ for $x = 3$ and $y = 1$

______

2. $7(a - 3b)$ for $a = 23$ and $b = 7$

______

3. $3(g - h) + 3$ for $g = 5$ and $h = 4.5$

______

4. $8m \div n$ for $m = 9$ and $n = 2$

______

1-2 Algebraic Expressions

Write an algebraic expression for each word phrase.

5. 5 minus the product of *x* and 3

____

6. one-fourth the sum of 8 and *y*

____

Write a word phrase for each algebraic expression.

7. $6a - 4$

____

8. $8(p + 9)$

____

1-3 Integers and Absolute Value

Write the integers in order from least to greatest.

9. −35, 4, −8, 25

____

10. 15, −9, −16, 2

____

11. −27, 31, 0, −28

____

12. 8, −6, −5, 7

____

Evaluate each expression.

13. $|-43| + |24|$ ______

14. $|-16| - |13|$ ______

15. $|6 + 10|$ ______

16. $|63 - 55|$ ______

SECTION 1A

Ready to Go On? Quiz continued

1-4 Adding Integers

Evaluate each expression for the given value of the variable.

17. $p + 7$ for $p = -12$ ______

18. $w + (-2)$ for $w = 2$ ______

19. $t + (-25)$ for $t = -2$ ______

20. $10 + x$ for $x = -5$ ______

21. One winter morning, the temperature was −5°F. By the afternoon, the temperature had increased 20°F. What was the temperature in the afternoon? ______

1-5 Subtracting Integers

Subtract.

22. $9 - (-3)$ ______

23. $-13 - (-17)$ ______

24. $-6 - 1$ ______

25. $0 - 30$ ______

26. A submarine was traveling at a depth of −200 feet below sea level. It then rose to a depth of −100 feet below sea level. What is the difference of the two depths? ______

1-6 Multiplying and Dividing Integers

Multiply or divide.

27. $\frac{-42}{7}$ ______

28. $-3(-6)$ ______

29. $8(-6)(2)$ ______

30. $\frac{-80}{-20}$ ______

31. During eight plays in the game, Carlo's football team had 3 gains of 6 yards each and 5 losses of 4 yards each. What was his team's total yards for those eight plays? ______

Name ______________________________________ Date ___________ Class ____________

SECTION 1A

Ready to Go On? Enrichment

Evaluating Algebraic Expressions with More Than Two Variables

There is no limit to the number of variables in an algebraic expression. Follow the same steps you would use to solve an algebraic expression with only two variables. Substitute all the values for the variables first, then simplify the expression.

Evaluate the expression for the given values of the variables.

$4xyz + 2x$

for $x = 2$, $y = 6$, and $z = 3$

$4(2)(6)(3) + 2(2)$	Substitute the values for the variables.
$144 + 4$	Simplify using the Order of Operations.
148	

Evaluate the expression for the given values of the variables

1. $w(8) + 4me$
   for $w = 2$, $m = 5$, and $e = -2$

   ____

2. $2books/1book$
   for $b = 2$, $o = 4$, $k = -5$, and $s = -2$

   ____

3. $\frac{1}{2}(time)$
   for $t = 2$, $i = 5$, $m = -3$, $e = -1$

   ____

4. $nine + one$
   for $n = -1$, $i = 2$, $e = 10$, and $o = 1$

   ____

5. $ur + 2cool$
   for $u = -2$, $r = 5$, $c = 2$, $o = -10$, and $l = 3$

   ____

6. $now + u + try + it$
   for $n = 2$, $o = 5$, $w = -6$, $u = -4$, $t = -7$, $r = -2$, $y = -1$, and $i = 9$

   ____

7. Make up your own algebraic expression with more than two variables. Assign each variable a value and give it to friend to solve.

   ____

Name ______________________________________ Date ___________ Class ____________

LESSON 1-7

Ready to Go On? Skills Intervention

Solving Equations by Adding or Subtracting

Vocabulary
equation
inverse operation

An **equation** is a mathematical sentence that shows two expressions are equal. Addition and subtraction are **inverse operations** that are used to solve equations.

Determining Whether a Number Is a Solution of an Equation
Determine which value of *n* is a solution of the equation.
$14 + n = 25$; $n = 5$ or 11

Substitute each value for *n* into the equation.
$14 + n = 25$

$14 + \_\_\_\_ \stackrel{?}{=} 25$	Substitute the first value of *n*, $n = 5$.
$\_\_\_\_ \stackrel{?}{=} 25$	What is the sum?
	Is the answer a true equation? ______
	Is $n = 5$ a solution of the equation? ______
$14 + n = 25$	
$14 + \_\_\_\_ \stackrel{?}{=} 25$	Substitute the second value of *n*, $n = 11$.
$\_\_\_\_ \stackrel{?}{=} 25$	What is the sum?
	Is $n = 11$ a solution of the equation? ______

You can solve an equation by isolating the variable using the properties of equality.

Solving Equations Using Addition and Subtraction Properties
Solve.

A. $y + 9 = 5$	What is the variable that you need to isolate? ___________
_____ = _____	To isolate the variable, add ______ to each side.
$y =$ _____	Add. Is the value of *y* positive or negative?
B. $-3 + k = -27$	What do you need to isolate? ______________________
_____ = _____	What do you need to add to each side? _______________
$k =$ _____	Add. Is the value of *k* positive or negative?

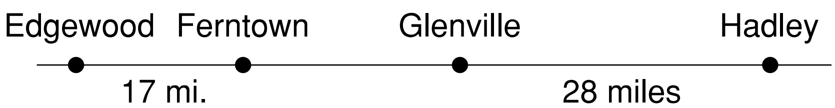
Name ______________________ Date __________ Class __________

LESSON **1-7**

Ready to Go On? Problem Solving Intervention

Solving Equations by Adding or Subtracting

You can solve some problems by writing an addition or subtraction equation to model the situation described in the problem.



Edgewood is 64 miles from Hadley. How far is it from Ferntown to Glenville?

Understand the Problem

1. What distance are you asked to find?

____

2. What is the sum of the distances from Edgewood to Ferntown, from Ferntown to Glenville, and from Glenville to Hadley?

____

Make a Plan

3. What relationship can you use to write an equation that can help you solve the problem?

____

____

Solve

4. Write an equation relating the given distances and the distance *d* that you need to find.

____

5. Solve your equation. How far is it from Ferntown to Glenville?

____

Check

6. Do the three distances between adjacent towns add up to 64 miles?

____

Solve a New Problem

7. You drive from Hadley to Ferntown, then back to Glenville. How many miles did you drive?

____

Name ______________________________ Date __________ Class __________

LESSON 1-8

Ready to Go On? Skills Intervention

Solving Equations by Multiplying or Dividing

The Division Property of Equality states that you can divide both sides of an equation by the same nonzero number and the statement will still be true.

Solving Equations Using Division

Solve. $8n = 64$

$\frac{8n}{\_\_} = \frac{64}{\_\_}$ What number do you divide both sides by?

$1n = \_\_$ What is the quotient?

$n = \_\_$ Remember: $1 \cdot n = \_\_\_\_$

Check: $8n = 64$

$8 \cdot \_\_\_\_ \stackrel{?}{=} 64$ What value do you substitute into the equation to check your solution?

$\_\_\_\_ \stackrel{?}{=} 64$ What is the product?

Is $n = 8$ a solution of the equation? ______________

The Multiplication Property of Equality states that you can multiply both sides of an equation by the same number and the statement will still be true.

Solving Equations Using Multiplication

Solve. $\frac{m}{6} = 9$

What is the inverse of dividing by 6? ________________

$\_\_\_\_ \cdot \frac{m}{6} = 9 \cdot \_\_\_\_$ Multiply.

$m = \_\_\_\_$

Check: $\frac{m}{6} = 9$

$\frac{\_\_}{6} \stackrel{?}{=} 9$ What value do you substitute into the equation to check your solution?

$\_\_\_\_ \stackrel{?}{=} 9$ What is the quotient?

Is $m = 54$ a solution of the equation? ______________

Name ______________________________ Date ___________ Class ____________

LESSON 1-8

Ready to Go On? Problem Solving Intervention

Solving Equations by Multiplying or Dividing

You can solve some problems by writing a multiplication or division equation to model the situation described in the problem.

If you divide the mystery number by 7 and then add 37, the result is 121. What is the mystery number?

Understand the Problem

1. What do you know about the mystery number?

____

Make a Plan

2. What operations will you use to write an equation for this problem?

____

3. What variable will you use to stand for the mystery number?

____

Solve

4. Write an equation to show what is done to the mystery number and what the result is.

____

5. Solve your equation.

____

Check

6. Check your solution by substituting it in your equation.

____

Find the mystery number by writing and using an equation.

7. If you divide the mystery number by -4 and then subtract 3, the result is -14.

____

8. If you multiply the mystery number by 8 and then add 80, the result is 64.

____

9. If you multiply the mystery number by 100 and then subtract 25, the result is 2,075.

____

Name ______________________ Date ____________ Class ____________

LESSON 1-9

Ready to Go On? Skills Intervention

Introduction to Inequalities

An **inequality** is a type of math sentence that uses the symbols <, >, ≤, or ≥. An **algebraic inequality** is an inequality containing a variable. The solution of an inequality is a **solution set** which can be shown on a number line.

Vocabulary
inequality
algebraic inequality
solution set

Completing an Inequality

Use < or > to complete the inequality.

15 + 6 [?] 25

____ [?] 25 — What is the sum of 15 and 6?

____ [ ] 25 — Insert the correct inequality sign.

Solving and Graphing Inequalities

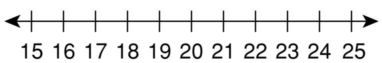
Solve and graph each inequality.

A. $m - 12 > 8$

$m - 12 > 8$

$+\_\_\_ \quad +\_\_\_$ — What number do you add to both sides?

$m > \_\_\_$ — What is the sum?



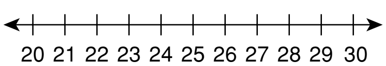
Should the graph have an open or closed circle? ________

Should you draw the arrow on the graph to the left or right? ________

B. $\frac{a}{4} < 7$

$\_\_\_\_ \cdot \frac{a}{4} < 7 \cdot \_\_\_\_$ — By what number do you multiply by both sides?

$a < \_\_\_\_$ — What is the product?



Should the graph have an open or closed circle? ________

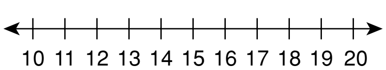
Should you draw the arrow on the graph to the left or right? ________

C. $b + 18 \leq 32$

$b + 18 \leq 32$

$-\_\_\_ \quad -\_\_\_$ — What number do you subtract from both sides?

$b \leq \_\_\_$ — Subtract.



Should the graph have an open or closed circle? ________

Should you draw the arrow on the graph to the left or right? ________

Name ______________________________________ Date ___________ Class ____________

LESSON 1-9

Ready to Go On? Problem Solving Intervention

Introduction to Inequalities

You can solve some problems by writing an inequality to model the situation.

Paul used part of his gift money to buy an exercise machine. The sale advertisement stated that you make 4 payments of $20 each plus a one-time shipping and handling fee of $7. Write and solve an inequality to find the least amount of gift money that Paul could have had.

Understand the Problem

1. What can you say about the cost of the exercise machine compared to Paul's gift money?

____

Make a Plan

2. What information will you use to find the cost of the exercise machine?

____

Solve

3. Write a numerical expression for the cost of the exercise machine.

____

4. Write an inequality to show the relationship between Paul's gift money *x* and the cost of the exercise machine.

____

5. Solve your inequality. Use the solution to answer the question in the problem.

____

Check

6. Check your solution by showing that a little more than $87 is a solution to the inequality and that a little less than $87 is not a solution.

____

____

____

Name ______________________ Date __________ Class __________

SECTION 1B

Ready to Go On? Quiz

1-7 Solving Equations by Adding or Subtracting

Solve.

1. $x + (-12) = -3$ __________
2. $t - (-8) = 16$ __________
3. $-42 + p = 7$ __________
4. $w + 15 = -3$ __________
5. $31 + k = 12$ __________
6. $y - 4 = 10$ __________
7. $h + (-7) = 29$ __________
8. $z + 21 = -3$ __________
9. $-9 + q = 0$ __________
10. $b - 13 = -14$ __________
11. $v - 56 = 19$ __________
12. $d - 10 = -20$ __________
13. Gabriela is saving money to buy a CD player that costs $42. She already has $17. How much more does she need to save to buy the CD player? __________
14. Lawrence was listening to a morning weather report on the radio, but he missed the first part of the forecast. The announcer said that the temperature will drop 17 degrees by the afternoon to make it −12°F. What was the temperature in the morning? __________

1-8 Solving Equations by Multiplying or Dividing

Solve.

15. $\frac{r}{12} = -3$ __________
16. $9d = 99$ __________
17. $\frac{8}{-20} = 10$ __________
18. $7w = 84$ __________
19. $32c = -32$ __________
20. $8x = 0$ __________
21. $-16b = -48$ __________
22. $\frac{96}{n} = -16$ __________
23. $\frac{k}{-300} = -10$ __________
24. $8f = -64$ __________

Name ________________ Date ________ Class ________

SECTION 1B

Ready to Go On? Quiz continued

1-8 Solving Equations by Multiplying or Dividing (continued)

25. Chelsea has 21 hair ribbons. This is 3 times as many hair ribbons as Gloria has. How many hair ribbons does Gloria have? ________

26. A baseball card shop has 212 rookie cards in a display case. The rookie cards make up $\frac{1}{3}$ of the total baseball cards on display. What is the total number of baseball cards the shop has on display? ________

1-9 Introduction to Inequalities

Solve.

27. $q + 72 \geq 32$ ________

28. $y + 8 < 10$ ________

29. $30 + r > -19$ ________

30. $p - 5 \leq 31$ ________

31. $c - 9 \geq 6$ ________

32. $-5 + f \leq -6$ ________

33. $x + 25 > 25$ ________

34. $98 + b < 39$ ________

35. $z - 480 > 1$ ________

36. $t - 24 \leq 24$ ________

37. $-37 + v \geq 0$ ________

38. $k + 8 > 3$ ________

39. To maintain her bowling average, Nola needs to bowl two games with a total score of at least 232. She scored a 127 in the first game. What is the lowest score Nola could have in the second game and still maintain her average?

____

40. Vince can't charge more than $200 on his credit card. He already charged $130 on his credit card to get his car fixed. What is the most Vince can charge on his credit card now?

____

Name ______________________________ Date __________ Class __________

SECTION 1B

Ready to Go On? Enrichment

Completing Inequalities by Evaluating Algebraic Expressions

Algebraic expressions can be evaluated by substituting the given values of the variables. Once both sides of an inequality have been simplified, you can use the "more than" or "less than" symbols to complete the inequality.

Compare. Write $<$ or $>$.

A. $x + 4$ ☐ $5 - x$ for $x = 1$

____ $+ 4$ ☐ $5 -$ ____	Substitute ____ for x.
5 ☐ 4	Simplify both sides.
5 ☐ 4	Complete the inequality.

B. $x + y$ ☐ $y + z$

for $x = 2$, $y = -4$, $z = 3$

____ + (____) ☐ (____) + ____	Substitute the values of the variables.
-2 ☐ -1	Simplify both sides.
-2 ☐ -1	Complete the inequality.

Compare. Write $<$ or $>$. Use these values for the variables: $a = 10$, $b = -2$, $c = 3$, and $d = -4$.

1. $a - b$ ☐ 10 **2.** $2a - 2b$ ☐ $7c$ **3.** $2ab$ ☐ $5bc$ **4.** $\frac{a}{b}$ ☐ d

5. $a + b + c + d$ ☐ $2a + 4b + 2c + 3d$ **6.** $10c - 4a$ ☐ $\frac{(12d)}{c}$

7. Complete the inequality $w + 8$ ☐ $w + 9$ for $w = -6$, 0, and 2. What do you notice about your answers?

____

8. Complete the inequality $2k$ ☐ $3k$ for $k = -3$, 1, and 3. What do you notice about your answers?

____

____

9. Write an inequality with one variable and using at least one operation that will always be true. Test your inequality by substituting at least three values for the variable.

____

Name ________________________________ Date ___________ Class ___________

LESSON 2-1

Ready to Go On? Skills Intervention

Rational Numbers

A **rational number** is any number that can be written as a fraction $\frac{n}{d}$, where n and d are integers and $d \neq 0$. Repeating and terminating decimals are rational numbers. When a fraction is in simplest form, the numerator and denominator are **relatively prime,** they have no common factors other than 1.

Vocabulary
rational number
relatively prime

$\frac{6}{24} = \frac{1}{4}$ $-0.55\overline{5} = -\frac{5}{9}$ $0.2 = \frac{2}{10}$

Simplifying Fractions

Write $\frac{8}{12}$ in simplest form.

$\frac{8}{12}$ What factor is common to 8 and 12? _____

$\frac{8\ \_\_\_}{12\ \_\_\_}$ How do you simplify the fraction? ____________________

____

$\frac{2}{3}$ How do you know your answer is in simplest form?

____

Writing Decimals as Fractions

Write each decimal as a fraction in simplest form.

A. −0.125

−0.12_ Which digit is farthest to the right? _________

What place value is the 5 in? ____________

$-0.125 = \frac{\_\_\_\_}{\_\_\_\_}$ Write the decimal as a fraction.

$= \frac{-1}{8}$ _____ is the greatest common factor of 125 and 1000.

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

Use long division to write $\frac{8}{3}$ as a decimal.

Which number is the dividend? ______

How many times does 3 go into 8? ______

How many times does 3 go into 20? ______

$\frac{8}{3} = \_\_\_\overline{6}$

$$\begin{array}{r} \_.\_\_ \\ 3\overline{)\_.00} \\ -6 \\ 20 \\ -18 \\ 2 \end{array}$$

Name ______________________________ Date __________ Class __________

LESSON 2-2

Ready to Go On? Skills Intervention

Comparing and Ordering Rational Numbers

To compare and order rational numbers, you need to find a common denominator. When comparing fractions, you often find the **least common denominator (LCD),** which is the least common multiple of the denominators. When you order fractions and decimals, first write them with the same denominator, then compare.

Vocabulary
least common denominator

Comparing Fractions by Finding a Least Common Denominator

Compare. Write <, >, or =.

A. Method 1: Multiply to find a common denominator.

$\frac{7}{9} \square \frac{4}{13}$

$9 \bullet$ ____ $= 117$ — Multiply 9 and ____ to find a common ____________.

$\frac{7}{9} \bullet \frac{\_\_}{\_\_} = \frac{\_\_}{117}$ and $\frac{4}{13} \bullet \frac{\_\_}{\_\_} = \frac{\_\_}{117}$ — Multiply each fraction by a fraction equal to ____.

$91 \square 36$, so $\frac{91}{117} \square \frac{36}{117}$ — Compare the fractions.

$\frac{7}{9} \square \frac{4}{13}$

B. Method 2: Find the least common denominator.

$\frac{4}{5} \square \frac{2}{3}$ — List multiples of ____________.

5: 5, 10, ____... 3: 3, 6, ____, ____... — What multiple do the denominators have in common? ____

$\frac{4}{5} \bullet \frac{\_\_}{\_\_} = \frac{\_\_}{15}$ and $\frac{2}{3} \bullet \frac{\_\_}{\_\_} = \frac{\_\_}{15}$ — Multiply each fraction by a fraction equal to ____.

$\frac{12}{15} \square \frac{10}{15}$ so $\frac{4}{5} \square \frac{2}{3}$ — Compare the fractions.

Compare Using Decimals

Compare. Write <, >, or =.

$2\frac{3}{4} \square 2\frac{4}{5}$

$2\frac{3}{4} =$ ______ and $2\frac{4}{5} =$ ______ — Write the fractions as decimals.

$2.75 \square 2.8$, so $2\frac{3}{4} \square 2\frac{4}{5}$ — Compare the decimals.

Name ______________________________________ Date ___________ Class ____________

LESSON 2-3

Ready to Go On? Skills Intervention

Adding and Subtracting Rational Numbers

Align the decimal points to add or subtract decimals.

not aligned	**aligned**
0.123 + 12.04	0.123 + 12.040

Application

Allen Johnson completed the 110-meter hurdles in 13.03 seconds. It took him 0.125 seconds to react to the starter pistol. How long did it take him to run the actual 110-m hurdles?

To solve this problem, should you add or subtract? __________

13.03_
− 0.125 — How many zeros do you need to add so the decimals align? ____________

________ Subtract.

It took Allen Johnson __________ to run the actual hurdles.

Adding and Subtracting Fractions with Like Denominators

To add or subtract fractions with like denominators, add the numerators and keep the denominator the same.

Subtract $\left(\frac{-3}{5}\right) - \frac{4}{5}$.

$\left(\frac{-3}{5}\right) - \frac{4}{5} = \frac{-3}{5} \_\_ \frac{\_4}{5}$ Rewrite the problem to show that you are adding the opposite.

$= \frac{-3 + (-4)}{\_\_}$ What value goes in the denominator?

= ______ Add. Is your answer positive or negative? Why? ___________

____

Evaluating Expressions with Rational Numbers

Evaluate the expression for the given value of the variable.

8.4 + x for x = −21.7

8.4 + (−______) What do you substitute for x? __________

________ Add. How do you find the sum? ________________

Is your answer positive or negative? ________________

How do you know? ________________________________

Name ______________________ Date ____________ Class ____________

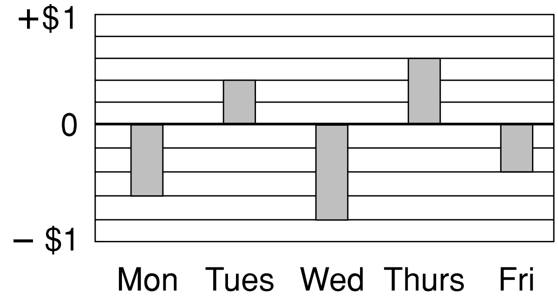
LESSON **2-3**

Ready to Go On? Problem Solving Intervention

Adding and Subtracting Rational Numbers

You can use rational numbers to keep track of increases and decreases.

The graph shows the daily change in the price of Seedy CD stock for one week. If the stock began the week at a price of $6.30, what was its price at the end of the week?



Understand the Problem

1. What does the bar for Monday tell you?

____

2. What do you need to find out?

____

Make a Plan

3. If you added the 5 daily changes, what would that sum tell you?

____

4. If you knew the sum of the changes, how could you find the price at the end of the week?

____

Solve

5. What were the daily changes for the week?

____

6. Look for shortcuts to add the changes. What is $-0.60 + 0.60$? What is $0.40 + (-0.40)$? ____________________

7. How much did the stock price change for the week? ____________________

8. What was the price at the end of the week? How did you get your answer? ____________________

Check

9. Show that your answer is reasonable.

____

____

____

Name ______________________ Date ___________ Class ___________

LESSON 2-4

Ready to Go On? Skills Intervention

Multiplying Rational Numbers

When multiplying fractions, you multiply the numerators and the denominators.

The product of two numbers with the same sign is positive.
(+) • (+) = (+) or (−) • (−) = (+)

The product of two numbers with different signs is negative.
(+) • (−) = (−) or (−) • (+) = (−)

Multiplying a Fraction and an Integer
Multiply. Write the answer as a mixed number in simplest form.

$-5\left(2\frac{3}{4}\right)$

$= -5\left(\frac{\_\_}{\_\_}\right)$ To change a mixed number to an improper fraction, ___________ the denominator by the whole number and ___________ the numerator.

$= -\frac{\_\_}{\_\_}$ To multiply a fraction and integer, ___________ the numerator by the integer and ___________ the denominator by ___________.

= ________ Write the answer as a mixed number. Is the answer positive or negative? ___________ How do you know? ____________________

____

Multiplying Fractions
Multiply. Write the answer in simplest form.

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

$= \frac{-3 \cdot \_\_}{\_\_ \cdot 3}$ To multiply fractions, ___________ the numerators and ___________ the denominators.

$= \frac{(\_\_)(-2)}{(5)(\_\_)}$ Cancel out the common factors.

= ______ Simplify. Is the answer positive or negative? ___________

How do you know? ______________________________

Name ______________________ Date ___________ Class ___________

LESSON **2-4**

Ready to Go On? Problem Solving Intervention

Multiplying Rational Numbers

You can estimate to compare products of rational numbers. You can use fractions or decimals, whichever makes the comparison simpler.

Which product is greater, $-11.89 \cdot 0.247$ or $\frac{21}{99} \cdot \left(-15\frac{3}{16}\right)$?

Understand the Problem

1. Are you asked to find the exact products? What does the problem ask?

____

2. Without calculating, what can you tell about the sign of both products?

____

Make a Plan

3. What simple fraction is close to 0.247? ______________________

4. What simple decimal is close to $\frac{21}{99}$? ______________________

Solve

5. Round -11.89 and $-15\frac{3}{16}$ to the nearest integers.

____

6. Write the two products with rounded factors. Which is greater?

____

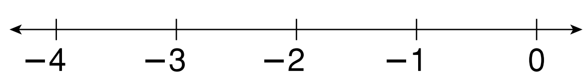
7. Without calculating either $-11.89 \cdot 0.247$ or $\frac{21}{99} \cdot \left(-15\frac{3}{16}\right)$, tell whether each product is greater than -3 or less than -3.

____

8. Which product is greater, $-11.89 \cdot 0.247$ or $\frac{21}{99} \cdot \left(-15\frac{3}{16}\right)$? ______________

Check

9. On the number line, show the approximate location of the two products.



Name ____ Date ___________ Class ____________

LESSON 2-5

Ready to Go On? Skills Intervention

Dividing Rational Numbers

Vocabulary
reciprocal

To divide a number by a fraction multiply by the reciprocal. The **reciprocal** of a number is found by exchanging the numerator and denominator.

Number	**Reciprocal**	**Product**
$\frac{7}{8}$	$\frac{8}{7}$	$\frac{7}{8} \cdot \frac{8}{7} = 1$
-2	$\frac{-1}{2}$	$-2 \cdot \frac{-1}{2} = 1$

Dividing Fractions

Divide. Write each answer in simplest form.

A. $\frac{7}{18} \div \frac{1}{2}$

$\frac{7}{18} \div \frac{1}{2} = \frac{7}{18} \cdot \frac{\_}{\_}$ What is the reciprocal of $\frac{1}{2}$?

$= \frac{7 \cdot \cancel{2}}{\cancel{18} \cdot 1}$ How many times does 2 go into 18?

$= \frac{\_}{\_}$ Simplify.

B. $3\frac{1}{6} \div \frac{2}{3}$

$3\frac{1}{6} \div \frac{2}{3} = \_\_\_\_\_\_ \div \frac{2}{3}$ To write $3\frac{1}{6}$ as an improper fraction, multiply ______ by ______ and add the numerator 1.

$\frac{19}{6} \div \frac{2}{3} = \frac{19}{6} \cdot \_\_\_\_\_\_$ Multiply by the reciprocal of $\frac{2}{3}$.

$= \frac{19 \cdot \cancel{3}}{\cancel{6} \cdot 2}$ What is the common factor? ______

$= \frac{19}{4} = \_\_\_\_\_\_$ Multiply and write as a mixed number.

Name ______________________ Date ___________ Class ___________

LESSON 2-6

Ready to Go On? Skills Intervention

Adding and Subtracting with Unlike Denominators

You can add or subtract fractions with unlike denominators by first finding a common denominator. There are two methods you can use to find the common denominator.

Method 1: Multiply one denominator by the other denominator.

Method 2: Find the **least common denominator (LCD)** by finding the least common multiple of the denominators.

Adding Fractions with Unlike Denominators

Add. $\frac{3}{5} + \frac{1}{7}$

To add two fractions, you need to have a ______________________.

Multiply 5 × 7 to get a common denominator of _____.

$= \frac{3}{5}\left(\frac{\quad}{\_\_\_}\right) + \frac{1}{7}\left(\frac{\quad}{\_\_\_}\right)$ Multiply by fractions equal to _____.

$= \_\_\_ + \_\_\_$ Rewrite with common denominators.

$= \_\_\_$ Add the _______________ and keep the _______________ the same.

Evaluating Expressions with Rational Numbers

Evaluate $n - \frac{3}{5}$ for $n = -\frac{1}{7}$.

$n - \frac{3}{5}$

$= \frac{\_\_}{\_\_} - \frac{3}{5}$ Substitute _____ for *n*.

$= (-\frac{1}{7})\left(\frac{\_\_}{\_\_}\right) - \frac{3}{5}\left(\frac{\_\_}{\_\_}\right)$ Multiply by fractions equal to _____.

$= -\frac{5}{\_\_} - \frac{21}{\_\_}$ Rewrite with a common denominator.

$= \frac{\_\_}{35}$ Subtract. Is the answer positive or negative?

____

Name ______________________ Date ___________ Class ____________

SECTION 2A

Ready to Go On? Quiz

2-1 Rational Numbers

Simplify.

1. $\frac{10}{24}$ ______ **2.** $\frac{21}{48}$ ______ **3.** $\frac{22}{77}$ ______ **4.** $\frac{13}{117}$ ______

2-2 Comparing and Ordering Rational Numbers

Write the numbers in order from least to greatest.

5. $4\frac{3}{4}$, 0.3, $3\frac{2}{5}$, 0.27

____

6. -1.3, $\frac{2}{3}$, 0.5, $-\frac{3}{4}$

____

7. 3.53, $2\frac{11}{12}$, $\frac{33}{8}$, 2.7

____

8. 2.6, $\frac{27}{100}$, 0.028

____

Write the numbers in order from greatest to least.

9. 0.275, $2\frac{5}{8}$, 0.15, $3\frac{6}{7}$

____

10. $2\frac{18}{25}$, 2.45, $\frac{7}{15}$, 3.2

____

11. $\frac{25}{6}$, 3.75, $3\frac{8}{9}$, 3.3

____

12. $\frac{3}{4}$, $\frac{4}{5}$, $\frac{7}{8}$, 0.79

____

2-3 Adding and Subtracting Rational Numbers

Evaluate each expression for the given value of the variable.

13. $75.8 + x$ for $x = 32.35$

____

14. $-\frac{4}{7} + y$ for $y = 4\frac{2}{7}$

____

15. $2\frac{4}{5} + z$ for $z = -1\frac{3}{5}$

____

Name ______________________ Date __________ Class __________

SECTION 2A

Ready to Go On? Quiz continued

2-4 Multiplying Rational Numbers

Multiply. Write each answer in simplest form.

16. $2\left(3\frac{3}{4}\right)$ ______

17. $-3\frac{2}{5}\left(1\frac{7}{10}\right)$ ______

18. $-4\frac{3}{5}\left(-3\frac{1}{7}\right)$ ______

19. $\frac{8}{35}\left(-5\frac{4}{9}\right)$ ______

20. Devon is making 8 loaves of bread. Each loaf of bread needs $3\frac{3}{4}$ cups of flour. How much flour does Devon need to make the bread? ______

2-5 Dividing Rational Numbers

Divide. Write each answer in simplest form.

21. $\frac{4}{5} \div \frac{7}{10}$ ______

22. $3.2 \div 0.8$ ______

23. $-\frac{5}{11} \div 3$ ______

24. $45.62 \div 0.02$ ______

2-6 Adding and Subtracting with Unlike Denominators

Add or subtract.

25. $\frac{3}{5} + \frac{1}{4}$ ______

26. $2\frac{3}{7} - 1\frac{1}{2}$ ______

27. $\frac{22}{9} + 3\frac{5}{6}$ ______

28. $7\frac{2}{5} - 4\frac{1}{3}$ ______

29. $1\frac{7}{10} + 2\frac{1}{8}$ ______

30. $3\frac{8}{9} - \frac{2}{3}$ ______

31. $3\frac{5}{8} + \frac{1}{2}$ ______

32. $2\frac{7}{8} - \frac{2}{3}$ ______

Name ______________________________ Date __________ Class __________

SECTION 2A

Ready to Go On? Enrichment

Guess the Operation

If you are given a problem without the operation symbol, you can use number sense to help you figure out what operation was used.

A. $\frac{1}{2} \square \frac{1}{3} = 1\frac{1}{2}$

The answer is ____________ than the first number.

The second number is ____________.

So, it is not subtraction because the answer would have to be ____________ than the first number.

What is $1\frac{1}{2}$ as an improper fraction? ______

What is the reciprocal of the second number? ______

What operation uses reciprocals? ____________

$\frac{1}{2} \square \frac{1}{3} = 1\frac{1}{2}$

B. $0.08 \square 0.007 = 0.00056$

The answer is ____________ than the first number.

The second number is ____________.

So, it is not addition because the sum of two positives is ____________ than either number.

How many decimal places are in the answer? ______

How many in the first number? ______ The second? ______

What operation has you add the number of decimal places in each number?

____

$0.08 \square 0.007 = 0.00056$

Use number sense to figure out what operation is being performed in each problem.

1. $0.25 \square 0.5 = -0.25$

2. $1.5 \square 0.3 = 5$

3. $0.7 \square 0.9 = 1.6$

4. $2.7 \square 1.11 = 2.997$

5. $\frac{2}{5} \square \frac{8}{5} = 2$

6. $\frac{2}{3} \square \frac{1}{4} = \frac{1}{6}$

7. $\frac{3}{8} \square \frac{1}{2} = \frac{3}{4}$

8. $\frac{9}{10} \square \frac{2}{5} = \frac{1}{2}$

9. $-0.6 \square 0.95 = 0.35$

10. $\frac{4}{7} \square \frac{3}{4} = \frac{16}{21}$

11. $\frac{7}{8} \square \frac{1}{4} = \frac{5}{8}$

12. $0.06 \square 0.03 = 0.0018$

Name ______________________ Date __________ Class __________

LESSON 2-7

Ready to Go On? Skills Intervention

Solving Equations with Rational Numbers

You solve an equation by isolating the variable. Use inverse operations to isolate the variable.

Solving Equations with Decimals

Solve.

A. $w - 6.5 = 31$

_____ _____ What number should you add to both sides?

$w =$ _____ What does *w* equal?

B. $\frac{x}{4.6} = 8$

$\frac{x}{4.6} \cdot$ _____ $= 8 \cdot$ (_____) To isolate *x*, multiply both sides of the equation by _____.

$x =$ _____ What does *x* equal?

What can you do to check your answer? ______________________________

____

C. $-3.7x = 22.2$

$\frac{-3.7}{-\_\_}x = \frac{22.2}{-\_\_}$ What number should you divide both sides of the equation by?

$x =$ _____ What does *x* equal? Does the solution check?

Solving Equations with Fractions

Solve.

$x + \frac{3}{5} = \frac{6}{7}$

$x + \frac{3}{5} -$ _____ $= \frac{6}{7} -$ _____ What number should you subtract from both sides of the equation?

$x = \frac{6}{7} - \frac{3}{5}$ To subtract fractions you must first find ______________________.

$x = \frac{30}{\_\_} - \frac{21}{\_\_}$ What is the common denominator?

$x =$ _____ What does *x* equal? Does the solution check?

Name ______________________________________ Date ___________ Class ____________

LESSON 2-7

Ready to Go On? Problem Solving Intervention

Solving Equations with Rational Numbers

You can use equations with rational numbers to model situations and solve problems.

Kim worked from 3:30 P.M. to 7:15 P.M. on Friday and from 8:45 A.M. to 1:30 P.M. on Saturday. She earned $55.25 for the two days. How much did she earn per hour?

Understand the Problem

1. Do you have enough information to figure out how many hours Kim worked?

____

2. What are you trying to find out?

____

Make a Plan

3. Let *t* stand for the total number of hours Kim worked on Friday and Saturday. If you know that she earned $55.25, what equation can you use to find *r,* her hourly rate?

____

Solve

4. How many hours did Kim work on Friday? On Saturday? On both days together?

____

5. Find Kim's hourly rate *r* by solving the equation you wrote for Exercise 3. (*Hint:* Use the value of *t* you found in Exercise 4.)

____

Check

6. Use the value you found for *r* and see if Kim earned $55.25.

____

Solve

7. How much more would Kim have had to earn for the two days in order for her hourly rate to be $7.50 per hour? Explain.

____

____

____

Name ________________________ Date ____________ Class ____________

LESSON 2-8

Ready to Go On? Skills Intervention

Solving Two-Step Equations

You solve an equation by isolating the variable. To isolate the variable, you may have to use more than one operation.

Solving Two-Step Equations

Solve.

A. $\frac{a}{3} + 7 = 15$

$\frac{a}{3} + 7 = 15$ What is the opposite of adding 7? ____________

$\underline{\quad\quad}\ \ \underline{\quad}$

$\frac{a}{3} = \_\_\_$ Simplify.

$\_\_\_ \cdot \frac{a}{3} = 8 \cdot \_\_\_$ To undo division, multiply both sides of the equation by ___.

$a = \_\_\_$ Solve for *a*.

Check:

$\frac{a}{3} + 7 = 15$

$\frac{\_\_}{3} + 7 \stackrel{?}{=} 15$ What value do you substitute into the equation for *a*? ____

$\_\_\_ + 7 \stackrel{?}{=} 15$ Does the solution check? _______

B. $-13.6 = -3.5f - 4.5$

$-13.6 = -3.5f - 4.5$ How do you undo -4.5? ____________

$\underline{\quad\quad}\ \ \underline{\quad\quad}$

$-9.1 = -3.5f$ How do you isolate *f*?

$\frac{-9.1}{\_\_\_} = \frac{-3.5f}{\_\_\_}$ ____________

$\_\_\_\_ = f$ Solve for *f*. Does the solution check? _____

C. $\frac{w + 7}{8} = 11$

To isolate the variable, how do you clear the fraction?

$\_\_\_\_ \frac{w + 7}{8} = 11 \_\_\_\_$ ____________

$w + 7 = \_\_\_\_$ To isolate *w*, what is the next step?

$\underline{\quad\quad}\ \ \underline{\quad\quad}$ ____________

$w = \_\_\_\_$ Solve for *w*. How do you check the solution?

____

____

Name ______________________________ Date ___________ Class ____________

LESSON 2-8

Ready to Go On? Problem Solving Intervention

Solving Two-Step Equations

You can write equations to help solve some problems involving plane figures.

A farmer plans to build a square chicken pen from the 114 yards of fencing she has. She needs to save 20 feet of the fencing for another project. What is the longest that each side of the chicken pen can be?

Understand the Problem

1. Complete to show what you know and what you need to find.

There are ______ yards of fencing in all. The farmer can use all but ______ feet.

The shape of the pen is ___________. Find ________________________________.

Make a Plan

2. Why does it make sense to convert 114 yards to feet?

____

3. Complete the equation to show how the quantities in the problem are related. Use *s* for the longest length in feet of each side of the pen.

______ + ______ = 3 • ______

Solve

4. Solve the equation you wrote in Exercise 3.

____

5. What is the longest that each side of the chicken pen can be?

____

Check

6. Use your answer to calculate how much fencing is used for the pen and the other project. See if you get 114 yards.

____

____

Solve

7. Suppose the pen were hexagonal, the farmer had 150 yd of fencing, and she needed 40 ft for another project. What would the answer be?

____

Name ________________________________ Date ___________ Class ___________

SECTION 2B

Ready to Go On? Quiz

2-7 Solving Equations with Rational Numbers

Solve.

1. $x - 3.5 = 1.2$

____

2. $y + \frac{4}{5} = \frac{2}{8}$

____

3. $2t = -5.7$

____

4. $\frac{9}{24}h = -\frac{36}{8}$

____

5. $-9 = \frac{m}{2.7}$

____

6. $k - \frac{3}{8} = \frac{13}{22}$

____

7. $\frac{s}{5.3} = 2.6$

____

8. $4.5 + p = -6.4$

____

9. $\frac{12}{15} = w - \frac{3}{5}$

____

10. Joe just moved into his new apartment. It takes him $5\frac{1}{4}$ hours to paint one bedroom. His apartment has 4 bedrooms. How many hours will Joe need to paint all the bedrooms of his new apartment?

____

11. Katie and Ann are going to make cornbread for the bake sale at school. The recipe calls for $2\frac{3}{4}$ cups of cornmeal for 1 loaf of cornbread. How many cups of cornmeal will they need to make 12 loaves of cornbread?

____

12. A bag of dried cherries had 387.9 total calories. There are 4.5 servings per bag. How many calories are in each serving of dried cherries?

____

Name ______________________________ Date __________ Class ___________

SECTION **2B**

Ready to Go On? Quiz continued

2-8 Solving Two-Step Equations

Solve.

13. $4w - 7.5 = 2.7$

14. $\frac{x - 2}{4} = -3.75$

15. $5t + 5.7 = 9.2$

16. $\frac{s + 8}{25} = -\frac{12}{5}$

17. $-11 = \frac{m}{0.3} - 18.3$

18. $8h - \frac{6}{7} = \frac{2}{3}$

19. $65.3 - \frac{k}{12.7} = 25.3$

20. $6.9 + 8p = -12.3$

21. $\frac{11}{15} = \frac{8}{35}y + \frac{3}{7}$

22. Judy sells stamps for her grandmother. She earns \$27 per week, plus \$2.25 for each stamp that she sells. Last week, Judy earned \$60.75. How many stamps did Judy sell that week?

23. The local ice skating rink charges \$8 for admission. Skate rental costs \$5.50 per pair. On Friday night, one half of the people who paid for admission also rented skates. The rink made \$1,333 that night. How many people went to the skating rink Friday night?

24. A digital cable company charges \$56.65 per month for cable and high-speed Internet service. After the first 100 minutes of Internet use, the cable company charges \$0.11 for each additional minute. A family's cable bill was \$128.37 last month. How many total minutes did the family use high-speed Internet?

Name ______________________________ Date __________ Class __________

SECTION **2B**

Ready to Go On? Enrichment

Combining Like Terms

When an equation has multiple terms that include a variable, you must get all the variables on one side of the equation and all the numbers on the other side.

$8x + 5 = 6x - 7$	First, get all the numbers on one side of the equation.
$\underline{-5} \quad \underline{-5}$	Subtract 5 from both sides.
$8x = 6x - 12$	
$\underline{-6x} \quad \underline{-6x}$	Now subtract 6*x* from both sides.
$2x = -12$	Divide both sides by 2.
$x = -6$	
$8(-6) + 5 = 6(-6) - 7$	Check your answer by substituting the *x*-value into the original equation.
$-48 + 5 = -36 - 7$	Simplify.
$-43 = -43$	The equation is true when $x = -6$.

Simplify each equation so that all the variables are on one side.

1. $7x + 4 = 2x - 8$ ____________

2. $2a + 6 = 3a + 2$ ____________

3. $6f - 3 = 12f + 4$ ____________

4. $4t + 9 = 6t + 7$ ____________

5. $3m - 2 = 4m + 1$ ____________

6. $8r - 4 = 12r + 6$ ____________

7. $5j + 2 = 4j - 7$ ____________

8. $6w + 3 = 2w - 8$ ____________

Solve.

9. $3y + 5 = 4y + 8$ ____________

10. $4b - 1 = -3b + 6$ ____________

11. $5g - 4 = 3g + 9$ ____________

12. $2s + 3 = 8s - 2$ ____________

13. $2m - 2 = 4m + 1$ ____________

14. $3s + 6 = s - 2$ ____________

15. $3k - 10 = 7k + 3$

____

16. $10z + 5 = 7z - 9$

____

Name ______________________________________ Date ___________ Class ____________

LESSON 3-1

Ready to Go On? Skills Intervention

Ordered Pairs

Vocabulary
ordered pair

An **ordered pair** is one way to express a solution to an equation.

Deciding Whether an Ordered Pair Is a Solution of an Equation

Determine whether this ordered pair is a solution of $y = 6x - 4$.

(3, 14) $y = 6x - 4$ What number do you substitute for x?

____ $\stackrel{?}{=}$ 6(____) − 4 What number do you substitute for y?

____ $\stackrel{?}{=}$ ____ Evaluate the right side of the equation.

Is (3, 14) a solution of the equation? Why? _________________

Creating a Table of Ordered Pair Solutions

Use the given values to make a table of solutions.
$y = 2x + 2$ for $x = 0, 1, 2, 3$

Substitute each value of x into the equation.
Fill in the missing values to complete the table.

x	$2x + 2$	y	(x, y)
0	2(0) + 2	2	(0, 2)
1	2(_) + 2	_	(1, _)
2	2(_) + 2	_	(_, _)
3	2(_) + 2	_	(_, _)

Recreation Application

When renting a bike at City Park, Joe must first pay a deposit and then pay a charge per hour. If the per hour fee is $5 and the deposit is $15, then the cost c of renting the bike for h hours can be determined using the equation: $c = 5h + 15$.

A. How much will it cost Joe to rent the bike for 4 hours?

$c = 5h + 15$

$c = 5($____$) + 15$ What number do you substitute for h?

$c =$ ____ Evaluate.

It will cost Joe $____ to rent the bike for 4 hours.

The solution can be written as (4, ____).

B. How much will it cost Joe to rent the bike for 6 hours?

$c = 5h + 15$

$c = 5($____$) + 15$ What number do you substitute for h?

$c =$ ____ Evaluate.

It will cost Joe $____ to rent the bike for 6 hours.

The solution can be written as ________.

Name ________________________________ Date ___________ Class ____________

LESSON **3-1**

Ready to Go On? Problem Solving Intervention

Ordered Pairs

When you use an equation to solve a problem, you can often use ordered pairs to show the solution.

The first story of a new skyscraper will be 25 feet high. Each of the other stories will be 12 feet high. The tower at the top will be 25 feet tall. If the building can be no taller than 800 feet, how many stories can there be?

Understand the Problem

1. What are the requirements for the skyscraper?

____

____

Make a Plan

2. If you write an equation relating all the given information, what variables will you use and what will they stand for?

____

____

3. What value will you set h equal to? ______________________

Solve

4. Using n to stand for the number of stories above the first, write an expression for the height of all the stories above the first. ____________

5. Write an equation relating h, the maximum height in feet of the skyscraper, to the height of the three sections you listed in question 1.

____

6. Solve the equation if $h = 800$, the maximum height allowed.

____

Check

7. If n is 62.5, how many stories can there be? Explain.

____

____

8. Solve the equation for $n = 62$ and show the solution as an ordered pair. ______________________

Name ________________________________ Date __________ Class __________

LESSON 3-2

Ready to Go On? Skills Intervention

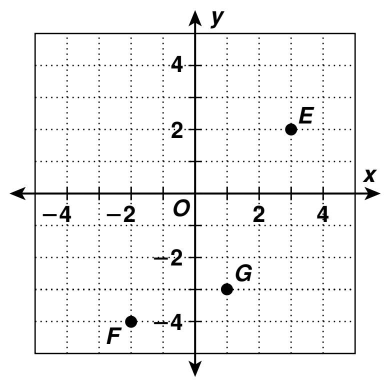
Graphing on a Coordinate Plane

A **coordinate plane** contains a horizontal number line called the ***x*-axis** and a vertical number line called the ***y*-axis.** The axes divide the coordinate plane into four **quadrants.** The point where the two axes intersect is the **origin.** The ***x*-coordinate** indicates movement left or right, and the ***y*-coordinate** indicates movement up or down.

Vocabulary
coordinate plane
x-axis
y-axis
quadrant
origin
x-coordinate
y-coordinate

Finding the Coordinates and Quadrants of Points on a Plane

Give the coordinates of each point.



A. point *E*

Is the point left or right of the origin? ____________

How many spaces? ____

Is the *x*-coordinate positive or negative? ____________

Is the point above or below the origin? ____________

How many spaces? ____

Is the *y*-coordinate positive or negative? ____________

What are the coordinates of point *E*? ____________ What quadrant is it in? ____

B. point *F*   The point is ______ of the origin ____ spaces. The sign is ____________.

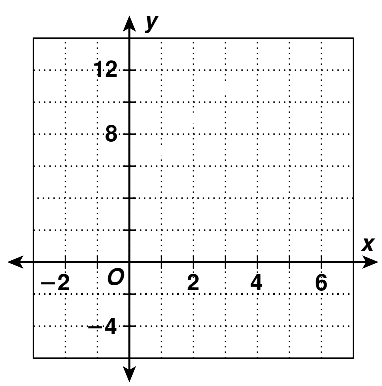
The point is how many units below the origin? ________________

What are the coordinates of the point? ____________ What quadrant is it in? ____

Graphing an Equation

Complete the table of ordered pairs.
Graph the equation on a coordinate plane.
$y = 2x + 5$

x	2*x* + 5	*y*	(*x*, *y*)
0	2(0) + 5	_	(0, _)
1	2(1) + 5	_	(1, _)
2	2(_) + 5	_	(_, _)
3	2(_) + 5	___	(_, ___)



Plot the points on the coordinate plane.
The first point is (0, 5). Look at the 0 first. What does this tell you?

____

Now look at the 5. Does this tell you to move up or down? ________________

Plot the remaining points and connect them with a straight line.

Name ______________________________________ Date ___________ Class ____________

LESSON 3-3

Ready to Go On? Skills Intervention

Interpreting Graphs and Tables

Matching Situations to Tables

Marcy, Susie, and Brian all work at a package delivery company. The table below shows how many packages each person handled in four days at work. Tell which person corresponds to each situation described below.

Day	**1**	**2**	**3**	**4**
Person 1	100	140	0	100
Person 2	150	130	150	0
Person 3	80	85	100	90

A. Brian had a busier second day than his first day and called in sick on the third day.

Who had an increase from Day 1 to Day 2?

____

How many packages would be handled by someone on a day they called in sick? ______________________

According to the table, which person probably called in sick on Day 3? ______________________

Brian corresponds to which person on the table? ____________

B. Marcy is new on the job. She handles fewer packages than her coworkers on Days 1 and 2.

Which person shows the lowest number of packages on Days 1 and 2? ______________________

Marcy corresponds to which person on the table? ____________

C. Susie is the busiest employee on the first day. She had a slight decrease in package numbers for the second day and took a vacation day on Day 4.

Which person is the busiest on Day 1? ______________________

How many packages would be handled by someone on vacation?

____

Which person handled this number on Day 4?

____

Susie corresponds to which person on the table? ____________

Name ______________________ Date ___________ Class ___________

SECTION 3A

Ready to Go On? Quiz

3-1 Ordered Pairs

Determine whether each ordered pair is a solution of $y = 3x - 4$.

1. (12, 32) ______

2. (−4, 8) ______

3. (1.4, 0.2) ______

4. (1.5, 1.5) ______

Acme Auto Rental charges $22.50 per day plus $0.15 per mile to rent a compact car. The equation for the total cost *c* of the car, including mileage and gas, is $c = 22.5 + 0.15m$, where *m* is the number of miles driven. Calculate the total cost to rent the car for each of the number of miles driven.

5. $m = 80$ miles ______

6. $m = 300$ miles ______

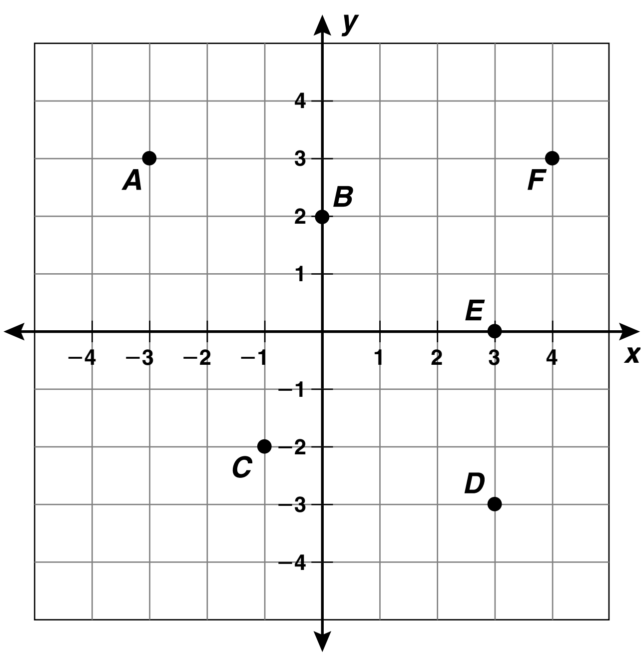
7. $m = 240$ miles ______

8. $m = 148$ miles ______

9. The Total Design T-Shirt Company has a one-time charge of $32.00 for a design and an additional $3.00 to print the design on each t-shirt. Let *t* represent the number of t-shirts and *c* represent the total cost. Write an equation that can be used to find the total cost to pick a design and have it printed on *t* t-shirts. ______________

3-2 Graphing on a Coordinate Plane

Give the coordinates and quadrant number of each point.



10. *A* ______________

11. *B* ______________

12. *C* ______________

13. *D* ______________

14. *E* ______________

15. *F* ______________

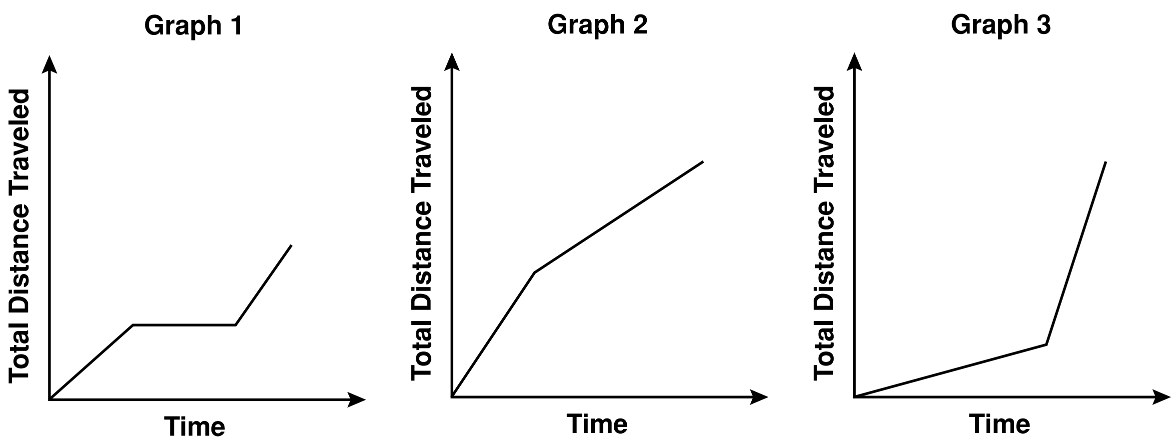
Name ______________________________ Date __________ Class ___________

SECTION 3A

Ready to Go On? Quiz continued

3-3 Interpreting Graphs and Tables

Tell which graph corresponds to each situation below.



16. Rosita walks from her home to town and then rides with a friend in her car to the other side of town. ____________

17. Reynaldo rides his bicycle from his home to the beginning of a path where he leaves his bike and takes a walking trip along a river. ____________

18. Simon rides his bicycle to the market where he stops to buy some snacks. He then continues on his bicycle at the same pace to his grandmother's house. ____________

19. Create a graph that would most likely represent the speed of an airplane as it taxis down the runway, takes off and reaches its cruising altitude.

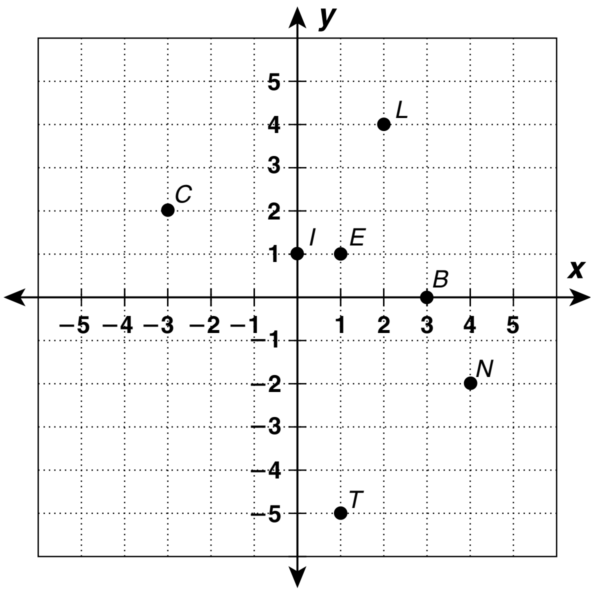
Name ______________________________ Date __________ Class __________

SECTION **3A**

Ready to Go On? Enrichment

Coordinate Plane Puzzles

Fill in the letter that names each point for the given coordinates to complete the riddle.

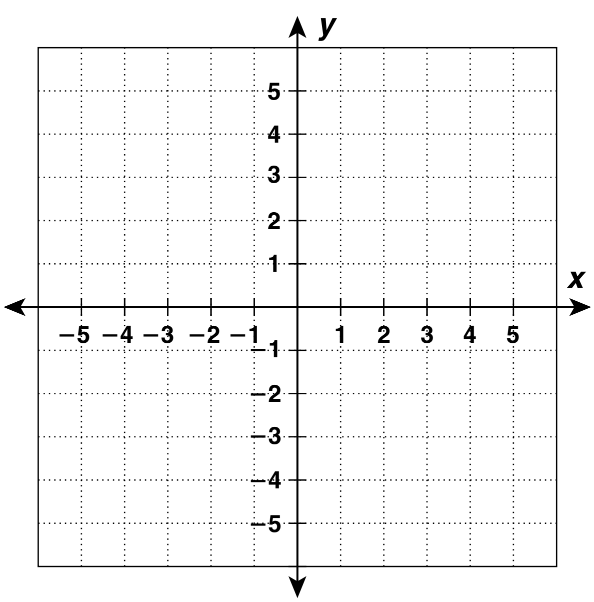


What did the zero say to the eight?

_____ _____ _____ _____   _____ _____ _____ _____

(4, −2) (0, 1) (−3, 2) (1, 1)   (3, 0) (1, 1) (2, 4) (1, −5)

Plot the points below. Then, connect them in the order they are listed and name the shape you form.



1. (0, 4)

2. (1, 2)

3. (3, 2)

4. (1, 0)

5. (3, −3)

6. (0, −1)

7. (−3, −3)

8. (−1, 0)

9. (−3, 2)

10. (−1, 2)

_____

Name ______________________________ Date __________ Class __________

LESSON 3-4

Ready to Go On? Skills Intervention

Functions

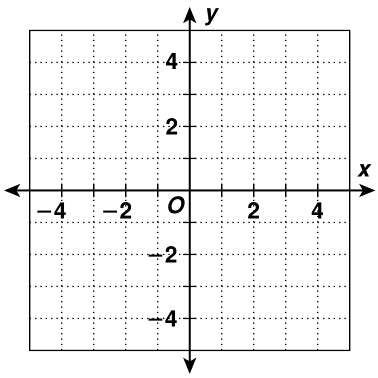
A **function** is a rule that relates two quantities so that only one **input** or *x*-value gives only one **output** or *y*-value. The **domain** of a function is all its possible input values and its **range** is all its possible output values.

Vocabulary
function
input
output
domain
range

Finding Different Representations of a Function
Make a table and graph of $y = x^2 - 1$.

Complete the table and then plot each point.

x	$x^2 - 1$	y	(x, y)
−2	$(-2)^2 - 1$	3	(−2, 3)
−1	$(\_\_\_\_)^2 - 1$		( )
0	$(\_\_\_\_)^2 - 1$		( )
1	$(\_\_\_\_)^2 - 1$		( )
2	$(\_\_\_\_)^2 - 1$		( )



Connect the points with a smooth curve.

Does each input value have one output value? ____

Identifying Functions
Determine if each relationship represents a function.

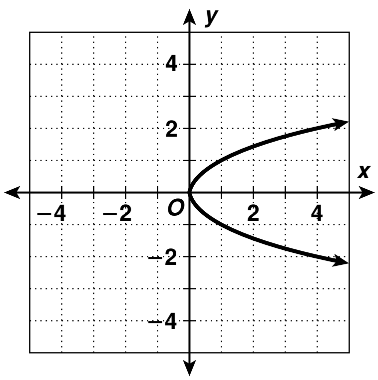
A.

x	y
2	4
6	8
10	12
14	16

Does each input (x) have only one output (y)? ____

Does the relationship represent a function? ____

B.



What are the output values for an input (x) value of 1? __________

Does the relationship represent a function? ____

Name ______________________________ Date __________ Class __________

LESSON 3-5

Ready to Go On? Skills Intervention

Equations, Graphs, and Tables

You can use an equation to represent data in different ways.

Using Equations to Generate Different Representations of Data

The distance a car has traveled is represented by the equation $d = 45h$, where d is the distance traveled and h is the number of hours. Make a table and a graph of the equation.

h	$45h$	d
0	45(0)	0
1	45(__)	_____
2	45(__)	_____
3	45(__)	_____

To find d, multiply h by 45.

What is the distance after 0 hours? ______

After 1 hour? ______ After 3 hours? ______

Complete the table.

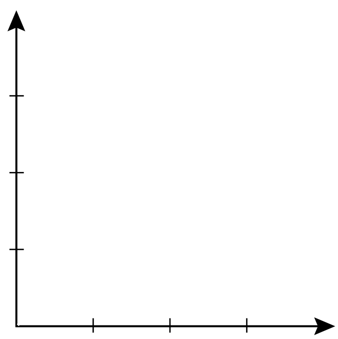
Use the information in the table to make a graph.

h represents the _______ and d represents the _______.

What is the x-coordinate of the first point? ______

What is the y-coordinate of the first point? ______

Make the graph.

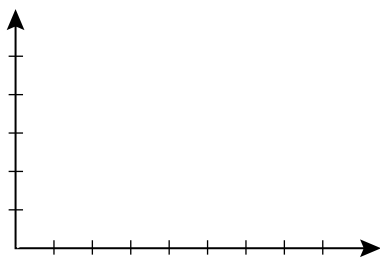


Using Tables to Generate Different Representations of Data

Use the table to make a graph and write an equation.

x	2	4	6	8
y	1	2	3	4

Use the data in the graph to plot points on the graph.



What are the coordinates of the first point? (_______)

Complete the graph.
Look for a pattern in the values.

2 ______ = 1 4 ______ = 2

6 ______ = 3 8 ______ = 4

Each value of x is ____________ to get each value of y.

Write the equation. ___________

Name ______________________ Date __________ Class __________

LESSON 3-5

Ready to Go On? Problem Solving Intervention

Equations, Tables, and Graphs

You can make a table and a graph to answer a word problem.

The amount of calories burned by swimming laps is represented by the equation $c = 12s$ where c is the number of calories and s is the number of laps. Use a table and a graph to find out how many calories Matilda burns when she swims 8 laps.

Understand the Problem

1. What quantity are you asked to find? ______________________

2. What do we know? ______________________

Make a Plan

3. How can a table help?

____

4. Complete the table.

5. What is the first ordered pair from the table?

______ The second? ______

6. How can you make a graph from the data in the table?

____

7. How will the graph help you answer the question?

____

s	$12s$	c
1	12(1)	12
2	12(2)	____
3	12(__)	____
4	12(__)	____

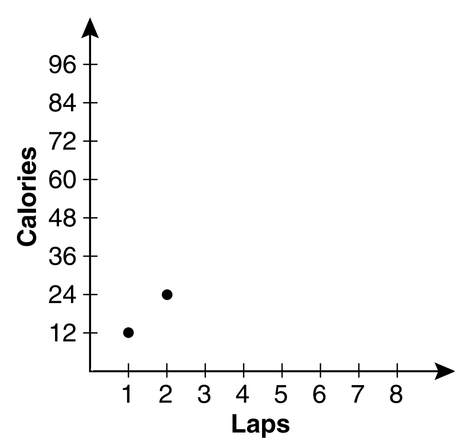
Solve

8. Make a graph for the data in the table.

9. Extend the graph. What is the value of c when $s = 8$? ____

10. Answer the question.

____



Check

11. How can you show that your answer is reasonable?

____

Name ______________________________________ Date ___________ Class ____________

LESSON **3-6**

Ready to Go On? Skills Intervention

Arithmetic Sequences

A **sequence** is an ordered list of items called **terms**. When the difference between each term is the same, it is called an **arithmetic sequence.** The difference between the terms in an arithmetic sequence is called the **common difference.**

Vocabulary
sequence
term
arithmetic sequence
common difference

Finding the Common Difference in an Arithmetic Sequence
Find the common difference in each arithmetic sequence.

A. 16, 13, 10, 7, 4…

What is the difference between the first and second terms? _____

Is this the same difference between the second and third terms? _____

Between the third and fourth terms? _____ Common difference: _____.

B. 0.9, 1.4, 1.9, 2.4, 2.9…

What is the difference between the first and second terms? _____

Is this the same difference between the second and third terms? _____

Between the third and fourth terms? _____ Common difference: _____.

Finding Missing Terms in an Arithmetic Sequence
Find the next three terms in the arithmetic sequence −6, −2, 2, 6,…

$-6 + \_\_\_\_ = -2$ $\quad -2 + \_\_\_\_ = 2$ $\quad 2 + \_\_\_\_ = 6$

Common difference: ____.

Add ____ to the last term to get the next term. ____

Add ____ to that. ____ Add ____ to that. ____

The next three terms are _______________.

Identifying Functions in Arithmetic Sequences
Find a function that describes the arithmetic sequence. Use *y* to identify each term in the sequence and *n* to identify the term's position.

3, 6, 9, 12

n	*n* ___	*y*
1	1 ___	3
2	2 ___	6
3	3 ___	9
4	4 ___	12

Make a table.

What can you add to 1 to get the first term? __________

Does this work to get the second term? __________

What is another way to get the first term from 1? ______________

Complete the table to see if this works for the other terms.

The rule is to ______________.

The function for this arithmetic sequence is __________.

Name ______________________________________ Date ___________ Class ____________

LESSON **3-6**

Ready to Go On? Problem Solving Intervention

Arithmetic Sequences

Finding a sequence can help you solve a word problem.

Tickets to a high school football game cost $4 each. The equipment manager and the concession stand manager each get $75 each game to replenish their supplies. Find a function to describe the sequence. Then find the profit if 127 tickets are sold.

Understand the Problem

1. What information do you have?

____

2. What are you trying to find?

____

Make a Plan

3. How much money does the school make from the sale of one ticket? Two tickets? ____________________

4. Write the first ten terms in the sequence for ticket sales.

____

5. What is the common difference? ____________________

6. How can you find a function for the profit?

____

____

Solve

7. What is the function that describes the profit from ticket sales? ____________________

8. What is $f(127)$? ____________________

Check

9. Substitute 358 for p in your function. Is the function true?

____

Name ________________________________ Date __________ Class __________

SECTION 3B

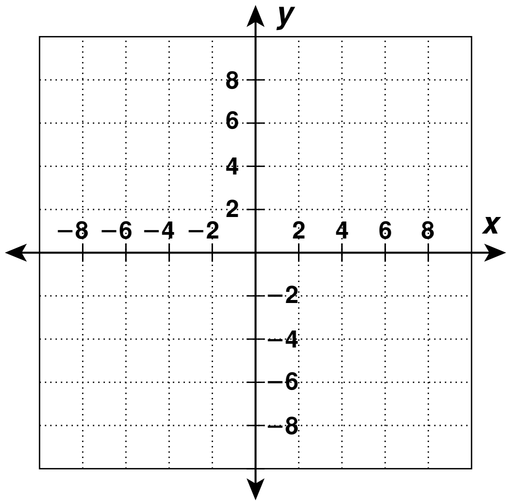
Ready to Go On? Quiz

3-4 Functions

Make a table and a graph for the function.

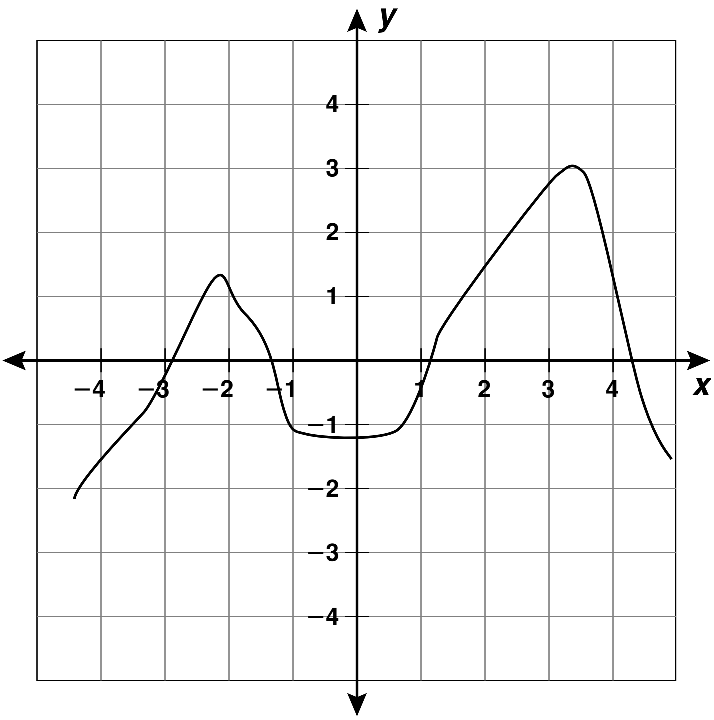
1. $y = 3x - 2$

x	$3x - 2$	y
−2	3(___) − 2	___
−1	3(___) − 2	___
0	3(___) − 2	___
1	3(___) − 2	___
2	3(___) − 2	___



Determine if each relationship represents a function.

2.



______

3.

x	1	2	3	4
y	8	12	15	16

______

4.

x	5	6	5	7
y	8	11	14	17

______

5. $y = x^2 + 2$ ______

6. $y = 3x + 2$ ______

Name ______________________________ Date __________ Class __________

SECTION 3B

Ready to Go On? Quiz continued

3-5 Equations, Tables, and Graphs

Use each table to make a graph and write an equation.

7.

x	1	3	5	7
y	3	11	19	27

____

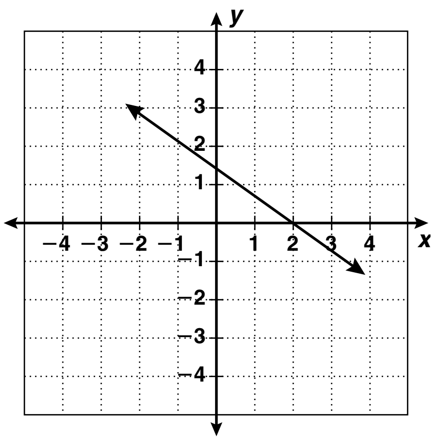
8.

x	2	5	8	11
y	7	13	19	25

____

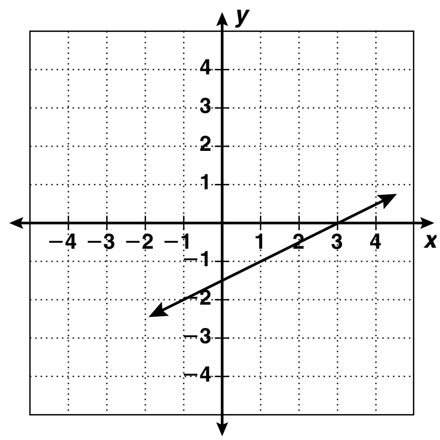
Use each graph to write an equation.

9.



____

10.



____

3-6 Arithmetic Sequences

Find the missing term in each sequence.

11. 4, 7, 10, 13, ______, 19

12. −3, −9, −15, ______, −27, −33

13. 4.7, 5.6, 6.5, 7.4, ______, 9.2

14. 2, 4, 8, ______, 32, 64

15. The swim team is selling tickets for $5 for admission to a swim party. The cost to rent the pool is $130. Find a function that describes the profit. What is the profit if they sell 200 tickets?

____

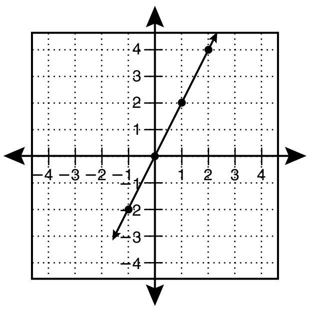
Name ______________________________ Date __________ Class __________

SECTION **3B**

Ready to Go On? Enrichment

Using a Graph to Solve Word Problems

You can use a graph to help you answer word problems. Look at the graph below.



Does it show a positive or negative relationship? ________

For every unit to the right, how much does the line rise?

____

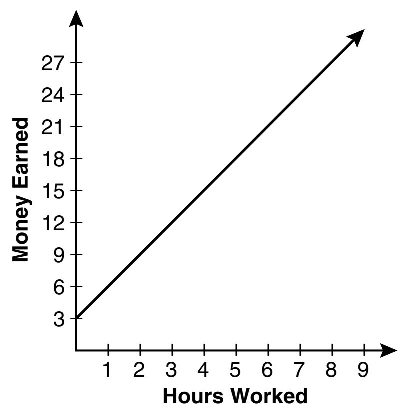
This amount of vertical change divided by the amount of horizontal change is called slope. It tells you what the variable in the equation of the line is multiplied by.

When $x = 0$, what does y equal? ________

This means that there is no number added to the variable in the equation of the line.

What is the equation of this line? ________

Jaqueline made this graph of her rate for doing yard work. Answer the questions below based on her graph.



1. Jaqueline has an initial charge to cover supplies for each client. What is it? ______
2. What is Jaqueline's hourly rate? ______________
3. Write an equation to describe Jaqueline's rate. Use h for the number of hours and t for the total amount of money she makes. ______________
4. Explain why the number multiplied by the variable is not 1, even though the graph looks like the line rises at a 1 to 1 ratio.

____

____

5. Jaqueline spent 2 hours weeding Mrs. Olsen's garden. Use the equation from Exercise 3 to find her pay. ______________
6. Jaqueline spent 3 hours working in her mother's yard. As a familiy discount, she took off the supply charge. How much did Jaqueline earn from her mother? ______________
7. Saturday, Jaqueline spent 2 hours mowing Mr. Harrison's lawn. Then she spent 1 hour pruning Mrs. Peterson's shrubs. Finally, she spent $1\frac{1}{2}$ hours raking leaves at Miss Ryder's house. How much did Jaqueline make on Saturday? (Each get a supply charge.) ______________

Name ______________________________ Date ___________ Class ____________

LESSON 4-1

Ready to Go On? Skills Intervention

Exponents

A **power** is a term such as 3^2 where the **base** is 3 and the **exponent** is 2. The exponent tells how many times the base is to be used as a factor. A number written with an exponent and a base is written in **exponential form.**

Vocabulary
power
base
exponent
exponential form

Writing Exponents

Write using exponents.

A. 5 • 5 • 5 • 5

How many times is 5 a factor? ___

5 • 5 • 5 • 5 = ___

The base is ___. The exponent is ___.

B. (−6) • (−6) • (−6)

How many times is −6 a factor? ___

(−6) • (−6) • (−6) = ______

The base is ___. The exponent is ___.

C. *x* • *x* • *x* • *x* • *x* • *x*

How many times is *x* a factor? ___

x • *x* • *x* • *x* • *x* • *x* = ___

The base is ___. The exponent is ___.

D. 4

How many times is 4 a factor? ___

4 = ___

The base is ___. The exponent is ___.

Evaluating Powers

Evaluate.

A. 3^5

How many times is 3 multiplied? ___

3^5 = ____________________

Find the product of five 3's. _____

3^5 = _____

B. $(-4)^3$

How many times is −4 multiplied? ___

$(-4)^3$ = ____________________

Find the product of three −4's. _____

$(-4)^3$ = _____

Using the Order of Operations

Evaluate.

$x(y + z^x)$ for $x = 2$, $y = 10$, and $z = 5$

_____(_____ + ______) Substitute

2(10 + _____) What operation do you do first? ________________________

2 (_____) What do you do next? ________________________

___ Multiply.

Name ____ Date ___________ Class ____________

LESSON **4-2**

Ready to Go On? Skills Intervention

Look for a Pattern in Integer Exponents

A number raised to a negative exponent equals one divided by that number raised to the opposite of the exponent.

Using a Pattern to Evaluate Negative Exponents

Evaluate the powers of 10.

10^{-2} — Is the exponent positive or negative? _____________

$10^{-2} = \frac{1}{\_\_\_\_\_\_}$ — Write the reciprocal and extend the pattern.

$10^{-2} = \frac{1}{\_\_\_} = \_\_\_\_$ — Simplify and write the fraction as a decimal.

Evaluating Negative Exponents

Evaluate.

$(-3)^{-5}$ — What is the exponent? __________

______ — When an exponent is negative, write the reciprocal.

What is the sign of the exponent, now? ___________

________________________ — Write the product of $\_\frac{1}{-3}$.

______ — Simplify.

Using the Order of Operations

Evaluate.

$4 - 5^0 + (7 - 5)^{-4}$

$4 - 5^0 + (\_\_\_)^{-4}$ — What operation do you do first?

____

What operation do you do next? _________________________

$4 - \_\_\_ + \frac{}{\_\_\_}$ — A number with 0 as an exponent equals ___.

To change the sign of an exponent, write the ___________.

$4 - \_\_\_ + \frac{}{\_\_\_}$ — Simplify.

___________ and ___________ from left to right.

____

Name ______________________________ Date __________ Class __________

LESSON 4-3

Ready to Go On? Skills Intervention

Properties of Exponents

Factors of a power can be grouped in different ways giving the same product. When the powers have the same base, keep these rules in mind:

Multiply: add exponents Divide: subtract exponents

Multiplying Powers with the Same Base

Multiply. Write the product as one power.

A. $6^4 \cdot 6^7$ Are the bases the same? ________

$6^{\_\_\_\_}$ What do you do to the exponents when multiplying? ________

$6^{\_\_}$ Does the base change? ________ What is the exponent? ________

B. $t \cdot t^8$ Are the bases the same? ________

$t^{\_\_} \cdot t^8$ What is the exponent of the first *t*? ________

$t^{\_\_\_\_}$ To multiply powers with the same base, what do you do with the exponents? ________

_____ What is the exponent? ________

Dividing Powers with the Same Base

Divide. Write the quotient as one power.

$\frac{10^{12}}{10^9}$ Are the bases the same? ________

$10^{\_\_\_\_}$ What do you do to the exponents when dividing? ________

_____ What is the base? ________ What is the exponent? ________

When a power is raised to a power, multiply the exponents.

Raising a Power to a Power

Simplify.

A. $(6^3)^4$

$6^{\_\_\_\_}$ What do you do to the exponents? __________

$6^{\_\_}$ What power is 6 raised to? ________

B. $(9^5)^{-2}$

9 What do you do to the exponents? __________

$9^{\_\_\_\_}$ What power is 9 raised to? ________

Name ______________________________ Date __________ Class __________

LESSON **4-3**

Ready to Go On? Problem Solving Intervention

Properties of Exponents

You can use exponents to work with very large numbers—even in your head.

It takes sunlight about 8 minutes to reach Earth. Light travels at about 186,000 miles per second. Earth is about 93 million miles from the sun. Is 8 minutes a reasonable figure?

Understand the Problem

1. How are distance, speed, and time related?

____

____

2. How can you figure out how far something travels if you know its speed and how long it travels? ____________________

Make a Plan

3. Why might you use powers of ten to help solve this problem?

____

____

____

Solve

4. The speed of light in mi/sec is closest to what power of ten? ______________

5. How many seconds are there in 8 minutes? ______________

6. Since you rounded down the speed of light, you can round up the time. What is your answer to Exercise 5 rounded up to the next highest power of ten? ______________

7. Use properties of exponents to multiply the speed of light (Exercise 4) by the time in seconds it takes to reach Earth (Exercise 6). What did you just calculate?

____

Check

8. Make sure you answer the question being asked.

____

____

Name ________________________________ Date ___________ Class ____________

LESSON 4-4

Ready to Go On? Skills Intervention

Scientific Notation

A shorthand way of writing large numbers as the product of a number and a power of ten is known as **scientific notation.**

Vocabulary
scientific notation

Translating Scientific Notation to Standard Notation
Write each number in standard notation.

A. 3.72×10^6

3.72×10^6	Is the exponent on 10 positive or negative? __________
$3.72 \times$ ____________	10^6 has ____ zeroes.
____________	Move the decimal point ____ places to the __________.

B. 2.46×10^{-3}

2.46×10^{-3}	Is the exponent on 10 positive or negative? __________
$2.46 \times$ ______	What does 10^{-3} equal?
$2.46 \div$ ______	Divide by the reciprocal.
__________	Move the decimal point ____ places to the __________.

C. -8.9×10^5

-8.9×10^5	Is the exponent on 10 positive or negative? __________
$-8.9 \times$ __________	10^5 has ____ zeroes.
____________	Move the decimal point ____ places to the __________.

Translating Standard Notation to Scientific Notation
Write 0.0000378 in scientific notation.

0.0000378	
3.78	How many places do you move the decimal point to get a number between 1 and 10? ____
$3.78 \times$ ____$^?$	Set up scientific notation. The decimal point needs to be moved which direction to change 3.78 to 0.0000378? __________ Will the exponent be positive or negative? ___________
$3.78 \times 10^{—}$	What is the exponent?

Check: Does $3.78 \times 10^{-5} = 3.78 \times 0.00001 = 0.0000378$? __________

Name ______________________________ Date __________ Class __________

LESSON 4-4

Ready to Go On? Problem Solving Intervention

Scientific Notation

You can use scientific notation to make it easier to compare and order very small numbers.

Put the speeds in the table in order from fastest to slowest.

Event	Speed
Fingernail growth	3×10^{-4} cm/h
Growth of some lichen	10^{-10} km/h
Garden snail crawling	8×10^{-3} km/h

Understand the Problem

1. Can you conclude that fingernail growth is faster than lichen growth just because $3 \times 10^{-4} > 10^{-10}$? Explain.

____

____

Make a Plan

2. Fill in the blanks with a power of ten to convert centimeters to kilometers and then centimeters per hour to kilometers per hour.

1 cm = ______ m ⟶ 1 m = ______ km

So, 1 cm = ______ • ______, or ______ km

3×10^{-4} cm/h = 3×10^{-4} cm/h • ______ km/cm = 3 × ______ km/h

Solve

3. Which is faster, $3 \bullet 10^{-9}$ km/h or $1 \bullet 10^{-10}$ km/h? ______________

4. Which is faster, $8 \bullet 10^{-3}$ km/h or $1 \bullet 10^{-10}$ km/h? ______________

5. List the 3 speeds in order from fastest to slowest.

____

Check

6. Why does it make sense that when you convert from centimeters per hour to kilometers per hour, you get a smaller number?

____

____

Name ______________________ Date __________ Class __________

SECTION **4A**

Ready to Go On? Quiz

4-1 Exponents

Evaluate.

1. 7^3 ________

2. $(-5)^4$ ________

3. 9^1 ________

4. $(-2)^7$ ________

5. Write $6 \times 6 \times 6 \times 6 \times 6$ in exponential form. ________

6. Evaluate $r^4 - 5s$ for $r = 4$ and $s = -2$. ________

4-2 Look for a Pattern in Integer Exponents

Evaluate.

7. 10^{-7} ________

8. $(-4)^{-3}$ ________

9. $(-3)^{-4}$ ________

10. 8^{-1} ________

11. $6 + 10^{-2}(-3)$ ________

12. $4^{-1} + 6(4)^{-2}$ ________

13. $-5^{-2} + 9^0$ ________

14. $8^{-2} - (2^0 - 2^{-3})$ ________

4-3 Properties of Exponents

Evaluate each expression. Write your answer as a power.

15. $7^6 \cdot 7^5$ ________

16. $\frac{12^3}{12^3}$ ________

17. $\frac{t^8}{t^4}$ ________

18. $6^5 \cdot 6^{-2}$ ________

Simplify.

19. $(9^4)^{-3}$ ________

20. $(5^6)^0$ ________

21. $(-w^6)^2$ ________

22. $(7^{-3})^5$ ________

23. The hard drive on a computer holds 2^{35} bytes of data, which is 2^5 gigabytes. How many bytes is one gigabyte? ________________

Name ______________________________ Date __________ Class ___________

SECTION **4A**

Ready to Go On? Quiz continued

4-4 Scientific Notation

Write each number in scientific notation.

24. 0.000027

____

25. 115,000,000

____

26. 0.6412

____

27. 10,000

____

Write each number in standard notation.

28. 7.29×10^5

____

29. 8×10^9

____

30. 4.5×10^{-4}

____

31. 5.26×10^{-6}

____

32. In 2004, California had the greatest population of all the states. Its population was approximately 3.589×10^7 people. The population of the United States was about 8.18 times as large as California's population. What was the approximate population of the United States in 2004? Write your answer in scientific notation.

____

33. The diameter of a rhinovirus, which causes the common cold, is 0.00000002 meter. The diameter of a human hair is 10,000 times as large as a rhinovirus. What is the diameter of a human hair? Write your answer in scientific notation.

____

34. An adult human may have as many as 30,000,000,000,000 red blood cells. Write 30,000,000,000,000 in scientific notation.

____

Name ______________________ Date __________ Class __________

SECTION 4A

Ready to Go On? Enrichment

Other Number Systems

The number system used by computers is the base 2, or binary number system.

- Place values are powers of 2.
- Digits are 0, 1.

1011_{binary} = 1 eight + 0 fours + 1 two + 1 one

2^3	2^2	2^1	2^0
1	0	1	1
$1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$ $8 + 0 + 2 + 1$ 11			

$1011_{binary} = 11_{decimal}$

To change a number in base 10 to a number in base 2, divide by powers of 2.

Change $28_{decimal}$ to base 2.

28 is between 2^4, or 16, and 2^5, or 32.

Divide by 2^4, 2^3, 2^2, 2^1, and 2^0.

$28 \div 2^4 = 28 \div 16 = \mathbf{1}$ R12
$12 \div 2^3 = 12 \div 8 = \mathbf{1}$ R4
$4 \div 2^2 = 4 \div 4 = \mathbf{1}$ R0
$0 \div 2^1 = 0 \div 2 = \mathbf{0}$ R0
$0 \div 2^0 = 0 \div 1 = \mathbf{0}$ R0
$28_{decimal} = 11100_{binary}$

Change each number in base 2 to base 10.

1. 11_{binary} ______________

2. 1010_{binary} ______________

3. 111010_{binary} ______________

Change each number in base 10 to base 2.

4. $13_{decimal}$ ______________

5. $222_{decimal}$ ______________

6. $1024_{decimal}$ ______________

Name ____ Date ___________ Class ____________

LESSON **4-5**

Ready to Go On? Skills Intervention

Squares and Square Roots

Every positive number has two square roots, one positive and one negative. The positive square root is called the **principal square root.** A **perfect square** is a number that has integers as its square roots.

Vocabulary
principal square root
perfect square

Perfect squares	**Not perfect squares**
25; 36; 196	12; 37; 186

The opposite of squaring a number is taking the square root.
$10^2 = 100$ $\sqrt{100} = 10$ $(-10)^2 = 100$ $-\sqrt{100} = -10$

Finding the Positive and Negative Square Roots of a Number
Find the two square roots of 49.

49

$\sqrt{49}$ = ______ What two numbers multiplied together equal 49? ____________

$-\sqrt{49}$ = ______ What other two numbers multiplied together equal 49?

____

Geometry Application
The area of a square rug is 1,024 square feet. What is the length of its side?

$A = s^2$ Use the formula for area of a square to find the side length, *s*.

$1{,}024 = s^2$ Taking the square root of a number is the ____________ of squaring a number.

$\sqrt{1{,}024} = \sqrt{s^2}$ Find the square root of both sides.

______ $= s$ What is the length of the square rug? What are the units?

Can the length of a side of the rug be negative? Explain.

____

Evaluating Expressions
Evaluate the expression $3\sqrt{36} + 5$ using the principal square root.

$3\sqrt{36} + 5$

3(______) + 5 What is the square root of 36?

______ + 5 Following the order of operations what should you do first?

____

______ Add.

Name ________________________ Date ____________ Class ____________

LESSON **4-5**

Ready to Go On? Problem Solving Intervention

Squares and Square Roots

You can solve some problems by finding square roots.

Each side of a small square gym is 17 meters long. A square classroom has half the area of the gym. How long is each side of the classroom? Round to the nearest whole number of meters.

Understand the Problem

1. If the area of the gym were 100 square meters, what would be the area of the classroom? ____________

2. If the area of the classroom were 50 square meters, about what would be the length of each side? (*Hint:* 50 is close to 49.) ____________

Make a Plan

3. How can you find the area of the gym? ____________

4. How can you find the area of the classroom if you know the area of the gym?

____

5. How can you find the length of a side of the classroom if you know its area?

____

Solve

6. What is the area of the gym? Of the classroom?

____

7. Round the area of the classroom to the nearest perfect square.

____

8. How long is each side of the classroom rounded to the nearest whole number? ____________

Check

9. Starting with your answer, show that the area of the gym is twice the area of the classroom.

____

____

Solve

10. The area of a square cafeteria is twice the area of the gym. About how long is each side of the cafeteria? ____________

Name ______________________________________ Date ___________ Class ____________

LESSON 4-6

Ready to Go On? Skills Intervention

Estimating Square Roots

If a number is not a perfect square, you still can estimate its square root by using one of two methods:

Method 1: Use two perfect square integers that the number lies between.

Method 2: Use a calculator and round the square root to a given place.

Estimating Square Roots of Numbers

Each square root is between two integers. Name the integers.

A. $\sqrt{40}$ What perfect squares are close to 40? ________ and ________

$6^2 =$ ______ Which perfect square is less than 40? ________

$7^2 =$ ______ Which perfect square is greater than 40? ________

$\sqrt{40}$ is between the integers ________ and ________.

B. $-\sqrt{130}$ Which perfect squares are close to 130?
________ and ________

$(-11)^2 =$ ______ Which perfect square is less than 130? ________

$(-12)^2 =$ ______ Which perfect square is greater than 130? ________

$-\sqrt{130}$ is between the integers ________ and ________.

Using a Calculator to Estimate the Value of a Square Root

Use a calculator to find $\sqrt{475}$. Round to the nearest tenth.

Using a calculator, $\sqrt{475} \approx 21.7$________. . .

What is 21.794494 rounded to the nearest tenth? ________

Name ______________________________ Date ___________ Class ___________

LESSON 4-6

Ready to Go On? Problem Solving Intervention

Estimating Square Roots

If you drop a penny, the time it takes to hit the ground depends on the height from which you drop it. If you know *h,* the height in feet, and if you ignore the effect of air, you can use a formula to find *t,* the number of seconds it takes to fall.

$$t = \sqrt{\frac{2h}{32}}$$

How many times longer will it take a penny to drop from 576 feet than from 144 feet?

Understand the Problem

1. How long would it take a penny to drop from a height of 16 feet? ______________

2. What are you being asked to compare?

____

Make a Plan

3. How can you find the two times?

____

4. Will you subtract or divide to compare? Why?

____

____

Solve

5. How long will it take the penny to fall from 576 feet? From 144 feet?

____

6. How many times longer will it take? ______________________________

Check

7. If you square both sides of the formula, you get $t^2 = \frac{2d}{32}$. Use that to check your values of *t* and *h.*

____

____

Solve

8. How many times higher than 144 feet would you need to drop the penny from in order for it to take 3 times as long to fall? ______________

Name ______________________ Date __________ Class __________

LESSON **4-7**

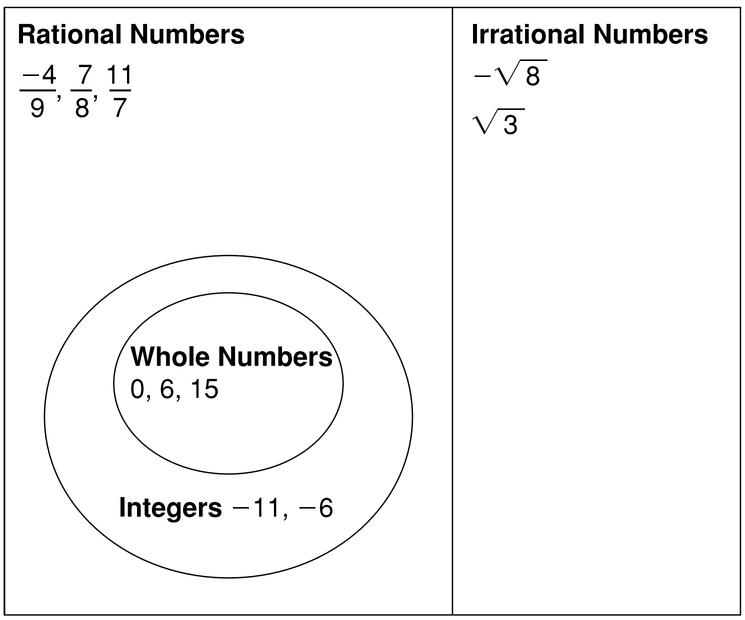
Ready to Go On? Skills Intervention

The Real Numbers

Vocabulary
real number
irrational number

Real numbers consist of the set of rational numbers and **irrational numbers.** Irrational numbers are non-terminating, non-repeating decimals.

Real Numbers



Classifying Real Numbers

Write all names that apply to each number.

A. $\sqrt{13}$

Is 13 a perfect square?

____

Classify $\sqrt{13}$.

____

B. -21.78

Is -21.78 a terminating or repeating decimal? __________________

Is -21.78 a rational number or irrational number? __________________

Classify -21.78. __________________

Determining the Classification of all Numbers

State if the number is rational, irrational, or not a real number.

A. $\sqrt{11}$ Classify the number 11. __________________

Is 11 a perfect square? __________________

What is the classification of $\sqrt{11}$? __________________

B. $\frac{15}{0}$ Can you divide a number by zero? __________________

What is the classification of the number? __________________

Name ______________________________ Date __________ Class __________

LESSON 4-8

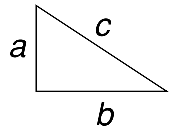
Ready to Go On? Skills Intervention

The Pythagorean Theorem

Vocabulary
Pythagorean Theorem
leg
hypotenuse

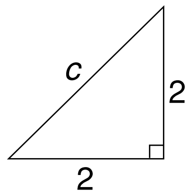
The **Pythagorean Theorem** states that in a right triangle, the sum of the squares of the lengths of the two **legs** is equal to the square of the length of the **hypotenuse.**

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



Finding the Length of a Hypotenuse

Find the length of the hypotenuse.



$\underline{\qquad\quad} = c^2$ Write the Pythagorean Theorem.

$2^2 + 2^2 = c^2$ Substitute ___ for *a* and ___ for *b*.

$4 + 4 = c^2$ Simplify.

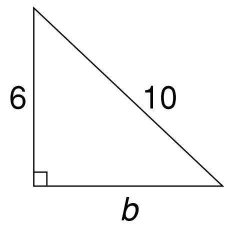
$\sqrt{8} = c$ How do you isolate *c*?

____

$\underline{\qquad} \approx c$ Use a calculator.

Finding the Length of a Leg in a Right Triangle

Solve for the unknown side in the right triangle.



$\underline{\ }^2 + b^2 = \underline{\quad}^2$ Substitute values for *a* and *c*.

$36 + b^2 = 100$ Simplify.

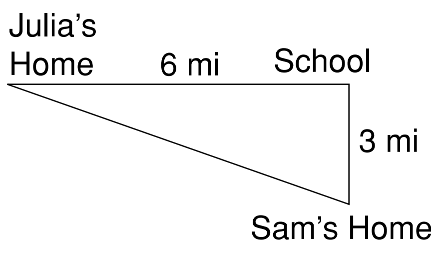
$b^2 = \underline{\quad}$ Isolate the variable.

$b = \sqrt{64}$ Take the square root of both sides.

$b = \underline{\quad}$ The length of the unknown leg is ___.

Using the Pythagorean Theorem for Measurement

Sam and Julia go to the same school. Sam lives 3 miles south of the school. Julia lives 6 miles west of the school. How far apart do Sam and Julia live from each other?



The distance Sam and Julia live from each other is the hypotenuse of a right triangle.

$a^2 + b^2 = c^2$ State the Pythagorean Theorem.

$\underline{\ }^2 + \underline{\ }^2 = c^2$ Substitute values for *a* and *b*.

$\underline{\quad} + \underline{\quad} = c^2$ Simplify.

$\underline{\quad} = c^2$ Add.

$\underline{\qquad} = c$ Take the square root of both sides.

$\underline{\quad} \approx c$ Use a calculator. Round to the nearest tenth.

Sam and Julia live ____ miles apart from each other.

Name ________________________________ Date ___________ Class ____________

LESSON **4-8**

Ready to Go On? Problem Solving Intervention

The Pythagorean Theorem

You can use the Pythagorean Theorem to help you find an unknown measurement.

A rectangular park is 240 feet long and 180 feet wide. What is the length of a diagonal path that connects two corners of the park?

Understand the Problem

1. Draw a diagram of the park. Label the side lengths. Show the diagonal path on your diagram.

2. What kind of triangles are formed by the diagonal and the sides of the park? ________________

Make a Plan

3. How does the Pythagorean Theorem relate the sides lengths of a right triangle?

____

4. What equation states the Pythagorean Theorem? ________________

5. How can you use this equation to solve the problem?

____

Solve

6. Substitute the values into in the Pythagorean Theorem. ________________

7. Solve for *c*. Use your calculator. ________________

8. How long is the diagonal path? ________________

Check

9. Is your answer reasonable? Explain.

____

____

____

____

Name ____ Date ___________ Class ____________

SECTION **4B**

Ready to Go On? Quiz

4-5 Squares and Square Roots

Find the two square roots of each number.

1. 64 ______________

2. 6,084 ______________

3. 1,000,000 ______________

4. 324 ______________

5. Amy wants to put together a jigsaw puzzle that will be 24 in. × 20 in. when finished. Will the puzzle fit on a square board with an area of 529 square inches? Explain your answer.

____

____

6. How many 6 in. × 6 in. square tiles will fit around the edges of a square hallway that has an area of 1,296 square inches? ______________________

4-6 Estimating Square Roots

Each square root is between two integers. Name the integers. Explain your answer.

7. $-\sqrt{56}$

____

____

8. $\sqrt{300}$

____

____

9. $-\sqrt{250}$

____

____

10. $\sqrt{860}$

____

____

11. A square quilt has an area of 28 square feet. To the nearest hundredth, what length of edging is needed to go around all the edges of the quilt? ______________________

SECTION **4B**

Ready to Go On? Quiz continued

4-6 Estimating Square Roots (continued)

12. The area of a square painting is 120 square inches. Find the length of one side of the painting to the nearest hundredth. ________________

4-7 The Real Numbers

Write all the names that apply to each number.

13. 0.26

____

14. $\sqrt{35}$

____

15. $\sqrt{400}$

____

16. $\frac{-\sqrt{100}}{5}$

____

17. Give an example of an irrational number that is less than -8.

____

18. Find a real number between $\sqrt{49}$ and 8. ________________

4-8 The Pythagorean Theorem

Find the missing length for each right triangle. Round your answer to the nearest tenth.

19. $a = 6$, $b = 10$, $c = ?$

______

20. $a = 4$, $b = ?$, $c = 12$

______

21. $a = ?$, $b = 15$, $c = 17$

______

22. $a = 36$, $b = 48$, $c = ?$

______

23. $a = 10$, $b = ?$, $c = 25$

______

24. $a = ?$, $b = 8$, $c = 18$

______

25. Jason is putting a fence around a garden. The measures of two sides that meet at a corner are 25 feet and 38 feet. For the corner to be a right angle, what would the length of the diagonal have to be? ________________

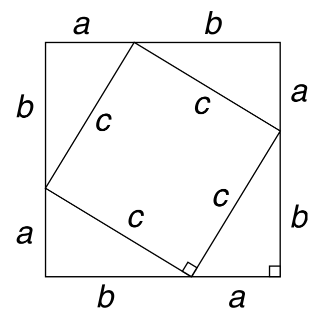
Name ______________________ Date ____________ Class ____________

SECTION **4B**

Ready to Go On? Enrichment

Proving the Pythagorean Theorem

It has been said that the Pythagorean Theorem has been proven to be true in more ways than any other theorem in mathematics. Use the diagram and complete the steps to complete one of these proofs.



Find the area of the large square in one way.

1. Use the variables *a* and *b* to represent the length of one side of the large square.

____

2. Use Step 1 to write the area of the large square. ________________________

3. Apply the Distributive Property to the expression in Step 2. Use exponents.

$(a + b)(a + b) = a^2 +$ ______ + ______ + ______

4. Simplify the expression in Step 3. Remember that *ab* and *ba* represent the same quantity. ________________________

Find the area of the large square in another way.

5. The area of the large square equals the area of __________ ________ plus the area of ______________.

6. Use the variable *c* to represent the area of the small square. ________________________

7. Use the formula for the area of a triangle and the variables *a* and *b* to write the area of one triangle. ________________________

8. Use Steps 6 and 7 to write the area of the large square. ________________________

9. Simplify the expression in Step 8. ________________________

10. Use Steps 4 and 9. Write an equation to show that the two expressions for the area of the large square are equal. ________________________

11. Subtract the quantity that is the same from both sides of the equation in Step 10. ________________________

12. How does the equation in Step 11 compare to the Pythagorean Theorem?

____

Name ____ Date ____________ Class _____________

LESSON 5-1

Ready to Go On? Skills Intervention

Ratios and Proportions

Vocabulary
ratio
equivalent ratio
proportion

A comparison of two quantities by division is called a **ratio.** **Equivalent ratios** are ratios that make the same comparison. A **proportion** is an equation that states that two ratios are equivalent.

Finding Equivalent Ratios
Find two ratios that are equivalent to the given ratio of $\frac{4}{6}$.

$\frac{4}{6} = \frac{4 \cdot 2}{6 \cdot \_}$ If you multiply the numerator by 2, by what do you need to multiply the denominator?

$= \frac{\quad}{\_\_\_}$ What is the new fraction?

$\frac{4}{6} = \frac{4 \div 2}{6 \div \_}$ When dividing the numerator by 2, you must also

divide the ______________ by 2.

$= \frac{\quad}{\_\_}$ What is the new fraction?

Two ratios equivalent to $\frac{4}{6}$ are $\frac{\quad}{\_\_\_}$ and $\frac{\quad}{\_\_}$.

Determining Whether Two Ratios are in Proportion
Simplify to tell whether the ratios form a proportion.

A. $\frac{20}{45}$ and $\frac{8}{18}$

$\frac{20}{45}$ $\frac{8}{18}$

$\frac{20 \div \_}{45 \div \_}$ Divide the numerator and the denominator by the GCF. $\frac{8 \_\_\_}{18 \_\_\_}$

$= \frac{\quad}{\_\_}$ What is the simplified fraction? $= \frac{\quad}{\_\_}$

$\frac{4}{9}$ ___ $\frac{4}{9}$ Are the fractions equivalent? ____ Are the ratios in proportion? ____

B. $\frac{16}{20}$ and $\frac{10}{15}$

$\frac{16}{20}$ simplified = $\frac{\quad}{\_\_}$ $\frac{10}{15}$ simplified = $\frac{\quad}{\_\_}$

Are the fractions equivalent? ____ Are the ratios in proportion? ____

Name ______________________________ Date __________ Class __________

LESSON **5-1**

Ready to Go On? Problem Solving Intervention

Ratios and Proportions

The Cougars have won 21 games and lost 9. If they win 3 of the next 5 games, will their winning ratio increase, decrease, or stay the same?

Understand the Problem

1. How many games have the Cougars played so far? ____________________

2. What is the Cougars winning ratio now? ____________________

Make a Plan

3. What will their winning ratio be if they win 3 of the next 5 games? ____________________

4. Can you compare the two winning ratios in Exercises 2 and 3 by simplifying? Explain.

____

5. Solve without simplifying. Compare the Cougars' winning ratio in the next 5 games to their current ratio $\left(\frac{3}{5}\right)$. What will happen to the winning ratio if $\frac{3}{5}$ turns out to be

a. greater than the current winning ratio?
b. less than the current winning ratio?
c. the same as the current winning ratio?

____

Solve

6. Is $\frac{3}{5}$ greater than, equal to, or less than $\frac{21}{30}$? Explain.

____

7. If they win 3 of their next 5 games, will the Cougar's winning ratio increase, decrease, or stay the same?

____

Check

8. Check your reasoning by starting with a winning ratio of $\frac{1}{2}$. According to your reasoning, that ratio should decrease if you win 1 of the next 4, stay the same if you win 2 of the next 4, and increase if you win 3 of the next 4? Does it?

____

Name ______________________________ Date __________ Class __________

LESSON 5-2

Ready to Go On? Skills Intervention

Ratios, Rates, and Unit Rates

A comparison of two quantities that have different units is a **rate.** **Unit rates** are simplified rates in which the second quantity is one. **Unit price** is a unit rate that compares the cost of item units.

Vocabulary
rate
unit rate
unit price

Application

A. Gold weighing 193 kg has a volume of 0.01 m^3. What is the density of gold?

$\frac{\_\_\_\text{ kg}}{\_\_\_\text{ m}^3}$ Write the rate.

$\frac{\_\_\_\text{ kg} \times \_\_\_}{\_\_\_\text{ m}^3 \times \_\_\_} = \frac{\_\_\_\_\_\text{ kg}}{1\text{ m}^3}$ Multiply to find kilograms per 1 m^3.

Gold has a density of ________ kg/m^3.

B. Jessie drives 203 miles in 3.5 hours. What is his average rate of speed?

$\frac{\_\_\_\text{ miles}}{\_\_\_\text{ hours}}$ Write the rate.

$\frac{\_\_\_\text{ miles} \div \_\_\_}{\_\_\_\text{ hours} \div \_\_\_} = \frac{\_\_\text{ miles}}{1\text{ hour}}$ Divide to find miles per 1 hour.

Jessie's rate of speed is __________ per ______.

Finding Proportional Rates

Alison can read 6 pages in 15 minutes. How many pages can she read in 3 hours?

$\frac{\_\_\text{ pages}}{\_\_\text{ minutes}}$ Write the information as a rate.

$\frac{\_\_\text{ pages} \times \_\_}{\_\_\text{ minutes} \times \_\_} = \frac{\_\_\text{ pages}}{\_\_\_\text{ minutes}}$ How many minutes do you want in the proportional rate? ______

$= \frac{\_\_\text{ pages}}{\_\text{ hours}}$ Alison can read ______ pages in 3 hours.

Finding Unit Prices to Compare Costs

A 14-oz box of cereal cost $3.29 and a 20-oz box of the same cereal cost $4.19. Which is the better buy?

To find the unit rate, divide the ______ by the __________________.

$\frac{\text{price of box \#1}}{\text{number of ounces}} = \frac{\quad}{\_\_\_\_\_\_} = \_\_\_\_\_\_\_\_\_$ $\frac{\text{price of box \#2}}{\text{number of ounces}} = \frac{\quad}{\_\_\_\_\_\_} = \_\_\_\_\_\_\_\_\_$

In which box are you paying less per ounce? __________________

Is the smaller or the larger box a better buy? __________________

Name ________________________ Date ____________ Class ____________

LESSON 5-2

Ready to Go On? Problem Solving Intervention

Ratios, Rates, and Unit Rates

For $7.29 you can buy a pack of 8 AA batteries that comes with an additional free battery. Or you can buy a pack of 4 AA batteries for $2.89. Which costs less per battery? Explain.

Understand the Problem

1. How many batteries do you get in the package that costs $7.29? ____________

Make a Plan

2. What two ratios can you compare to solve the problem?

____

3. Suppose you knew the cost of 36 batteries when purchased in the 8-packs. Suppose you also knew the cost of 36 batteries when purchased in the 4-packs. How would that help you? Why is 36 a convenient number to use for this comparison?

____

____

____

Solve

4. How many of the $7.29 packs would you need in order to get 36 batteries? What would you multiply to find how much that would cost?

____

5. How many of the $2.89 packs would you need in order to get 36 batteries? What would you multiply to find how much that would cost?

____

6. Estimate. Is 4 • $7.29 greater than or less than $28? Is 9 • $2.89 greater than or less than $28? Explain.

____

____

Check

7. Make sure you answer the question and explain your answer.

____

____

Name ______________________________ Date __________ Class __________

LESSON 5-3

Ready to Go On? Skills Intervention

Dimensional Analysis

To convert units, multiply by one or more ratios of equal quantities called **conversion factors.** Multiplying by a conversion factor is like multiplying by a fraction that reduces to one.

Vocabulary
conversion factor

Finding Conversion Factors
Find the appropriate factor for each conversion.

A. minutes to hours

How many minutes are there in one hour? ______

To convert minutes to hours, multiply the number of minutes by

$\frac{\text{1 hour}}{\_\_\_\_\_\_}$.

B. liters to milliliters

How many milliliters are in a liter? ______

To convert liters to milliliters, multiply the number of liters by

$\frac{\_\_\_\_\_\_}{\_\_\_\_\_\_}$.

Using Conversion Factors to Solve Problems
A movie theater sells an average of 18,000 ounces of popcorn per month. Use conversion factors to find the number of pounds of popcorn the movie theater sells in an average month.

How many ounces are in a pound? ______

What is the conversion factor? ______

$\frac{\text{18,000 oz}}{\text{1 month}} \cdot \_\_\_\_\_\_$ Multiply by the conversion factor.

$= \frac{\_\_\_\_\_\_ \cdot \text{1 lb}}{\text{1 month} \cdot \_\_\_\_\_\_}$ What units can be cancelled? ______

$= \frac{\_\_\_\_\_\_}{\_\_\_\_\_\_}$ Divide. What units are left?

The movie theater sells ________________________ of popcorn.

Name ______________________ Date ___________ Class ___________

LESSON 5-3

Ready to Go On? Problem Solving Intervention

Dimensional Analysis

You can use dimensional analysis to help keep track when you convert units.

The recommended daily allowance of potassium is about 3,600 milligrams. How many pounds is that per year? (*Hint:* There are 454 grams in a pound.)

Understand the Problem

1. How many milligrams are in one gram? ____________

2. Complete the equation with the units given in the problem.

Recommended allowance = $\frac{280\ \_\_\_\_}{1\ \_\_\_\_}$

Make a Plan

3. If you use unit analysis for this problem, to what unit will you convert?

____

Solve

4. Complete. Cross out to cancel units.

$\frac{3{,}600 \text{ mg}}{1 \text{ day}} \cdot \frac{1 \text{ g}}{\_\_\_\_ \text{ mg}} \cdot \frac{\_\_\_\_}{\_\_\_\_} \cdot \frac{\_\_\_\_}{\_\_\_\_} \approx \_\_\_\_ \frac{\text{pounds}}{\text{year}}$

Check

5. Complete to show that your answer is reasonable.

3.6 g per day ≈ 4 g • 300 days per year, or ____________ g per year

____________ g per year ≈ $\frac{1{,}200 \text{ g}}{400 \text{ g}}$ per lb, or ____________

____________ lb/yr is reasonably close to my answer of ____________ lb/yr

Solve

6. If you consume the recommended allowance for potassium each day in April, how many kilograms of potassium will you consume that month? ____________

7. For a 2,000-calorie diet, the recommended daily allowance of dietary fiber is 25 g. How many pounds is that in a year?

____

8. What is the recommended allowance for potassium in grams per hour?

____

Name ____________________________________ Date ___________ Class ____________

LESSON 5-4

Ready to Go On? Skills Intervention

Solving Proportions

Vocabulary
cross products

Cross products in proportions are equal. If the cross products are not equal then the ratios are not in proportion.

Using Cross Products to Identify Proportions

Tell whether the ratios are proportional.

A. $\frac{10}{32} = \frac{8}{28}$

$\frac{10}{32} \times \frac{8}{28}$ Find cross products.

$10 \times 28 =$ ____

$32 \times 8 \ =$ ____

Are the cross products equal? ____

Are the ratios proportional? ____

B. $\frac{15}{25} = \frac{6}{10}$

$\frac{15}{25} \times \frac{6}{10}$ Find cross products.

$15 \times 10 =$ ____

$25 \times 6 \ =$ ____

Are the cross products equal? ____

Are the ratios proportional? ____

C. A bottle of liquid lawn fertilizer instructs you to mix one part fertilizer and 16 parts water. Is a mixture of 68 oz of water and 4 oz of fertilizer proportional to this ratio?

What is the fertilizer to water ratio given on the bottle? $\frac{\_\_\_\_}{\_\_\_\_}$

What is the fertilizer to water ratio of the mixture? $\frac{\_\_\_\_}{\_\_\_\_}$

$\frac{1}{16} = \frac{4}{68}$ What are the cross products? ___________

Are they equal? ____

Is this a correct mixture of fertilizer? ____

Using Equivalent Fractions

Solve each proportion.

A. $\frac{12}{20} = \frac{n}{25}$

What are the cross products? ___________

Divide to isolate *n*. $n =$ ____

Check:

Does $\frac{12}{20} = \frac{15}{25}$? ____

B. $\frac{9}{x} = \frac{57}{19}$

What are the cross products? ___________

Divide to isolate *x*. $x =$ ____

Check:

Does $\frac{9}{3} = \frac{57}{19}$? ____

Name ______________________________ Date ___________ Class ___________

LESSON 5-4

Ready to Go On? Problem Solving Intervention

Solving Proportions

You can write and solve proportions to see what will happen if a rate continues.

At 2:10 P.M., your family began a 58-mile car trip to Grandma's. At 2:50 P.M., you have gone 23 miles. At this rate, will you get there by 3:30 P.M.?

Understand the Problem

1. How many miles is the whole trip to Grandma's? How many miles have you driven so far?

____

2. Do you have to find the exact time of arrival?

____

3. If you arrive at 3:30, how long will the whole trip have taken?

____

Make a Plan

4. Let *x* be the number of minutes it takes for the whole trip. What must *x* be less than or equal to for you to arrive in time? ______________

5. Complete the proportion to show how you could find *x*.

$$\frac{\_\_\_\text{ miles}}{\_\_\_\text{ minutes}} = \frac{\_\_\_\text{ miles}}{x\text{ minutes}}$$

6. Why can you estimate or use mental math to solve the problem?

____

Solve

7. Is 58 miles greater than or less than 2 times 23 miles?

____

8. Why must *x* be more than 80?

____

Check

9. Make sure you answer the question that the problem asks.

____

Name ____________________ Date __________ Class __________

SECTION 5A

Ready to Go On? Quiz

5-1 Ratios and Proportions

Simplify to tell whether the ratios form a proportion.

1. $\frac{4}{9}$ and $\frac{28}{63}$ ____ **2.** $\frac{35}{56}$ and $\frac{45}{70}$ ____ **3.** $\frac{21}{96}$ and $\frac{7}{32}$ ____ **4.** $\frac{5}{6}$ and $\frac{15}{22}$ ____

5. Kara found a recipe that called for 0.5 cup of blueberries to make 30 blueberry pancakes. She created the table shown here to make 24 or 36 pancakes. Is she following the recipe?

Blueberries (c)	Number of Pancakes
0.3	24
0.6	36

____

The specifications from a cement manufacturer for making concrete call for 1 part cement, 4 parts gravel, and 2.5 parts sand, all by volume.

6. How many cubic yards of cement and sand should be mixed with 18.4 cubic yards of gravel?

____

7. How many cubic yards each of cement, gravel, and sand are needed to produce 165 cubic yards of concrete?

____

5-2 Ratios, Rates, and Unit Rates

8. The mass of a chunk of titanium is 55 g. The volume is 12.5 cm^3. What is the density of the chunk of titanium? ____________

9. Bixbyite is a rare mineral with a density of 4.95 g/cm^3. What is the volume of a piece of bixbyite with a mass of 101.97 g? ____________

10. Maria's St. Bernard, Arfy, is fed the same amount of food every day. If Arfy gets fed 36.75 cups of dog food per week, how many cups of dog food does he get fed per day? ____________

Determine the better buy.

11. 40 lb of potatoes for $11.20 or 60 lb of potatoes for $16.20 ____________

12. $35.70 for 15 gallons of gas or $64.80 for 27 gallons of gas ____________

Name ______________________ Date ___________ Class ___________

SECTION 5A

Ready to Go On? Quiz continued

5-3 Dimensional Analysis

Find the appropriate factor for each conversion.

13. miles to feet ____________

14. seconds to minutes ____________

15. cups to quarts ____________

Use conversion factors to find each unit to the nearest hundredth.

16. 16 yards to feet ____________

17. 88 gallons to quarts ____________

18. 2,890 meters to kilometers ____________

19. 620 seconds to minutes ____________

20. 4.5 tons to pounds ____________

21. 200 inches per year to yards per year ____________

22. Driving at a constant rate, Joanne traveled 225 kilometers in 3.5 hours. Express her driving rate in meters per minute. ____________

5-4 Solving Proportions

Solve each proportion to the nearest hundredth.

23. $\frac{\text{12,000 tons}}{\text{8 weeks}} = \frac{t\text{ tons}}{\text{22 weeks}}$ ____________

24. $\frac{\text{440 meters}}{\text{32 seconds}} = \frac{\text{200 meters}}{s\text{ seconds}}$ ____________

25. $\frac{\text{464 feet}}{\text{8 days}} = \frac{\text{522 feet}}{d\text{ days}}$ ____________

26. $\frac{\$178.50}{\text{17 hours}} = \frac{\$\ d}{\text{28 hours}}$ ____________

27. Jonathan conducted 24 telephone surveys in 6 hours. At this rate, how long will it take him to conduct 15 more telephone surveys? ____________

Name ____ Date ____________ Class _____________

SECTION 5A

Ready to Go On? Enrichment

Acceleration

Velocity is a ratio of distance to time. Acceleration is a ratio of change in velocity to time. If a car accelerates from 50 miles/hour to 60 miles/hour in 5 seconds, the acceleration is 2 miles per hour per second.

These three equations can be used to solve problems involving acceleration:

(a) $d = v_o t + \frac{1}{2}at^2$

(b) $v_f = v_o + at$

(c) $v_f^2 - v_o^2 = 2ad$

d	Distance
v_o	Original velocity, the velocity at the beginning of acceleration
v_f	Final velocity, the velocity at the end of acceleration
a	Acceleration that is constant
t	Time, the time during which acceleration occurs

Suppose a car is traveling at 35 miles per hour and accelerates for 15 seconds at a rate of 1 mile per hour per second. How many feet does the car travel in that 15 seconds?

$$d = v_o t + \frac{1}{2}at^2$$
$$= \left(35 \cdot \frac{5{,}280}{3{,}600}\right)(15) + \frac{1}{2}\left(\frac{5{,}280}{3{,}600}\right)(15)^2$$
$$= 770 + 165 = 935 \text{ ft}$$

$v_o = 35$ miles/hour $= 35 \cdot \frac{5{,}280}{3{,}600}$ feet/sec

$a = 1$ mile/hour/sec $= 1 \cdot \frac{5{,}280}{3{,}600}$ feet/sec^2 $= \frac{5{,}280}{3{,}600}$ feet/sec^2

$t = 15$ seconds

The car travels 935 feet.

1. A car is traveling at 45 miles per hour and accelerates for 10 seconds at a rate of 2 miles per hour per second. About how many feet does the car travel in that 10 seconds? ________________

2. A motorcycle accelerates from 0 to 40 miles/hour in 8 seconds.

a) What it its approximate rate of acceleration in feet per seconds? *Hint:* Use equation (b). ________________

b) How many feet does it travel in that period of time? ________________

3. A truck accelerates from 0 to 60 miles/hour with a constant acceleration of 1.5 miles/hour/sec. How many feet does it travel in the time it takes to reach 60 miles/hour. *Hint:* Use equation (c). ________________

4. Form three different formulas for acceleration, each one based on one of the equations given above. ____

Name ____ Date ___________ Class ____________

LESSON **5-5**

Ready to Go On? Skills Intervention

Similar Figures

Vocabulary
similar

Congruent figures have the same size and the same shape, whereas **similar** figures have the same shape but not always the same size. In similar polygons corresponding angles must be congruent and corresponding sides must have lengths that form equivalent ratios.

Using Scale Factors to Find Missing Dimensions

A standard 4 inch long by 6 inch wide photo is scaled down to 1.5 inch long to fit in a photo key chain. How wide should the picture be in the key chain for the two pictures to be similar?

What is the known length of the scaled picture? _______

What is the corresponding length of the original picture? _______

_______________ Divide the known length by the corresponding length.

This is the ____________.

6 in. × ______ = ______ Multiply the width of the original picture by the scale factor.

What is the width of the new picture? _________

Using Equivalent Ratios to Find Missing Dimensions

An architect draws a blueprint of a house. He draws the length of the house 15 inches and the width 6 inches. If the actual length is 60 feet, what is the width?

What is the length of the house on the blueprint? ________

What is the width of the house on the blueprint? ________

What is the length of the actual house? ________________

What is the unknown? ________________________________

Set up a proportion as shown.

$\frac{\text{blueprint length}}{\text{blueprint width}} = \frac{\text{actual length}}{\text{actual width}}$ ________________

What are the cross products? ______ • x ft = ______ • 6 in.

Are the same units on both sides of the equal sign? ______ Cancel them.

Multiply each side. ______ = ______

Divide to isolate x. x = ____

What is the width of the actual house? _______

Name ______________________ Date __________ Class __________

LESSON 5-5

Ready to Go On? Problem Solving Intervention

Similar Figures

Similar figures have the same shape, but not necessarily the same size. The ratio formed by corresponding sides is the scale factor.

A photo of a candidate for mayor is 6 inches tall and 4.5 inches wide. It is being enlarged to become a campaign poster that will be 2.5 feet tall. How wide will the poster be, if the pictures are similar?

Understand the Problem

1. What is true about the sides and angles of similar figures?

____

2. Identify the corresponding sides of the photo and poster.

____

____

____

Make a Plan

3. Using the ratio of the scale factor on one side of an equation, what can you form with another ratio to help you find the unknown width of the poster?

____

4. In order to compare equivalent units, what dimension should you use in the equation for the height of the poster? ____________

Solve

5. Form a proportion using *x* for the unknown width of the poster.

____

6. Cross multiply then simplify to isolate *x*. What will be the width of the poster? ____________

Check

7. The photo and poster are similar figures, so the ratio of height to width for each should be the same. Show whether this is true.

____

Name ______________________ Date ___________ Class ___________

LESSON 5-6

Ready to Go On? Skills Intervention

Dilations

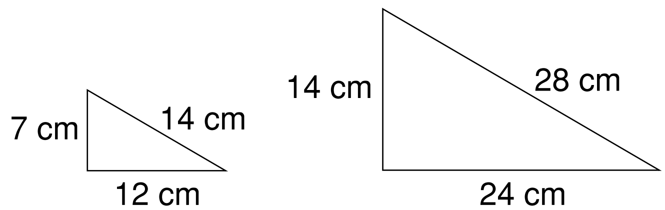
A **dilation** is an enlargement or reduction of a figure without changing its shape. A **scale factor** describes how much a figure is enlarged or reduced. The **center of dilation** is a fixed point that connects each pair of corresponding vertices.

Vocabulary
dilation
center of dilation
scale factor

Identifying Dilations

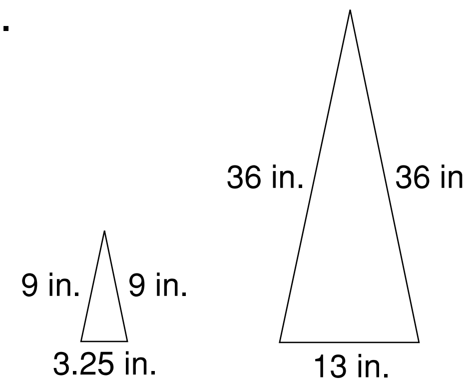
Tell whether each transformation is a dilation.

A.



Is the transformation a dilation? ____

B.



Is the transformation a dilation? ____

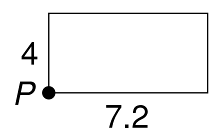
Dilating a Figure

Dilate the figure by a scale factor of 1.5 and with *P* as the center of dilation.

What will each side be multiplied by? _____

What is the length of side $A'B'$? _________

What is the length of side $B'C'$? _________



Using the Origin as the Center of Dilation

Dilate the figure by a scale factor of $\frac{3}{4}$. What are the coordinates of the image?

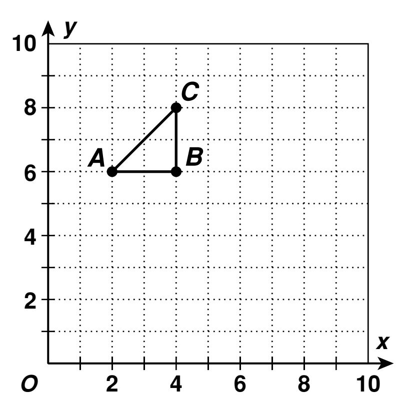
What do you need to multiply each coordinate by? ____________________

$\triangle ABC$ $\qquad\qquad$ $\triangle A'B'C'$

$A(2, 6) \rightarrow A'\left(2 \cdot \frac{3}{4}, 6 \cdot \frac{3}{4}\right) \rightarrow A'$ __________

$B(4, 6) \rightarrow B'\left(4 \cdot \frac{3}{4}, 6 \cdot \frac{3}{4}\right) \rightarrow B'$ __________

$C(4, 8) \rightarrow C'\left(4 \cdot \frac{3}{4}, 8 \cdot \frac{3}{4}\right) \rightarrow C'$ __________



Sketch the dilated figure on the same coordinate plane.

Name ________________________ Date ___________ Class ___________

LESSON 5-6

Ready to Go On? Problem Solving Intervention

Dilations

For some problems, you can choose coordinates that will be easy to work with.

A square with an area of 16 cm^2 is dilated with a scale factor of 2.5. What is the area of the dilated square?

Understand the Problem

1. Will the area of the dilated square be greater than 16 cm^2? Explain.

____

2. By what number would you multiply the coordinates of a vertex on the square to find its new coordinates after the dilation? ____________

Make a Plan

3. How would it help draw the original square on a coordinate plane?

____

____

4. Why would it make sense to use (0,0) as one corner?

____

5. What is the length of the original square? Explain.

____

____

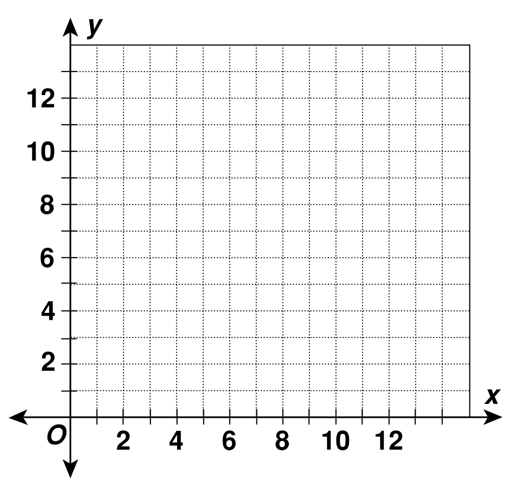
Solve

6. On the grid, draw the original square with the lower left corner at (0, 0). Label the coordinates of each corner of the square.

7. Multiply to find the coordinates of the corners of the dilated square. Draw it and label the coordinates of each corner.

8. What is the area of the dilated square?

____



Check

9. Make sure your multiplication and your diagram are accurate.

Name ______________________________ Date __________ Class __________

LESSON **5-7**

Ready to Go On? Skills Intervention

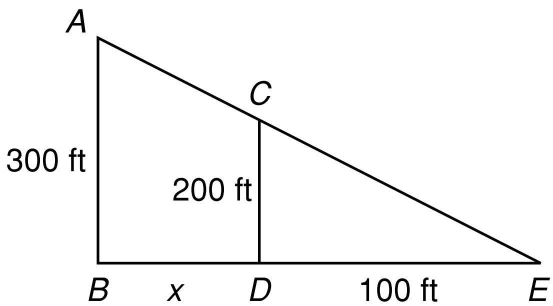
Indirect Measurement

Vocabulary
indirect measurement

Indirect measurement is a way of using similar figures and proportions to find a measure when a distance cannot be measured directly.

Geography Application

Benjamin is planning to run a pipeline across a canal. $\overline{BE}$ represents the width of the canal. How wide is the canal where the pipeline will pass over it?



Triangles *ABE* and *CDE* are similar.

$\frac{CD}{AB} = \frac{DE}{\_\_}$, so $\frac{200}{300} = \frac{\_\_\_}{x+100}$ — Corresponding sides of similar figures are ____________.

200(______) = ___(100) — Find the cross products.

200*x* + ______ = 30,000 — Apply the Distributive Property.

200*x* = ______ — Subtract from both sides of the equation to isolate *x* on the left side.

x = __ — Divide both sides of the equation by the same number to solve for *x*.

50 + _____ = _____ — Add 50 to the length of *DE*.

The distance across the canal is _____ feet.

Problem Solving Application

A building casts a shadow that is 23 feet long. A boy walking past the building is 5 feet tall and casts a shadow that is 3 feet long. What is the height, *h*, of the building?

$\frac{h}{\_\_} = \frac{5}{\_\_}$ — Form a proportion using corresponding sides.

_*h* = ___ — Find the cross products

h = ____ — Divide both sides of the equation by the same number to solve for *h*.

The height of the building is approximately _____ feet.

Name ____ Date ___________ Class ____________

LESSON **5-7**

Ready to Go On? Problem Solving Intervention

Indirect Measurement

Indirect measurement is a way of using similar figures and proportions to find a measure.

A trash can is 3 feet tall and casts a shadow 2.4 feet long. Near the trash can is a telephone pole that casts a shadow that is 20 feet long. What is the height of the telephone pole?

Understand the Problem

1. Draw a diagram and label it with all the information given in the problem.

2. What shapes do the telephone pole with its shadow and the trash can with its shadow form?

   ____

3. What are you asked to find?

   ____

Make a Plan

4. Form a proportion showing the ratio of shadow lengths equal to the ratio of heights. Use h for the height of the telephone pole.

   ____

Solve

5. _____ h = _____ Find the cross products.

   h = _____ Divide both sides by the same number to isolate h.

6. What is the height of the telephone pole? __________

Check

7. Since the two triangles are similar, the ratio $\frac{\text{shadow}}{\text{height}}$ should be the same for both triangles. Does this check out?

   ____

Name ________________________ Date ____________ Class ____________

LESSON **5-8**

Ready to Go On? Skills Intervention

Scale Drawings and Scale Models

A **scale drawing** is a two-dimensional drawing that accurately represents and is mathematically similar to an object. A **scale model** is a three-dimensional representation that is mathematically similar to the object. A **scale** gives the ratio of the dimensions in the drawing to the object. A scale drawing or model that is smaller than the actual object is a **reduction.** A scale drawing or model that is larger is an **enlargement.**

Vocabulary
scale drawing
scale model
scale
reduction
enlargement

Using Proportions to Find Unknown Scales

The length of an object on a scale drawing is 3 in. and its actual length is 18 ft. The scale is 1 in.: __?__ ft. What is the scale?

What is the proportion using $\frac{\text{scale length}}{\text{actual length}}$? ____________

What are the cross products? $1 \cdot \_\_ = \_\_ \cdot 3$

Solve the proportion. $x = \_\_$

What is the scale? 1 in.: ___ ft

Finding Unknown Dimensions Given Scale Factor

The length of a chimney on a scale of a factory is 5.5 cm. The scale is 1 cm:3 m. What is the actual length of the chimney?

What is the proportion using $\frac{\text{scale length}}{\text{actual length}}$? ____________

What are the cross products? $\_\_ \cdot x = 5.5 \cdot \_\_$

$x = \_\_\_\_$

What is the actual length of the chimney? _______

Life Science Application

A model of a molecule chain was made using the scale of 3 cm:0.0000001 mm. If the model of the chain is 15 cm long, what is the length of the actual chain? What is the scale factor?

Scale factor $= \frac{3 \text{ cm}}{0.0000001 \text{ mm}} = \frac{\_\_ \text{ mm}}{0.0000001 \text{ mm}} =$ ____________

$\frac{300{,}000{,}000}{1} = \frac{\_\_ \text{ cm}}{x \text{ cm}}$ Set up a proportion using x for the length of the actual molecule chain.

__________ $x =$ _____ Cross multiply.

$x =$ __________ Solve for the length of the actual chain.

The length of the molecule chain is $5 \times 10^{—}$ cm.

Name ______________________________ Date ___________ Class ___________

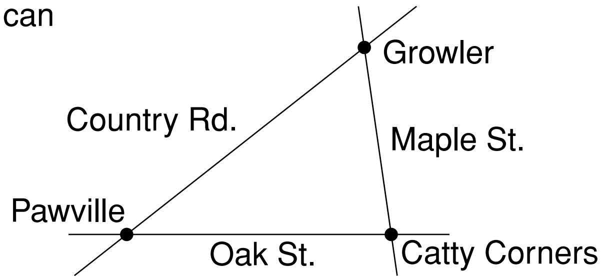
LESSON **5-8**

Ready to Go On? Problem Solving Intervention

Scale Drawings and Scale Models

Because most maps are scale drawings, you can use them to determine times and distances.

You can travel at 25 mi/h on Country Road or 45 mi/h on Oak Street and on Maple Street. Which route from Pawville to Growler will take less time? How much less?



Understand the Problem

1. What are the two routes you will compare?

____

Make a Plan

2. How could you find the time each route would take?

____

3. How could you find the actual distances?

____

Solve

4. Fill in each map distance.

Long Route:

Pawville to Catty Corners is ______ cm; Catty Corners to Growler is ______ cm.

Total for long route is ______ cm

Short Route: Pawville to Growler is ______ cm

5. What is the actual distance of each route?

____

6. Fill in to find the time for each route in hours and in minutes.

Long: $\frac{\text{mi}}{\text{mi/h}}$ ______ hr, or ______ min

Short: $\frac{\text{mi}}{\text{mi/h}}$ ______ hr, or ______ min

Check

7. Make sure you answer the question that the problem asks.

____

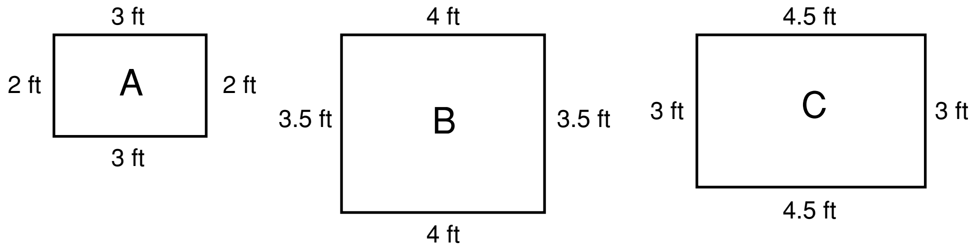
Name ______________________ Date __________ Class __________

SECTION 5B

Ready to Go On? Quiz

5-5 Similar Figures

1. Which rectangles are similar? ______________



2. Jaime found a picture that he wanted to fit into a collage he was making. The picture was 5 inches wide and 4 inches tall. He enlarged the picture to a width of 12.5 inches. How tall was the enlarged picture? ______________

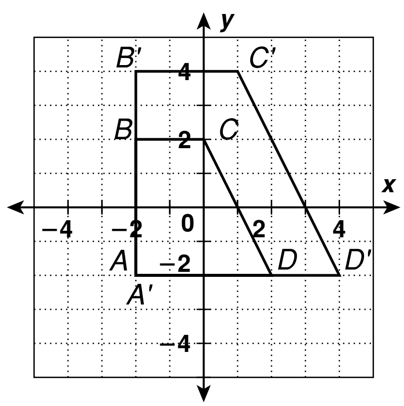
3. Laura had a photo of her dog that she wanted to enlarge to fill a frame. The original photo was 5 inches wide and 8 inches tall. The enlargement was 9.6 inches tall. How wide was the enlargement? ______________

4. A computer screen contained the picture of an office building. The measurement of the building on the screen was 14 cm tall by 2.6 cm wide. The image was projected onto a wall where the height of the building measured 91 cm. What was the width of the building as measured on the wall? ______________

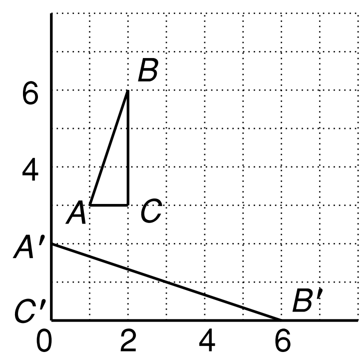
5-6 Dilations

Tell whether the transformation is a dilation.

5. ________



6. ________



7. A triangle has vertices with coordinates (0,0), (−3, 4), and (5, −1). If the triangle is dilated by a scale factor of 2 with the origin as the center of dilation, what are the coordinates of the vertices of the image?

____

Name ______________________________________ Date ___________ Class ____________

SECTION 5B

Ready to Go On? Quiz continued

5-7 Indirect Measurement

8. Maureen is walking past a tree. Maureen's height is 5 ft and her shadow at that moment is 5.5 ft. The tree's shadow is 44 ft. How tall is the tree? ______________

9. A blimp is positioned over a field. The shadow of the blimp strikes the ground 1,200 feet from a point directly under the blimp. A meter stick stuck in the ground directly under the blimp casts a shadow of 120 cm. What is the height of the blimp? ______________

10. A street lamp is 20 feet tall and casts a shadow 14 feet long. Attached part way up the street lamp is a parking sign. The shadow of the upper edge of the parking sign is 5.6 feet from the base of the street lamp. How high off the ground is the upper edge of the parking sign? ______________

11. A professional basketball player is talking on the sidewalk with her coach. The player is 6.4 feet tall and casts a shadow 3.5 feet long. The shadow cast by the coach is 3.1 feet long. Approximately how tall is the coach? ______________

5-8 Scale Drawings and Scale Models

12. The model of rocket was built using a scale of 2 inches:5 feet. If the length of the model was 22 inches, what was the length of the actual rocket? ______________

13. Eric was examining a dust particle under a microscope using the 400:1 setting. The dust particle appeared to have a length of 80 mm. What was the actual length of the dust particle? ______________

14. The length of an object on a scale drawing is 6 cm. The actual length of the object is 54 cm. What is the scale of the drawing? ______________

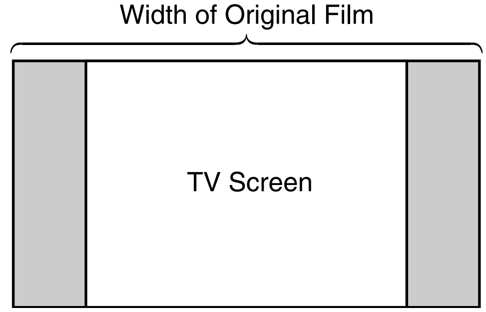
15. Sam is going to build a scale model of sailboat with a length of 75 ft. He has decided upon the scale 3 inches:10 feet. How long will Sam's model be? ______________

SECTION 5B

Ready to Go On? Enrichment

Aspect Ratios

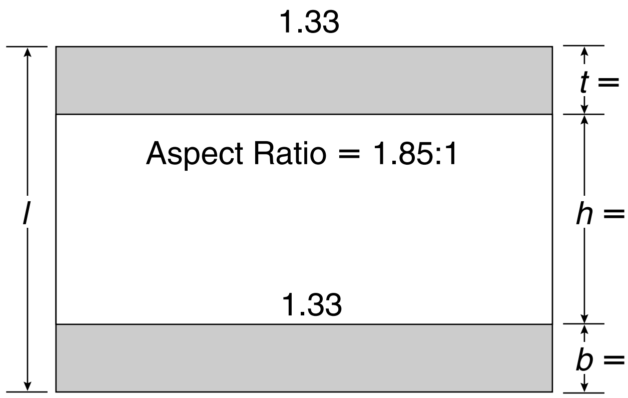
Aspect ratio is the ratio of the width of a picture to the height of a picture. The screens of traditional television sets have an aspect ratio of 4:3, or 1.33:1. One common aspect ratio used for films today is the widescreen format of 1.85:1.



1. The diagram on the right shows what happens when the full height of a movie with an aspect ratio of 1.85:1 is shown on a standard TV screen. About what percent of the original image appears to get cut off?

____

The situation gets a little more interesting when the full width of a movie with an aspect ratio of 1.85:1 is shown centered on a standard TV screen.



2. In the diagram, the width of the 1.85:1 film is shown conforming to the width of the 1.33:1 TV screen. Write and solve a proportion to find the relative height *h* of the displayed film. Fill in that dimension on the diagram, leaving it as a fraction. ______________________________

3. The unused areas of the TV screen, shown in gray, are equal in size. Use the dimension you found for *h* to determine relative dimensions for *t* and *b*. Fill in those dimensions on the diagram leaving them as fractions.

4. About what percent of the TV screen is used by the film image? How does that compare with your answer to question 1?

____

____

____

Name ______________________________ Date __________ Class __________

LESSON **6-1**

Ready to Go On? Skills Intervention

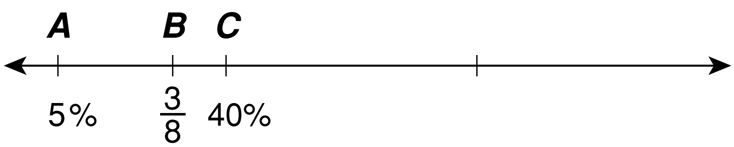
Relating Decimals, Fractions, and Percents

Percents are ratios that compare a number to 100.

Vocabulary
percent

Finding Equivalent Ratios and Percents

Find the missing ratio or percent equivalent for each letter *A* – *C* on the number line.



A. 5%

$\frac{5}{\_\_\_}$ Write the percent as a fraction. What number is the denominator?

______ Divide both the numerator and denominator by the GCF: ___.

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

___ ÷ ___ = ______ Divide the numerator by the denominator.

______ • ______ = ______ Multiply the quotient by 100.

Insert a percent sign. What is the percent equivalent of $\frac{3}{8}$? _______

C. 40%

______ Write as a fraction. What is the denominator? ______

______ Divide both the numerator and denominator by the GCF: _____

Comparing and Ordering Fractions, Decimals, and Percents

Write $\frac{1}{4}$, 0.26, and 15% in order from least to greatest.

Write each number as a percent.

$\frac{1}{4}$ = ______ Convert the fraction to a decimal.

0.26 = ______% Convert the decimals to percents by moving the

______ = ______% decimal point and inserting a percent symbol.

15% ☐ ______% ☐ ______% Order the percents.

The numbers in order from least to greatest are ______________________.

Name ______________________ Date ____________ Class ____________

LESSON 6-1

Ready to Go On? Problem Solving Intervention

Relating Decimals, Fractions, and Percents

You can change fractions to decimals to solve some problems.

A flag is $\frac{3}{8}$ blue, $\frac{1}{5}$ red, $\frac{1}{8}$ green, and the rest is white. What percent of the flag is white?

Understand the Problem

1. If you converted the 3 given fractions to percents, what would those percents and the answer to the problem add up to? Explain.

____

Make a Plan

2. If you converted the 3 given fractions to percents, how could you use those percents to solve the problem?

____

3. Why might it make sense to add the fractions for blue and green before converting to a percent?

____

____

Solve

4. What percent of the flag is red? ____________________

5. Together, what percent do the blue and green sections cover? ____________________

6. What percent of the flag is white? Explain. ____________________

Check

7. Change your answer to a fraction and then add the four fractions to see if the sum is 1.

____

Solve

8. If the green part of the flag were white instead, what percent of the flag would be white? ____________________

9. If $\frac{7}{8}$ of a flag is gray, what percent is not gray? ____________________

Name ______________________________________ Date ___________ Class ____________

LESSON **6-2**

Ready to Go On? Skills Intervention

Estimating with Percents

An **estimate** can be given for a problem when an exact answer is not required. To estimate with percents, **compatible numbers** are used. **Benchmarks** are a kind of compatible number that are common and often used as references.

Vocabulary
estimate
compatible numbers
benchmark

Estimating with Percents
Estimate.

A. 48% of 64

What compatible numbers can be used in place of 48% or $\frac{48}{100}$?

$\frac{48}{100} \approx$ ___ and ___ $= \frac{1}{2}$

Use the compatible numbers to estimate.

$\frac{1}{2} \cdot 64 =$ _____ Remember multiplying by $\frac{1}{2}$ is the same as __________ by 2.

48% of 64 is about _____.

B. 16% of 856
What percent can 16% be rounded to for easier calculations? _____

Remember _____ = 10% + _____.

15% • 856 = (___________) • 856 Substitute to simplify.

= _______ 856 + _______ 856 Use the ___________ property.

= _____ + _____

= _____

16% of 856 is about _____.

Geography Application
Texas is the second largest state in the United States. Its area is 43% of the area of Alaska, the largest state in the country. If Alaska's area is 615,230 square miles, then approximately what is the area of Texas?

Round numbers for easier estimating:

43% rounds to _____.

615,230 square miles rounds to _______________________.

Think: What number is 40% of 600,000?

$n =$ _______________ Write an equation.

$n =$ _______________ Multiply.

The area of Texas is approximately _______________________.

Name ______________________ Date ____________ Class ____________

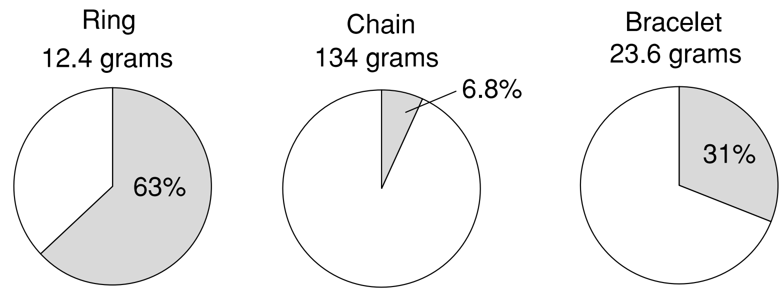
LESSON 6-2

Ready to Go On? Problem Solving Intervention

Estimating with Percents

You can solve many problems without calculating exact amounts.

The graphs show the weight of 3 pieces of jewelry and the percent of gold in each. Which piece has the most gold? Which has the least?



Understand the Problem

1. Why can't you just choose the highest percent and the lowest percent as the answers?

____

Make a Plan

2. What 2 numbers can you multiply to find the number of grams of gold in the ring? In the bracelet? In the chain?

____

3. Why might estimation or number sense be useful for solving this problem?

____

Solve

4. Use number sense to compare the amounts of gold in the ring (0.63 • 12.4) and in the bracelet (0.31 • 23.6). Write < or >.

0.63 ☐ double 0.31   12.4 ☐ half of 23.6   So, 0.63 • 12.4 ☐ 0.31 • 23.6

5. Now compare the ring (0.63 • 12.4) and the chain (0.068 • 134).

134 ☐ 10 • 12.4   0.068 ☐ $\frac{1}{10}$ of 0.63   So, 0.068 • 134 ☐ 0.63 • 12.4

6. Write the 3 products in the correct order.

_____ • _____ > _____ • _____ > _____ • _____

Check

7. Answer the question that is asked in the problem.

____

Name ________________________________ Date __________ Class ___________

LESSON 6-3

Ready to Go On? Skills Intervention

Finding Percents

Finding the Percent One Number Is of Another

A. What percent of 180 is 54?

The word "of" tells you to ________. The word "is" tells you to use the ________ sign.

p __ 180 __ 54 Set up an equation to find the percent.

$\frac{p \cdot 180}{180}$ __ $\frac{54}{180}$ To solve the equation, ________ both sides by 180.

$p =$ _____ Simplify and change to a percent.

$=$ _____

54 is _____ of 180.

B. The area of the state of Hawaii is 6,425 square miles. The area of the island of Hawaii, often called the Big Island, is 4,035 square miles. Find the percent of Hawaii's area that is on the Big Island.

Set up a proportion to find the percent.
Answer the question: What number is to 100 as 4,035 is to 6,425?

$\frac{\text{number}}{100} = \frac{\text{part}}{\text{whole}}$ → Substitute into the proportion. → $\frac{n}{100} = \frac{4{,}035}{6{,}425}$

$n \cdot$ ________ $= 100 \cdot$ ________ Find the cross products.

$n =$ ________ Solve for n.
$n \approx 62.8$

The area of the island of Hawaii is ________ of the area of the state of Hawaii.

Health Application

A brand of ice cream has 11 grams of fat per serving. This is 17% of the recommended daily value for a person. To the nearest gram, find the total recommended daily value of fat for a person.

Set up an equation to solve the problem.
Think: 17% of what number is 11?

_____ $\cdot\ n = 11$ Use the decimal equivalent of 17%.

$n = \frac{11}{\_\_\_\_}$ ________ both sides by ________.

$n \approx$ _____ Solve for n.

The total recommended daily value of fat is about _____ grams.

Name ______________________________ Date __________ Class ___________

LESSON 6-3

Ready to Go On? Problem Solving Intervention

Finding Percents

Organizing information can help you solve many problems.
Scott consumes 2500 calories per day, and 28% of the calories come from fat. Mandy consumes 2000 calories per day. If Mandy eats the same number of fat calories as Scott, what percent of her calories will come from fat?

Understand the Problem

1. Complete the table to organize what you know. Use *x* for the number you need to find.

Name	Daily Calories	Percent from Fat
Scott		
Mandy		

Make a Plan

2. If you knew how many fat calories Mandy consumes per day, how could you find *x*?

____

3. If you knew how many fat calories Scott consumes per day, how could you tell how many Mandy consumes per day?

____

4. How can you find the number of fat calories Scott consumes per day?

____

Solve

5. Complete to find out how many fat calories Scott consumes per day.

____% of ________ = 0.28 • ________ = ________

6. If Mandy ate the same number of fat calories as Scott, what percent of her daily calories would that be? Complete and solve for *x* to find out.

________ is *x* % of ________ → $\frac{x}{100}$ = $\frac{\quad}{\quad}$ → *x* = $\frac{\quad \cdot \quad}{\quad}$ = ________

Check

7. Is Mandy's percent greater than Scott's? Why does that make sense?

____

Name ____________________________________ Date ___________ Class ____________

LESSON 6-4

Ready to Go On? Skills Intervention

Finding a Number When the Percent Is Known

A known percent can be used to find a missing number when solving problems.

Finding a Number When the Percent is Known

A. 56 is 40% of what number?

Write an equation to solve the problem.

The word "is" tells you to use the ________ sign and "of" tells you to ________.

Remember to use the decimal equivalent of 40%. 40% = _____

$56 = 0.40 \cdot n$ — Write the equation.

$\frac{56}{\_\_\_\_} = \frac{0.40n}{\_\_\_\_}$ — Divide both sides by _____ to isolate the variable.

_____ $= n$ — Solve for n.

56 is 40% of _____.

B. 12 is 60% of what number?

Think: 60 is to 100 as 12 is to what number?

$\frac{60}{100} = \frac{}{\_\_}$ — Set up a proportion to solve the problem.

$60 \cdot \_\_ = 100 \cdot \_\_$ — Find the cross products.

$60n = 1200$ — Simplify and solve the equation.

$\frac{60n}{\_\_\_} = \frac{1200}{\_\_\_}$ — Divide both sides by ___ to isolate n.

$n = \_\_$

12 is 60% of ___.

Technology Application

A CD-ROM has a storage capacity of 673 Mega-bytes (MB). This is 269% of the storage capacity of a Zip® disk. To the nearest Mega-byte, find the storage capacity of a Zip® disk.

Think: 673 is 269% of what number?

What does "is" represent? ___________ Write 269% as a decimal. _____

_____ = _____ $\cdot\, n$ — Set up the equation.

$\frac{673}{\_\_\_\_} = \frac{2.69n}{\_\_\_\_}$ — Isolate n.

_______ $\approx n$ — Divide.

The storage capacity of a Zip® disk is approximately _____ mega-bytes.

Name ______________________________ Date ___________ Class ___________

LESSON **6-4**

Ready to Go On? Problem Solving Intervention

Finding a Number When the Percent is Known

In a garden, the tomato section is 20 ft by 6 ft and takes up 60% of the total area. The zucchini section takes up 18% of the area. How many square feet is the zucchini section?

Understand the Problem

1. Make a sketch to show what you know.

Make a Plan

2. If you knew *G*, the area of the whole garden, how could you find *Z*, the area of the zucchini section?

____

3. Suppose you knew *T*, the area of the tomato section. Write a percent statement you could use to find *G* (the area of the garden).

____

4. How can you calculate *T*?

____

Solve

5. Find *T*, the area of the tomato section. _______________________

6. Find G, the area of the garden.

____

7. Now find *Z* and then answer the question in the problem.

____

Check

8. Compare your answers with the sketch from Exercise 1. Are your numbers reasonable?

Solve

9. A 15 ft by 5 ft section of roses makes up 30% of a flower garden. What is the area of the tulip section that takes up 16% of the garden?

____

Name ______________________ Date __________ Class __________

SECTION 6A

Ready to Go On? Quiz

6-1 Relating Decimals, Fractions, and Percents

Compare. Write <, >, or =.

1. $\frac{5}{9}$ ☐ 56% **2.** 0.86 ☐ $\frac{6}{7}$ **3.** 8% ☐ 0.08

4. $\frac{3}{7}$ ☐ 0.43 **5.** 2.3 ☐ 23% **6.** 37% ☐ $\frac{3}{8}$

Order the numbers from least to greatest.

7. $\frac{7}{8}$, 0.9, $\frac{6}{7}$, 85% ______________

8. $\frac{3}{14}$, 9.9%, 0.16, $\frac{1}{6}$ ______________

9. 30%, $\frac{2}{5}$, 7.4%, 0.297 ______________

10. 0.011, $\frac{1}{11}$, 0.1, 6% ______________

11. Exactly 60% of the animals in the local animal shelter are dogs. What fraction of the animals is this? ______

6-2 Estimating with Percents

Estimate.

12. 67% of 87 ______ **13.** 15% of 79 ______ **14.** 55% of 81 ______

15. 17% of 54 ______ **16.** 40% of 42 ______ **17.** 5% of 115 ______

Estimate the tip for each bill.

18. 12% on a $16.15 bill ___ **19.** 15% on a $33.90 bill ___ **20.** 10% on a $28.98 bill ___

Name ______________________ Date __________ Class __________

SECTION **6A**

Ready to Go On? Quiz continued

6-2 Estimating with Percents (continued)

21. About 21.1% of the riders pay half-fare on the local bus system. Douglas estimates that if 124,800 people ride the buses in a day, about 10,000 of them will pay half-fare. Estimate to determine whether Douglas' number is reasonable. Explain.

____

6-3 Finding Percents

22. What is 44% of 4? ______

23. What is 85% of 6? ______

24. What is 11% of 11? ______

25. What is 52% of 5? ______

26. What is 34% of 7? ______

27. What is 15% of 13? ______

28. An estimated 293.6 million people were Americans in 2004. An estimated 41.3 million of these Americans were Hispanic or Latino. To the nearest tenth of a percent, what percent of the American population was Hispanic or Latino in 2004? ______

29. Minnesota is called the Land of 10,000 Lakes. The total surface area of the state is about 86,940 square miles. The water area is approximately 7,330 square miles. To the nearest tenth of a percent, what percent of Minnesota is water? ______

6-4 Finding a Number When the Percent is Known

30. 18 is 22.5% of what number? ______

31. 77 is 55% of what number? ______

32. 161 is 230% of what number? ______

33. 5 is 4% of what number? ______

34. The normal highway speed limit of 65 mph is only about 34.95% of the highest speed ever achieved for an entire 500-mile race at the Indianapolis 500. To the nearest hundredth of a mile per hour, what would this record speed be? ______

35. A highway speed limit is only 55 mph. However, this is 240% of the speed of a bicycle that is traveling along the side of the road. To the nearest tenth of a mile per hour, how fast is the bicycle moving? ______

Name ______________________________________ Date ___________ Class ____________

SECTION **6A**

Ready to Go On? Enrichment

Cross-Percents

These puzzles are worked the same way as crossword puzzles. Solve the problems in the clues and write the answers in the boxes across and down, one digit only per box. Round to whatever place is necessary to make the answer fit.

If there is a decimal point in the answer, put it in the box with the digit that follows it, with the decimal point preceding the digit. A decimal point, just like a digit, must always be valid for both the across answer and the down answer. Decimals less than 1, contrary to the customary convention, should be written without a zero in the ones place.

Puzzle I

1	2				
3		4			
		5		6	
				7	

ACROSS

1. 8% of 150
3. 420% of 75
5. 7% of 15
7. 131% of 62

DOWN

1. 22% of 60
2. 32% of 66
4. 330% of 15.4
6. 6.3% of 927

Puzzle II

		1	2
	3		
4			
5			
	6	7	8
	9		

ACROSS

1. 72% of 25
3. 216% of 50
4. 57% of 96
5. 27% of 85
6. 0.5% of 143
9. 850% of 66

DOWN

1. 89% of 12
2. 116% of 76
3. 25% of 575
4. 7% of 743
7. 19% of 84
8. 119% of 43

Name ______________________________ Date __________ Class ___________

LESSON 6-5

Ready to Go On? Skills Intervention

Percent Increase and Decrease

Vocabulary
percent change
percent increase
percent decrease

Percent change is the ratio of change to the original amount.
Percent increase represents an increase in the original amount.
Percent decrease represents a decrease in the original amount.

Finding Percent Increase or Decrease

Find the percent increase or decrease from 65 to 50, to the nearest percent.

The number gets smaller, so this is a percent _________.

$65 - 50 =$ _____ Find the amount of change of the two numbers.

$15 = p \cdot 65$ Write an equation. *Think: 15 is what percent of 65?*

$\frac{15}{\_\_} = \frac{p \cdot 65}{\_\_}$ Solve for p by dividing both sides by _____.

_____ $= p$ Solve for p.

What is the percent equivalent of your answer? _____

So, from 65 to 50 there is a _____% decrease.

School Application

Javier scored a 72 and then an 85 on his last two math tests. What is the percent increase in his scores?

$85 - 72 =$ _____ Find the amount of change between the two scores.

_____ $= p \cdot$ _____ Write an equation. *Think: 13 is what percent of 72?*

$\frac{\_\_\_}{\_\_\_} = \frac{p \cdot \_\_}{\_\_}$ Solve for p by dividing both sides by _____.

_____ $= p$ Solve for p.

How do you change a decimal to a percent? ______________________________

____

Write 0.18 as a percent. _____

Javier had an _____% increase in his test scores.

Using Percent Increase or Decrease to Find Prices

Kaylee buys a CD collection priced at \$60. She received a 15% discount. How much did Kaylee pay for her CDs?

Kaylee received a discount so this is an example of a percent _________.

$d =$ _____ $\cdot\ 60 =$ _____ Find 15% of the original price to determine the discount.

60 _____ 9 = _____ _________ the discount from the original price.

Kaylee paid _____ for the CD collection.

Name ______________________________ Date __________ Class __________

LESSON 6-5

Ready to Go On? Problem Solving Intervention

Percent Increase and Decrease

A store owner changes the regular price of a camera by 50% each day. She raises the price 50% the first day, lowers it 50% the second day, then raises it 50% the third day, and so on. When will the price of the camera be less than half its regular price?

Understand the Problem

1. What happens to the price on the first day? On the second day?

____

2. Does the problem ask for when the price will reach a certain dollar amount? What does it ask for?

____

Make a Plan

3. Choose an amount for the regular price. Why does it make sense to pick an amount like $100 rather than an amount like $67.98?

____

4. If the regular price is $100, what will the price be on the first day? Explain.

____

5. When you compute the price on the second day, what amount will you take 50% of to find the discount? Why?

____

Solve

6. Fill in the table and then extend it to solve the problem.

7. When will the price fall below half the regular price?

	1st	2nd	3rd	4th		
Starting Price	100.00	150.00				
Change in Price	+50.00	−75.00				
New Price	150.00					

____

Check

8. Try a different starting price and see if you get the same answer.

Name ______________________ Date ___________ Class ____________

LESSON 6-6

Ready to Go On? Skills Intervention

Applications of Percents

Multiplying by Percents to Find Commission Amounts

A sales person in an electronics store earns a sales commission of 2%. If he sells a large screen television for $945 and a set of speakers for $580, what commission does he earn?

Find the total sales. $945 + _______ = _______

Write the commission rate as a percent and a decimal. ___________

Think: commission rate • sales = commission

_______ 1,525 = *c* Write an equation.

_______ = *c* Multiply.

The sales person earned a commission of _______.

Multiplying by Percents to Find Sales Tax Amounts

If the sales tax rate is 6.5%, how much tax will Ariel pay if she buys a skirt for $28.70 and a blouse for $16.98?

Find the total sales amount. ____________________

Write the sales tax rate as a percent and a decimal. _______________

Think: sales tax rate • total sales amount = amount of tax

_________ 45.68 = *t* Write an equation.

_______ = *t* Multiply.

_________ ≈ *t* Round to the nearest cent.

Ariel will pay _________ in sales tax.

Using Proportions to Find the Percent of Tax Withheld

Seth earns $6,600 per month. Of that, $792 is withheld for taxes. What percent of Seth's earnings is withheld?

Think: What percent of $6,600 is $792?
Let *p* represent the unknown percent.

p • ______ = ______ Write an equation.

$p = \frac{792}{\_\_\_\_}$ Divide to isolate *p*.

p = ______ Solve for *p*.

How do you change a decimal to a percent? ______________________________

____

______ of Seth's earnings are withheld for taxes.

Name ______________________________________ Date ___________ Class ____________

LESSON 6-6

Ready to Go On? Problem Solving Intervention

Applications of Percents

You can use equations to solve many problems with percents.

Including the 5% sales tax, you would have to pay $189.00 for a bicycle. What is the price of the bicycle?

Understand the Problem

1. What percent of the price is added on for tax? ________________

2. What are you asked to find?

____

Make a Plan

3. If *x* is the price before tax, write an expression for how many dollars the tax comes to. ________________

4. Use your answer to Exercise 3 to write an expression for what you pay for the bike, including tax. What amount is that equal to?

____

5. Use your answers to Exercise 4 to write an equation you can use to find *x*, the price of the bike.

____

Solve

6. Use your equation from Exercise 5 to solve the problem.

____

Check

7. Check by starting with your answer and finding the cost after tax.

____

Find the price before tax.

8. For a jacket, you pay $107, including 7% sales tax. ________________

9. For a video game, you pay $64.80, including 8% sales tax. ________________

10. For a guitar, you pay $213, including 6.5% sales tax. ________________

Name ______________________ Date __________ Class __________

LESSON **6-7**

Ready to Go On? Skills Intervention
Simple Interest

Vocabulary
simple interest
interest
principal
rate of interest

Simple interest is one kind of **interest** paid for the use of money. The formula $I = Prt$ is used to calculate the amount of interest, where P is the **principal,** r is the **rate of interest,** or percent, and t is the time.

Finding Interest and Total Payment on a Loan
Maryanne borrowed $32,000 from the bank to remodel her house. She plans to pay back the money in 7 years. The bank is lending the money at a simple interest rate of 7.5%.

A. How much interest will Maryanne pay if she pays off the loan in 7 years?

What is the principal amount of the loan? ________

Write the interest rate, as a decimal. ____________

What is the time length of the loan? ____________

$I = P \cdot r \cdot t$ Use the formula.

$I =$ _______ • _______ • _______ Substitute known values.

$I =$ _______ Multiply.

Maryanne will pay ________ in interest on the loan.

B. What is the total amount of money, A, Maryanne will pay the bank?

Use the formula: $P + I = A$
Substitute the value for the principal, P, from the original problem and the value for the interest, I, from Exercise A.

_______ + _______ $= A$

_______ $= A$

Maryanne will repay a total of ________.

Finding the Rate of Interest
Martin borrowed $6,500 for 4 years to buy a car. If Martin repaid a total of $7,865, at what simple interest rate did he borrow the money?

$P + I = A$ What is the amount of interest paid?

_______ $+ I =$ _______

$I =$ _______ Solve for I.

_______ = _______ $\cdot r \cdot 4$ Substitute known values in the formula $I = Prt$.

_______ = _______ $\cdot r$ Multiply.

_______ $= r$ Solve for r.

Martin borrowed the money at an annual rate of _______%.

Name ________________________________ Date ___________ Class ____________

LESSON **6-7**

Ready to Go On? Problem Solving Intervention

Simple Interest

You can use mental math to solve some percent problems even when the numbers look complicated at first.

You borrow $2,500 with simple interest. Two years later you pay off the loan by paying $2,980. What was the annual simple interest rate?

Understand the Problem

1. Complete to show what you know.

   Borrowed: $ ______ Paid back: $ ______ Time: ______ years

2. What are you asked to find?

   ____

Make a Plan

3. If you knew the number of dollars in interest you paid per year, how could you solve the problem?

   ____

4. If you knew the total amount of interest you paid, how could you find the amount of interest you paid per year?

   ____

5. How can you find the total amount of interest you paid?

   ____

Solve

6. Use mental math to find the total amount of interest and the amount of interest per year. ______________

7. Complete to compare the interest to the loan and to convert to a denominator of 100.

   $$\frac{\text{Interest paid} \rightarrow: \ \$\_\_\_\_}{\text{Amount borrowed} \rightarrow: \ \$\_\_\_\_} = \frac{\_\_\_\_}{10{,}000} = \frac{\_\_\_\_}{100}$$

8. What was the annual simple interest rate? ______________

Check

9. Round your answer to a whole percent and estimate to check.

   ____

   ____

Name ______________________________ Date __________ Class ___________

SECTION 6B

Ready to Go On? Quiz

6-5 Percent Increase and Decrease

Find each percent increase or decrease to the nearest percent.

1. from 30 to 41 ____________

2. from 90 to 73 ____________

3. 125 to 59 ____________

4. from 87 to 100 ____________

5. Playing on the school baseball team, Jake got 46 hits last year and only 37 hits this year. What is the percent decrease to the nearest tenth of a percent? ________

6. Suppose gasoline cost $2.89 per gallon six months ago and it costs $3.19 per gallon now. What would the percent increase be to the nearest tenth of a percent? ________

7. A pair of jeans that costs $89.59 is on sale for 25% off. What is the sale price of the jeans? ________

6-6 Applications of Percents

Find the commission or sales tax to the nearest cent.

8. total sales: $16,000.00

commission rate: 5.5% ____________

9. total sales: $9,500.00

commission rate: 3.75% ____________

10. total sales: $117.89

sales-tax rate: 7.5% ____________

11. total sales: $22.50

sales-tax rate: 9.25% ____________

12. total sales: $359.01

commission rate: 6% ____________

13. total sales: $3599.50

sales-tax rate: 4.5% ____________

14. Jonvil sold $4,400 worth of clothing last month and received a commission of $341. What was her commission rate? ________

6-7 Simple Interest

Find the interest and the total amount, both to the nearest cent.

15. $1,450 at 6% for 2 years interest:

____

total amount: ____________

16. $899 at 4% for 5 years interest:

____

total amount: ____________

SECTION 6B

Ready to Go On? Quiz continued

6-7 Simple Interest (continued)

17. $71 at 2.5% for 10 years

interest: __________

total amount: __________

18. $21,600 at 9% for 12 years

interest: __________

total amount: __________

19. $520 at 3.55% for 4 years

interest: __________

total amount: __________

20. $2,130 at 7% for 6.5 years

interest: __________

total amount: __________

21. Wilma puts $315 into a savings account at her neighborhood bank. The interest rate is fixed at 4.5%. After 2 years, how much interest will Wilma have earned? What will the total amount in her account be?

____

22. Jordon borrows $88 at 12.5% annual interest. She pays off her debt after six months. What was the amount of her interest? What was the total amount she had to pay back?

____

23. Abdul borrows $10,500 for 5 years to buy a car. The annual interest rate is 8.25%. What is the interest that he must pay? What is the total amount he has to pay back?

____

24. Gigi loans someone $225 at 5.4% annual interest for four months. What interest will she earn? How much money will she be paid back in all?

____

25. The Happy Hammer Lumber Company borrowed $120,000 at 3.5% annual interest for 2.5 years. What interest did they have to pay? What was the total amount they had to pay back?

____

Name ______________________________ Date __________ Class ___________

SECTION 6B

Ready to Go On? Enrichment

From Start to Finish

Part I

Begin at **START**. Your goal is to reach **FINISH**. Each turn, find the percent increase (+) or decrease (−), using the two numbers in the square where you are located. Find the correct answer to the nearest percent one square up, down, left, or right (never diagonally) from where you are. Draw a line from your old square to the new square, which is now where you will be located. Continue until you reach **FINISH**. Always mark your path as you progress. You may use a calculator.

START from 70 to 103	**+ 48%** from 115 to 19	**− 83%** from 75 to 58	**− 23%** from 29 to 99	**+ 71%** from 84 to 65
+ 47% from 65 to 29	**− 55%** from 44 to 65	**− 5%** from 77 to 62	**+ 241%** from 37 to 39	**+ 5%** from 470 to 62
+ 55% from 6 to 0	**+ 5%** from 19 to 123	**− 19%** from 41 to 43	**+ 111%** from 97 to 79	**− 87%** from 150 to 317
− 100% from 200 to 166	**+ 547%** from 258 to 3	**− 99%** from 18 to 19	**− 18%** from 31 to 259	**+ 211%** from 64 to 11
− 17% from 1,440 to 0	**− 97%** from 320 to 266	**+ 6%** from 99 to 827	**+ 735%** from 350 to 60	**− 83%** **FINISH**

Part II

Now let's do a check on your work. Identify all the squares your path did not touch. Add the positive percents located at the top of these squares and subtract the negative ones. The result will be 100% if all your work is correct, and you will have solved the puzzle.

____

Name ______________________________ Date ___________ Class ___________

LESSON 7-1

Ready to Go On? Skills Intervention

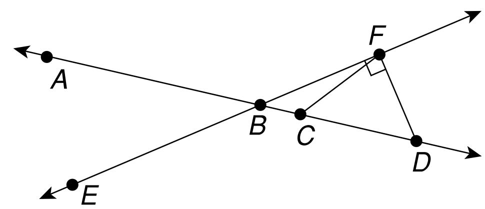
Points, Lines, Planes, and Angles

The building blocks of geometry are the **point, line,** and **plane.**

A **right angle** measures 90°, an **obtuse angle** measures greater than 90° but less than 180°, and an **acute angle** measures less than 90°. Two acute angles are said to be **complementary** if their measures add to 90°.

Vocabulary
point
line
plane
right angle
obtuse angle
acute angle
complementary angles

Use the figure to the right to answer each question.



Naming Points, Lines, and Planes

A. Name five points in the figure.

How many letters name a point? ____________

Name 3 points. ____________________________

____

B. Name a line in the figure.

How many points name a line? ____________

Name a line in the figure. ________________

____

C. Name a plane in the figure.

How many points name a plane? ____________

What figure do three points in a plane form? ________

Name a plane. ________________________

____

Classifying Angles

A. Name a right angle in the figure.

How many degrees are in a right angle?

____

Name a right angle. ____________________

C. Name two obtuse angles in the figure.

An obtuse angle has a measure greater

than ______ but less than ______.

Name two obtuse angles.

____

B. Name two acute angles in the figure.

What is the measure of an acute angle?

____

Name two acute angles. ________________

D. Name a pair of complementary angles in the figure.

The sum of the measures of complementary angles total __________.

Name two complementary angles.

____

Name ____ Date ___________ Class ____________

LESSON 7-2

Ready to Go On? Skills Intervention

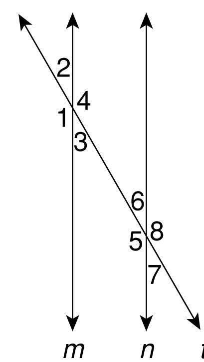
Parallel and Perpendicular Lines

Vocabulary
parallel lines
perpendicular lines
transversal

Parallel lines are two lines in a plane that never meet and **perpendicular lines** intersect at 90° angles. A line that intersects two or more lines is called a **transversal.** When two parallel lines are intersected by a transversal, the acute angles and obtuse angles that are formed are congruent and any acute angle is supplementary to any obtuse angle.

Identifying Congruent Angles Formed by a Transversal

Lines *m* and *n* are parallel. Use a protractor to measure the angles formed when the transversal intersects the parallel lines. Which angles seem to be congruent?



Find the measure of:

∠1 _____ ∠2 _____ ∠3 _____ ∠4 _____

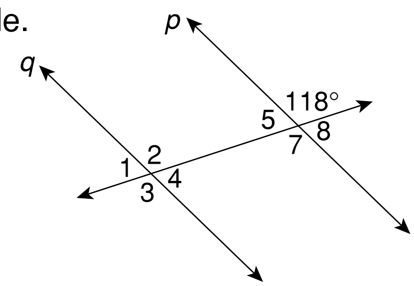
∠5 _____ ∠6 _____ ∠7 _____ ∠8 _____

Which angles are congruent to ∠2? _____ _____ and _____

Which angles are congruent to ∠1? _____ _____ and _____

Finding Angle Measures of Parallel Lines Cut by Transversals

In the figure, line *p* || line *q*. Find the measure of each angle.



A. ∠7

What type of angle is ∠7? _______

What is the measure of the angle opposite ∠7? _____

When parallel lines are cut by a transversal, all obtuse angles are ___________.

So, m∠7 = _____.

B. ∠5

When parallel lines are cut by a transversal, any _______ angle formed is supplementary to any _______ angle formed.

What is the sum of two supplementary angles? _____

∠5 is _______________ to 118°.

m∠5 + 118° = _____ Write an equation to find m∠5.

−118° −118° Subtract.

m∠5 = _____

Name ______________________________ Date ___________ Class ___________

LESSON 7-3

Ready to Go On? Skills Intervention

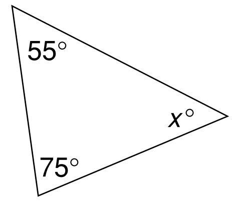
Angles in Triangles

The **Triangle Sum Theorem** states that the angle measures of any triangle in a plane add up to 180°.

Vocabulary
Triangle Sum Theorem

Finding Angles in Acute and Right Triangles

A. Find x in the acute triangle.



What is the sum of the angles in an acute triangle? ______

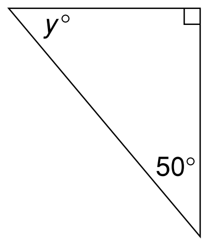
$55^\circ + 75^\circ + x^\circ =$ _______

$130^\circ + x^\circ = 180^\circ$ Add.

_______ _______ What should you subtract from each side to isolate x?

$x^\circ =$ _______ What is the measure of x?

B. Find y in the right triangle.



What is the measure of a right angle? ______

What is the sum of the angles in a right triangle? ______

$50^\circ +$ ______ $+ y^\circ = 180^\circ$

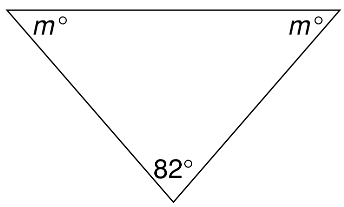
$140^\circ + y^\circ = 180^\circ$ Add

_______ _______ What do you subtract from each side?

$y^\circ =$ _______ What is the measure of y?

Finding Angles in an Isosceles Triangle

Find the angle measures in the isosceles triangle.



In an isosceles triangle two angles have

____________________.

$82^\circ +$ _____ $+$ _____ $= 180^\circ$ Fill in the missing information.

$82^\circ +$ _____ $= 180^\circ$ Combine like terms.

_____ _____ First, undo the addition.

$2m^\circ = 98^\circ$

$\frac{2m^\circ}{\_\_} = \frac{98^\circ}{\_\_}$ Now, undo the multiplication.

$m^\circ =$ ____ What does m equal?

Name ______________________________ Date __________ Class __________

LESSON **7-4**

Ready to Go On? Skills Intervention
Classifying Polygons

A **polygon** is a closed plane figure formed by three or more segments. A **regular polygon** has sides and angles of equal measure. The sum of the angle measures in any *n*-gon is 180° (*n* − 2).

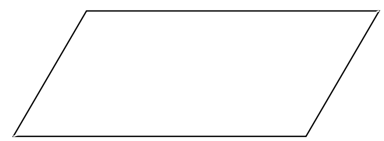
Quadrilaterals are given names based on certain properties.

Trapezoid: one pair of parallel sides
Rectangle: 4 right angles
Rhombus: 4 congruent sides
Parallelogram: 2 pairs of parallel sides
Square: 4 congruent sides and 4 right angles

Vocabulary
parallelogram
polygon
rectangle
regular polygon
rhombus
square
trapezoid

Finding Sums of the Angle Measures in Polygons

A. Find the sum of the angle measures in a parallelogram.



Draw a diagonal line from opposite corners.

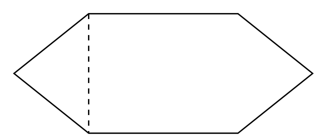
How many triangles are formed? _____

How many degrees are in a triangle? _____

2 • 180° = _____

There are _____ in a parallelogram.

B. Find the sum of the angle measures in a hexagon.



Divide the figure into triangles.

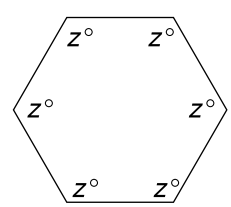
How many triangles are formed? _____

_____ • 180° = _____

There are _____ in a hexagon.

Finding the Measure of Each Angle in a Regular Polygon

Find the angle measures in the regular hexagon.
What is true about the angles and sides in a regular polygon?



____

Use the formula 180° (*n* − 2).

$6z° = 180°(\_\_\_ - 2)$	What is *n*?
$6z° = 180°(\_\_\_)$	Subtract.
$6z° = \_\_\_\_\_$	Multiply.
$\frac{6z°}{\_\_\_} = \frac{720°}{\_\_\_}$	Divide to isolate *z*.
$z° = \_\_\_\_\_$	What is the measure of each angle?

Name ______________________________________ Date ___________ Class ____________

LESSON **7-5**

Ready to Go On? Skills Intervention

Coordinate Geometry

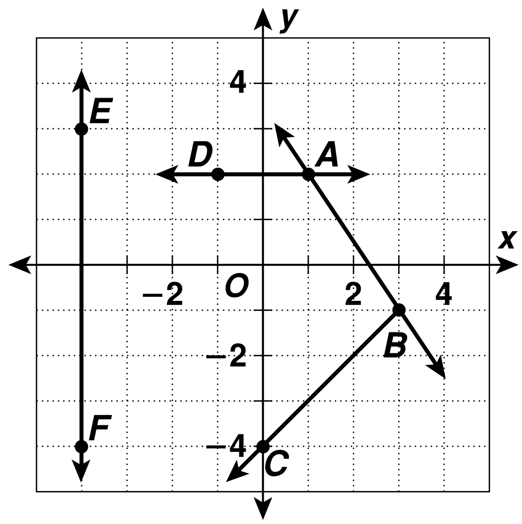
Vocabulary
slope
rise
run

Slope describes how steep a line is.

Slope $= \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\textbf{rise}}{\textbf{run}}$

Finding the Slope of a Line

Determine if the slope of each line is positive, negative, 0, or undefined.



A. $\overleftrightarrow{AB}$

Does the line rise up to the left or right? _____

What is the vertical change between point *A* and point *B*? ____ What is the horizontal change between point *A* and point *B*? ______

slope $\overleftrightarrow{AB} = \frac{\text{rise}}{\text{run}} = \frac{\_\_}{2}$

The slope is ___________________________.

B. $\overleftrightarrow{AD}$

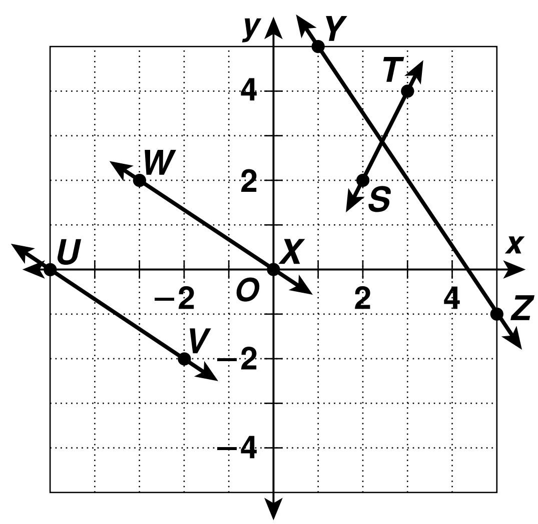
The slope of a horizontal line is ___________.

C. $\overleftrightarrow{EF}$

The slope of a vertical line is ______________.

Finding Perpendicular and Parallel Lines

Which lines are parallel? Which lines are perpendicular?



Parallel lines have slopes that are _________.

Perpendicular lines have slopes whose product equals ______.

Find the slope of $\overleftrightarrow{ST}$. $\frac{\_\_}{1}$ = ____

Find the slope of $\overleftrightarrow{UV}$. $-\frac{2}{\_\_}$

Find the slope of $\overleftrightarrow{WX}$. $-\frac{\_\_}{3}$ Find the slope of $\overleftrightarrow{YZ}$. ______

Which lines have equal slopes? _________________________

Are these lines parallel or perpendicular? _________________

What is the product of the slope of lines *YZ* and *UV*? $-\frac{\_\_}{3} \cdot \frac{-3}{\_\_}$ = ____

Are these lines parallel or perpendicular or neither? _________________

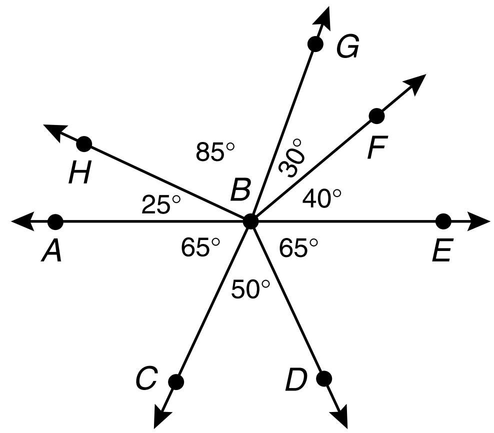
Name ______________________ Date ___________ Class ___________

SECTION 7A

Ready to Go On? Quiz

7-1 Points, Lines, Planes, and Angles

Refer to the figure.



1. Name two pairs of complementary angles.

____

2. Name three pairs of supplementary angles above line $\overline{AE}$.

____

____

3. Name one right angle. __________

4. How many rays are in the figure? ________

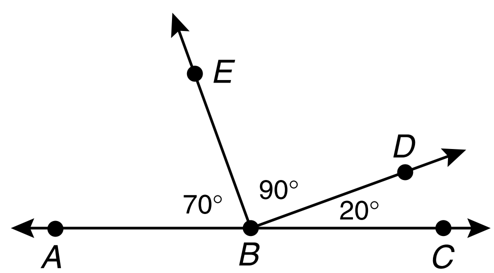
5. Name the segments identified on line $\overline{AE}$.

____

6. How many points, in addition to those identified, are located on plane *ABC*?

____

Refer to the figure.



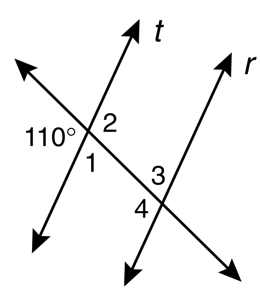
7. Name the right angle. ________

8. Name two acute angles. ______________

9. Name two obtuse angles. ______________

7-2 Parallel and Perpendicular Lines

In the figure, line *t* || line *r*. Find the measure of each angle.

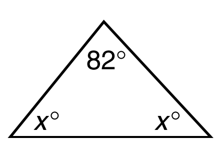


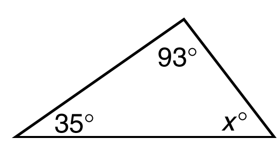
10. ∠1 ________ **11.** ∠2 ________

12. ∠3 ________ **13.** ∠4 ________

7-3 Angles in Triangles

Find *x* in each triangle.





14. ________ **15.** ________

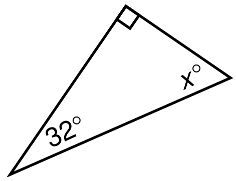
Name ______________________ Date __________ Class __________

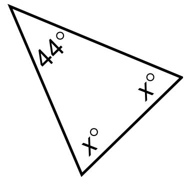
SECTION 7A

Ready to Go On? Quiz continued

7-3 Angles in Triangles (continued)

Find *x* in each triangle.





16. __________ **17.** __________

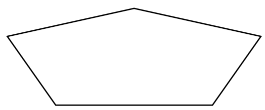
7-4 Classifying Polygons

Give all the names that apply to each figure

18. ______________________

____

19. ______________________

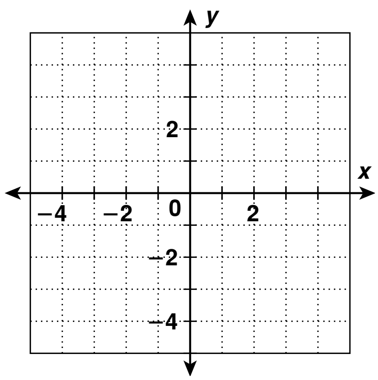


7-5 Coordinate Geometry

Graph the quadrilaterals with the given vertices. Give all of the names that apply to each quadrilateral.

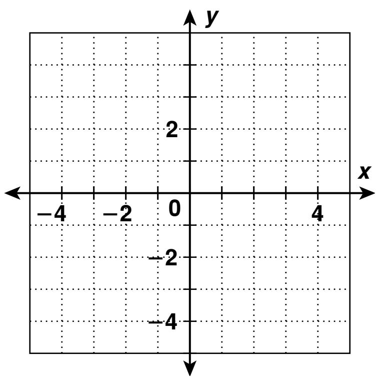
20. *A*(4, 4), *B*(4,−2), *C*(−3, −2), *D*(−2, 4)

____



21. *P*(2, 4), *Q*(2, −1), *R*(−1, −1), *S*(−1, 4)

____



Name the coordinates of the missing vertex.

22. rectangle *ABCD* with *A*(−3, 2), *B*(4, 2), *C*(4, −3)

____

23. parallelogram *PQRS* with *P*(−3, 2), *Q*(−1, 4), *R*(2, −1)

____

Name ______________________________________ Date ___________ Class ____________

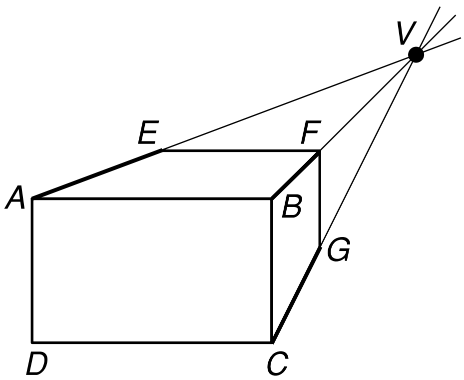
SECTION 7A

Ready to Go On? Enrichment

Single Point Perspective

Perspective is a technique used to help make a drawing of an object appear the way the actual object appears to the human eye. A main feature of perspective drawing is that some edges that are parallel in an actual object are not drawn as parallel line segments. These non-parallel lines converge at a "vanishing point."

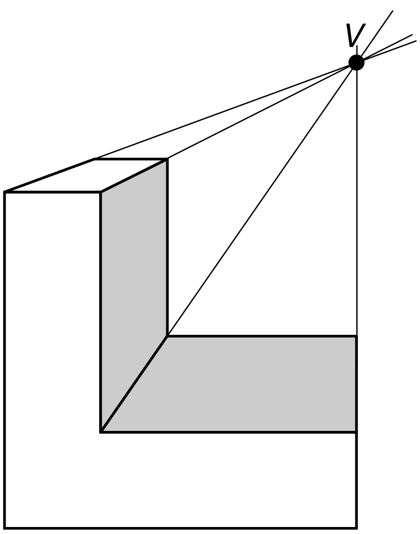
These are the steps for drawing a three-dimensional rectangular solid with single point perspective.



Steps

1. Draw rectangle *ABCD*.
2. Choose any vanishing point *V* you wish.
3. Draw light lines from each vertex of rectangle *ABCD* through point *V*.
4. Choose a point *E* on line *AV* . Draw a line from *E* that is parallel to *AB* and intersects *BV* at *F*.
5. Draw *FG* parallel to *BC*.
6. Darken lines *AE, BF*, and *CG*.

You can now apply the same technique to create a three-dimensional drawing of the letter L. Use vanishing point *V*. You do not have to label any other vertex. When you are finished drawing, shade the two inside surfaces of the figure.



Name ______________________________________ Date ___________ Class ____________

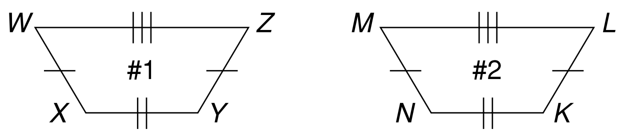
LESSON **7-6**

Ready to Go On? Skills Intervention
Congruence

Two figures are congruent if all corresponding sides and angles are congruent. When writing congruence statements between a pair of polygons, the vertices in the second figure are written in order of **correspondence** with the first figure.

Vocabulary
correspondence

Writing Congruence Statements
Write a congruence statement for the pair of polygons.



In polygon #2, which angle is congruent and in the same position as $\angle W$ in polygon #1? _____

In polygon #2, which angle is congruent and in the same position as $\angle X$ in polygon #1? _____

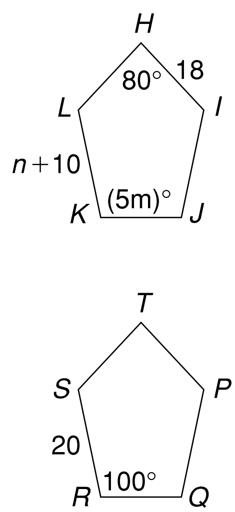
Complete the following statements.

$\angle Y \cong \angle K$ so _____ corresponds to $\angle K$.

$\angle Z \cong$ _____ so $\angle Z$ corresponds to _____.

Complete the statement: trapezoid *WZYX* ≅ trapezoid _______.

Using Congruence Relationships to Find Unknown Values
pentagon *HIJKL* ≅ pentagon *TPQRS*



A. Find *m*.
What angle corresponds to $\angle K$? _____

What is the measure of these angles? _____

$5m = 100$ Write an equation to find *m*.

$\frac{5m}{\_\_} = \frac{100}{\_\_}$ Divide to isolate *m*.

$m =$ ____ Solve for *m*.

B. Find *n*.
What side does $n + 10$ correspond to? ____

$n + 10 = 20$ Write an equation.

$-$___ $-$___ Undo the addition.

$n =$ ___ Solve for *n*.

Name ______________________________ Date __________ Class __________

LESSON 7-7

Ready to Go On? Skills Intervention

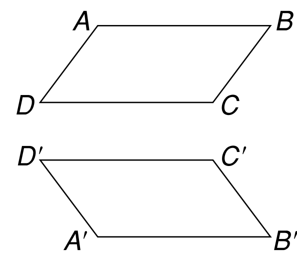
Transformations

Vocabulary
transformation
translation
rotation
center of rotation
reflection
image

Three types of **transformations** are:
Translation: slides a figure along a line without turning.
Rotation: turns the figure around a point, called the **center of rotation.**
Reflection: flips the figure across a line to create a mirror **image.**

Identifying Transformations

Identify each as a translation, rotation, reflection, or none of these.



A. What point corresponds to *A*? ____

Can you turn the original figure to match the translated figure? ____

Can you slide the original figure to match the translated figure? ____

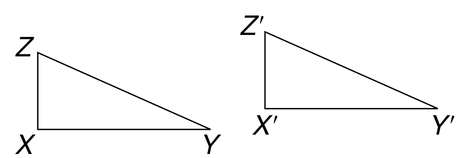
Can you flip the original figure to match the translated figure? ____

What type of transformation is shown? __________

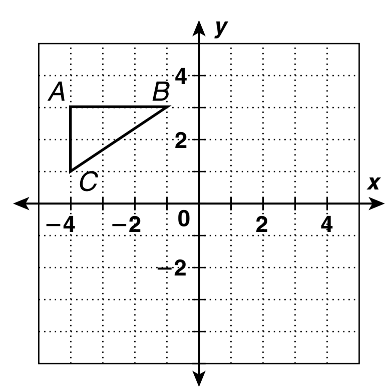
The image of a translation, rotation, or reflection is __________ to the original figure.

B. Was triangle *ZXY* rotated? ____

What was done to get triangle *X′Y′Z′*? ____________



Graphing Transformations



If triangle *ABC* is translated 4 units right, what are the coordinates of the image of point *A*? __________

Translate triangle *ABC* 4 units right and label the image $A_1B_1C_1$.

If triangle *ABC* is rotated 180° clockwise about (0, 0), the rotated image of side *BC* will be __________ to side *BC*.

Rotate triangle *ABC* 180° clockwise about (0, 0) and label the image $A_2B_2C_2$.

If triangle *ABC* is reflected across the *x*-axis, what are the coordinates of the image of point *C*? ____________

Reflect triangle *ABC* across the *x*-axis and label the image $A_3B_3C_3$.

Name ______________________________ Date __________ Class __________

LESSON **7-8**

Ready to Go On? Skills Intervention

Symmetry

A figure with **line symmetry** can be split into two mirror images by drawing a line through the figure. This line is called the **line of symmetry.**

A figure with **rotational symmetry** can be turned around a point so it coincides with itself.

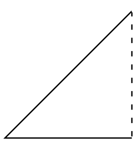
Vocabulary
- line symmetry
- line of symmetry
- rotational symmetry

Drawing Figures with Line Symmetry

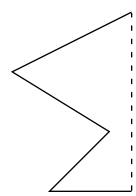
Complete each figure. The dashed line is the line of symmetry.

If you fold a figure on the line of symmetry, what is true about each half of the figure? ________________.

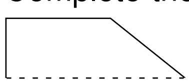
A. Draw the other half of the figure.



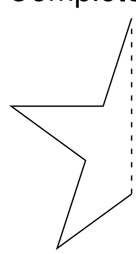
B. Draw the other half of the figure.



C. Complete the figure.



D. Complete the figure.



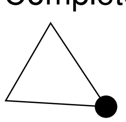
Drawing Figures with Rotational Symmetry

Complete the figure. The point is the center of rotation.

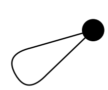
The amount of rotation must be less than _____ degrees.

Rotational symmetry means that you can rotate the figure around some point so that the figure __________ with itself.

A. In a 3-fold rotation the figure will coincide with itself every _____ degrees. Complete the figure.



B. In a 6-fold rotation the figure will coincide with itself every _____ degrees. Complete the figure.



Name ____ Date ___________ Class ____________

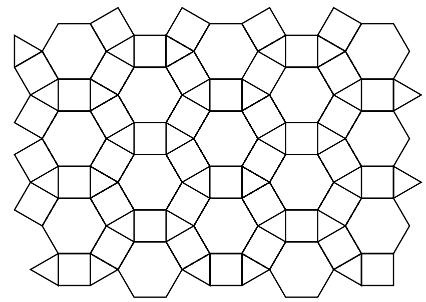
LESSON 7-9

Ready to Go On? Skills Intervention
Tessellations

A **tessellation** is a repeating pattern of polygons that completely covers a plane.

Vocabulary
tessellation

Example of a Tessellation



Is the pattern shown a tessellation? _______________

How do you know? ______________________________

____

____

What shapes makes up the pattern? _______________

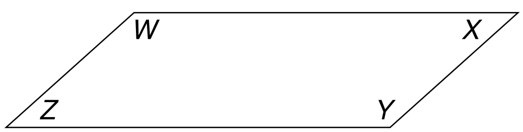
____

Add to the pattern using the same shapes.

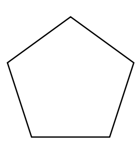
Creating a Tessellation

A. Create a tessellation with parallelogram *WXYZ*.

Do the quadrilaterals overlap each other in a tessellation? _______
Draw a tessellation using the quadrilateral.



B. Use the pentagon shown below to demonstrate that a tessellation of regular pentagons is impossible.



A tessellation is not possible because there are _______ between the figures.

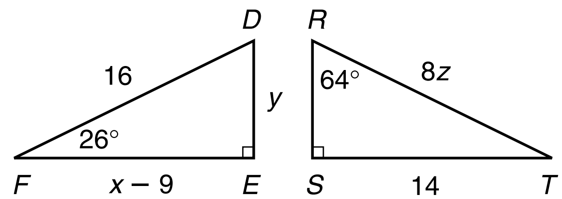
Name ______________________ Date ____________ Class ____________

SECTION 7B

Ready to Go On? Quiz

7-6 Congruence

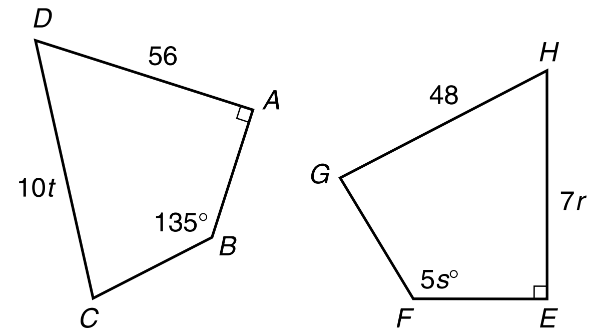
In the figure, triangle *DEF* ≅ triangle *RST*.



1. Find *x*. ______

2. Find z. ______

In the figure, quadrilateral *ABCD* ≅ *quadrilateral EFGH*



3. Find *r*. ______

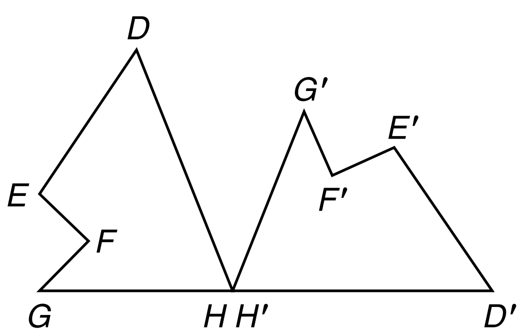
4. Find *s*. ______

5. Find t. ______

7-7 Transformations

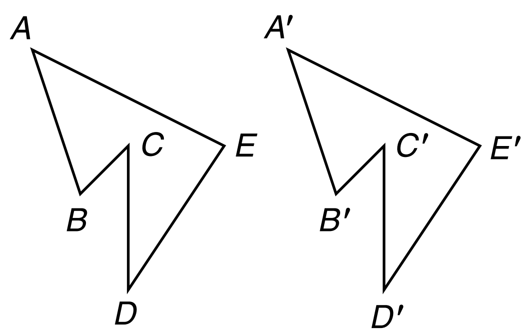
Identify each as a translation, reflection, rotation, or none of these.

6.



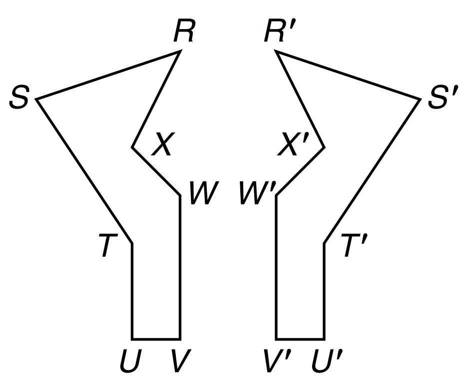
____

7.



____

8.



____

SECTION 7B

Ready to Go On? Quiz continued

7-7 Transformations (continued)

Quadrilateral *ABCD* has vertices at *A*(−7, 5) *B*(−2, 4), *C*(−2, 2), *D*(−4,1). Find the coordinates of the image of each point after each transformation.

9. translation 5 units right, point *B*

____

10. reflection over the y-axis, point *C*

____

11. reflection across the x-axis, point *A*

____

12. translation 2 units down, point *D*

____

Quadrilateral *JKLM* has vertices *J*(0, 0), *K*(5, 0), *L*(4, −4), *M*(0, −6). Find the coordinates of the image of each point after each transformation.

13. 90° clockwise rotation about (0,0), point *K*

____

14. reflection across the *y*-axis, point *J*

____

15. translation 5 units up, point *L*

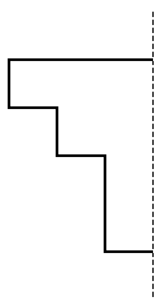
____

16. 180° clockwise rotation about (0,0), point *M*

____

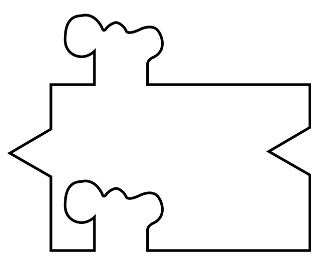
7-8 Symmetry

17. Complete the figure. The dashed line is the line of symmetry.



7-9 Tessellations

18. Two shapes have been cut out of the square and added on the opposite side. Will this figure tessellate?



____

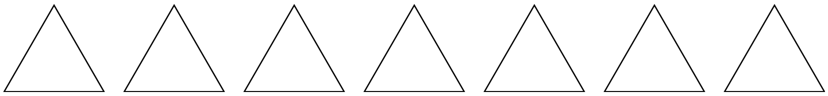
Name ______________________________ Date __________ Class __________

SECTION **7B**

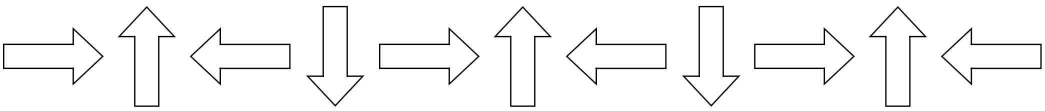
Ready to Go On? Enrichment

Frieze Designs

A frieze is a pattern that repeats in one direction. It consists of repeated copies of a single figure or block. Frieze patterns, also called border patterns, can be found along the upper edge of wallpaper, on pottery, as decorative design on buildings, and elsewhere. An example of a frieze is below.

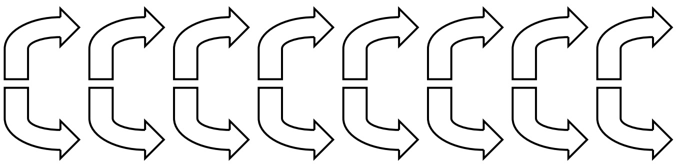


As you can see, the same triangle is repeated and it has been reflected horizontally. Name the translation used to make the frieze below. ____________________

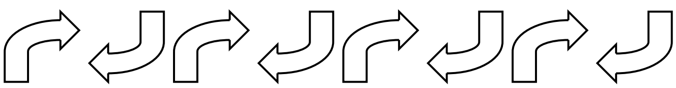


Five basic transformations used for friezes are listed below at the right. Match each transformation with the frieze that incorporates it.

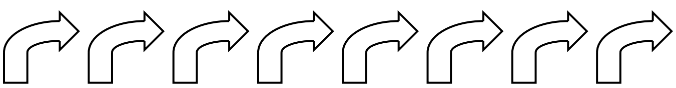
A.



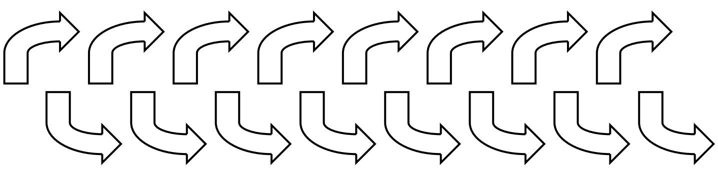
B.



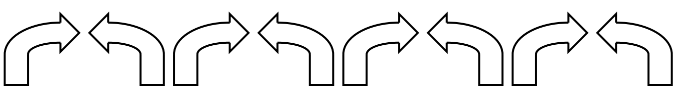
C.



D.



E.



Rotation ______

Translation ______

Reflection Across a Horizontal Line ______

Reflection Across a Vertical Line ______

Glide Reflection ______

Name ________________________________ Date __________ Class ___________

LESSON 8-1

Ready to Go On? Skills Intervention

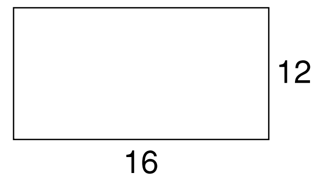
Perimeter and Area of Rectangles and Parallelograms

Vocabulary
perimeter
area

To find the **perimeter** of a figure, add the lengths of all its sides.

Finding the Perimeter of Rectangles and Parallelograms

Find the perimeter of the figure.



p = 2__ + 2__ Write the formula for the perimeter of a rectangle.

p = 2(___) + 2(___) What are the values for *b* and *h?*

p = 32 + 24 Multiply.

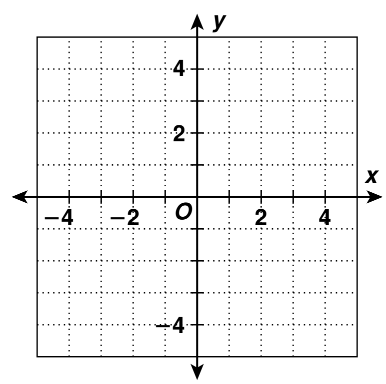
p = ___ Add.

The perimeter is ___ units.

The **area** of a rectangle or parallelogram is found by multiplying the base times the height, or *bh*.

Using a Graph to Find Area

Graph the figure with the given vertices. Then find the area of the figure. (−3, −2), (1, −2), (1, 1), (−3, 1)



Plot each point on the graph.

What is the base? ___ What is the height? ___

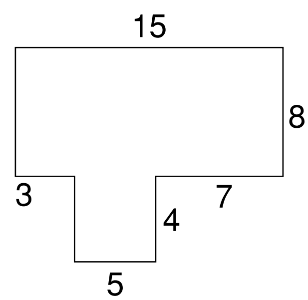
A = ___ Write the area formula.

A = 4 • 3 Substitute the length of the base and height.

A = ___ units^2 Multiply.

Finding Area and Perimeter of a Composite Figure

Find the perimeter and area of the figure.



How do you find the perimeter? ____________________

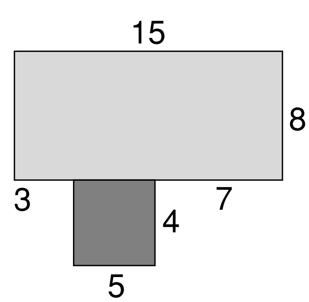
Complete the formula.

p = 15 + ____ + 7 + ____ + 5 + ____ + 3 + 8

p = ____ units

How many rectangles are there? ____

What is the formula for the area of a rectangle? _________



A = (15 • ____) + (4 • ____) Find the area of each rectangle.

A = 120 + ____ Multiply.

A = ____ units^2 Add.

Name ______________________________ Date __________ Class __________

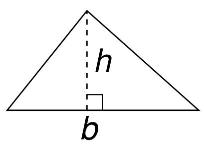
LESSON **8-2**

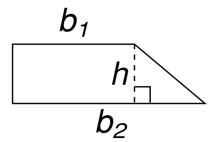
Ready to Go On? Skills Intervention

Perimeter and Area of Triangles and Trapezoids

To find the perimeter of a triangle or trapezoid, find the total of the side lengths. Use these formulas to find the area.

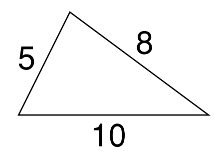
Area of Triangle: $A = \frac{1}{2}bh$ Area of Trapezoid: $A = \frac{1}{2}h(b_1 + b_2)$





Finding the Perimeter of Triangles and Trapezoids

Find the perimeter of each figure.



A. Find the perimeter of the triangle.

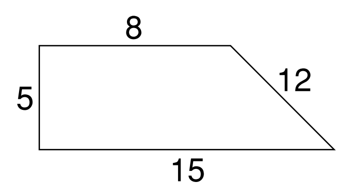
Define perimeter.

____

$p = 5 +$ ___ $+$ ___ Fill in the blanks.

$p =$ ___ units Add. What is the perimeter?

B. Find the perimeter of the trapezoid.



How do you find perimeter?

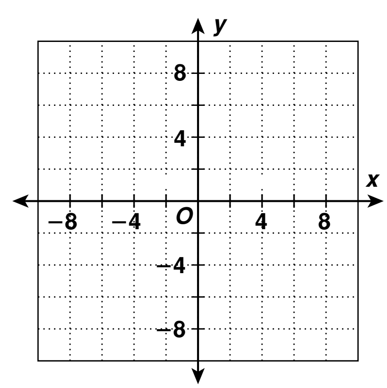
____

$p = 8 +$ ___ $+ 15 +$ ___ Complete the problem.

$p =$ ___ units Add.

Finding the Area of Triangles and Trapezoids

Graph and find the area of the figure with the given vertices: (−2, 1), (1, 7), (4, 1).



Plot and connect the points (−2, 1), (1, 7) and (4, 1).

What is the base? ___ What is the height? ___

$A =$ _____ What is the formula for the area of a triangle?

$A = \frac{1}{2} \cdot$ ___ $\cdot$ ___ Substitute the values for b and h.

$A =$ ___ units^2 Multiply.

Name ______________________________ Date __________ Class __________

LESSON **8-2**

Ready to Go On? Problem Solving Intervention

Perimeter and Area of Triangles and Trapezoids

The Pythagorean Theorem allows you to find the length of one side of a right triangle, if you know the length of the other two sides.

Tamara has a house built on a corner lot shaped like a right triangle. The legs of the triangle measure 45 ft and 50 ft. She wants to put up a fence along the entire boundary of her property. Find out how long the fence will be to the nearest tenth of a foot.

Understand the Problem

1. What is the problem asking you to do?

____

2. What useful information is given about the size and shape of the lot?

____

____

Make a Plan

3. What additional information do you need before you can find the perimeter?

____

4. How can you find that information using what you already know?

____

____

Solve

5. Set up an equation using the Pythagorean Theorem and the information you know. Then answer the question.

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

$(\_\_\_)^2 + (\_\_\_)^2 = c^2$

$\_\_\_\_ + \_\_\_\_ = \_\_\_\_ = c^2$

$\_\_\_\_ \approx c$ The third side is about ______ ft. The amount of fencing needed is approximately ______ + ____ + ____ = ______ ft.

Check

6. The hypotenuse of a right triangle is longer than either leg but less than the sum of the legs. What three inequalities tell you whether the length you found for the third side of the lot is reasonable?

____

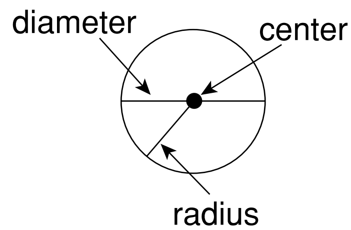
Name ______________________________ Date __________ Class __________

LESSON **8-3**

Ready to Go On? Skills Intervention

Circles

A **circle** is a set of points in a plane that are a fixed distance from a given point, called the center.



Vocabulary
circle
diameter
radius
circumference

The **circumference** is the distance around a circle, $C = \pi d$ or $C = 2\pi r$. The formula for the area of a circle is $A = \pi r^2$.

Finding the Circumference of a Circle

Find the circumference of each circle both in terms of π and to the nearest tenth of a unit. Use 3.14 for π.

A. circle with radius 6 cm

$C =$ _____	Write the formula for the circumference of a circle, if you know the radius.
$C = 2\pi(\_\_\_)$	What do you substitute for r?
$C =$ ___π cm	Multiply.

Using a calculator 12π is $\approx$ ______ cm.

What is 37.68 rounded to the nearest tenth? _____

B. circle with diameter 2.5 in.

$C =$ ____	Write the formula for the circumference of a circle, if you know the diameter.
$C = \pi(\_\_\_\_)$	Substitute the value for d into the equation.
$C = 2.5\pi$ in.	Multiply.
$\approx$ ____ in.	Use a calculator. Round to the nearest tenth.

Finding the Area of a Circle

Find the area of the circle both in terms of π and to the nearest tenth. Use 3.14 for π.

circle with diameter 2.5 in.

$A = \pi r^2$

$r = \frac{d}{2} = \frac{\_\_}{2} =$ _____	What is the relationship between the radius and diameter of a circle? ______________________________
$A = \pi(\_\_\_\_^2)$	Substitute the value of r into the formula.
$A \approx$ ____ in^2	What is the area to the nearest tenth?

Name ______________________ Date __________ Class __________

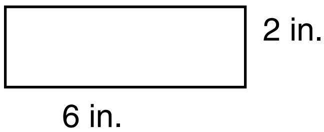
SECTION 8A

Ready to Go On? Quiz

8-1 Perimeter and Area of Rectangles and Parallelograms

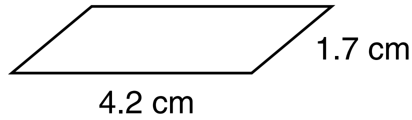
Find the perimeter of each figure.

1.



____

2.

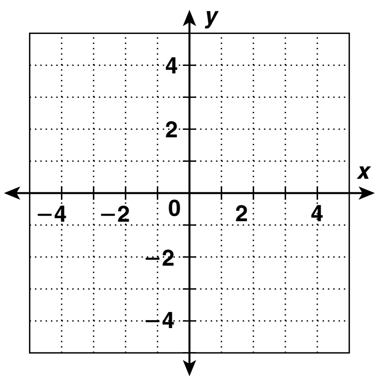


____

Graph and find the area of each figure with the given vertices.

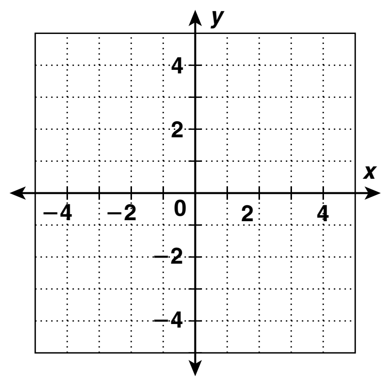
3. (−1, 2), (2, −1), (−1, −1), (2, 2)

____



4. (−3, 2), (−1, 2), (0, −1), (2, −1)

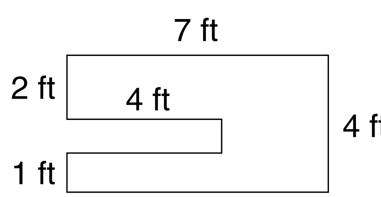
____



5. Find the area and perimeter of the figure.

____

____



8-2 Perimeter and Area of Triangles and Trapezoids

6. Andrea drew a design on her T-shirt in the shape of a right triangle. The legs of the triangle were 4 inches and 6 inches. She sewed ribbon along the entire edge of the triangle. To the nearest tenth of an inch, how much ribbon did she use?

____

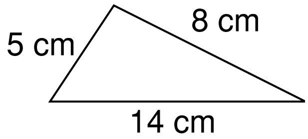
Name ________________________ Date __________ Class __________

SECTION **8A** **Ready to Go On? Quiz** continued

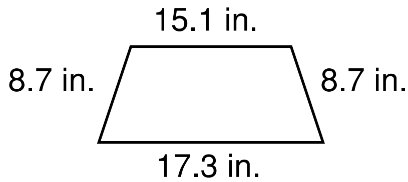
8-2 Perimeter and Area of Triangles and Trapezoids (continued)

Find the perimeter of each figure.

7. ____________________



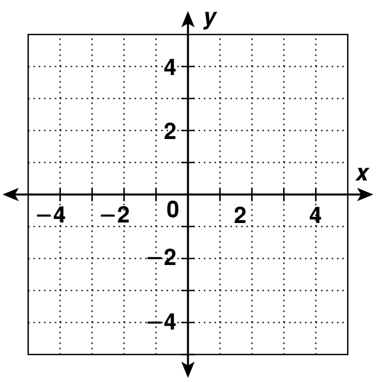
8. ____________________



Graph and find the area of each figure with the given vertices.

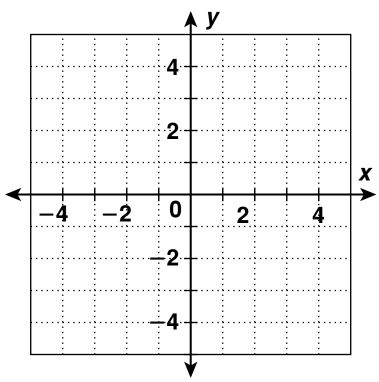
9. (−2, −1), (2, −1), (1, 3)

____



10. (3, 2), (3, −1) , (−1, 2), (−2, −1)

____



8-3 Circles

Find the area and circumference of each circle, both in terms of π and to the nearest tenth. Use 3.14 for π.

11. radius = 14 cm

____

____

12. diameter = 8 yd

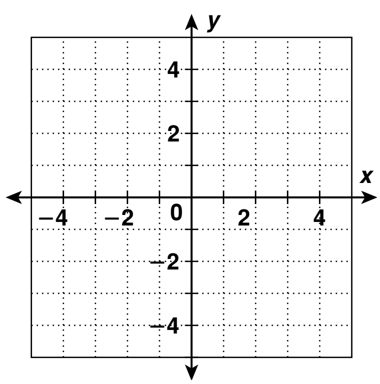
____

____

13. Graph a circle with center (1, 0) that passes through (1, 2). Find the area and circumference, both in terms of π (and to the nearest tenth). Use 3.14 for π.

____

____

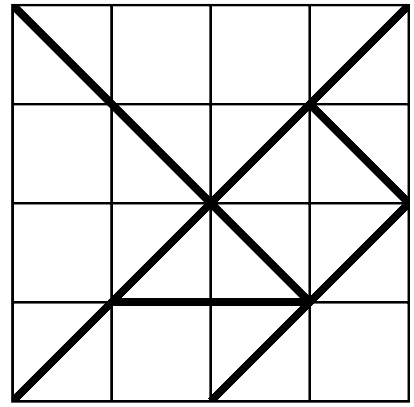


Name ________________________ Date ____________ Class ____________

SECTION **8A**

Ready to Go On? Enrichment

Tangrams



The tangram is a type of puzzle that originated in China over 300 years ago. A tangram consists of seven figures: five triangles, one square and one parallelogram. The challenge is to recreate a shape that is presented to you by using all seven of the "tans." They must lay flat, they must touch, and they may not overlap.

Create your own tangram set by using a 4 × 4 grid and cutting out the seven pieces as indicated in the diagram to the right.

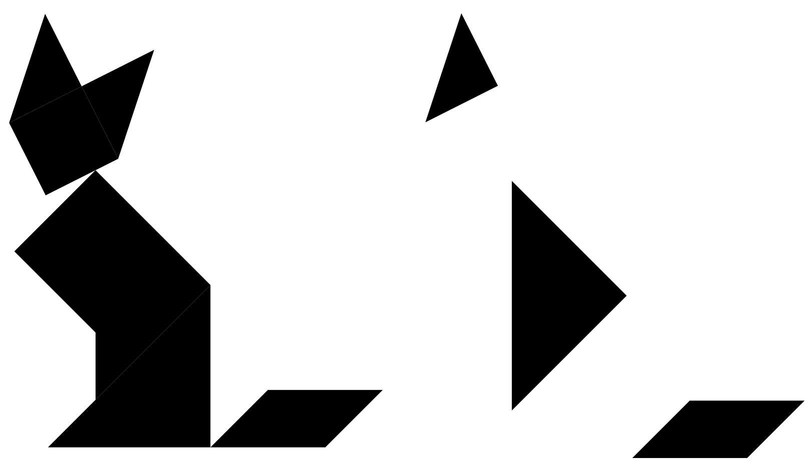
1. What fraction of the entire area of the tangram set is represented by each of the seven shapes?

____

____

2. Describe the basic shape that all seven shapes are made up of.

____



3. Look at the figure of the cat. See if you can reproduce it using your tangram set. A partial solution is shown on the right to give you a head start.

4. Is there any figure that can be made with a tangram set created from a 4-in. square that cannot be made with a tangram set created from a 12-in. square? Explain.

____

____

____

Name ____ Date ___________ Class ____________

LESSON 8-4

Ready to Go On? Skills Intervention

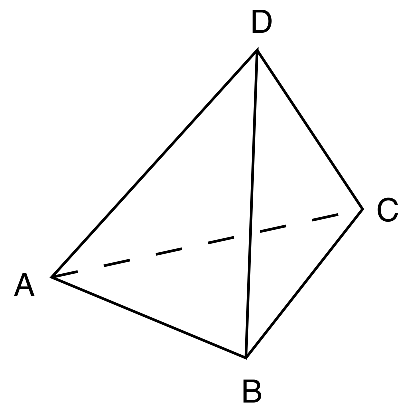
Drawing Three-Dimensional Figures

The drawings of three-dimensional objects show the **faces, edges**, and **vertices** of the objects. A face is a flat surface, an edge is where two faces meet, and a vertex is where three or more edges meet. The **orthogonal view** of a figure shows how the figure looks when seen from different perspectives such as the front, top, and side. Studying an orthogonal view of a figure can give you the information needed to draw the figure in three dimensions.

Vocabulary
face
edge
vertex
orthogonal views

Identifying Vertices, Edges, and Faces

Name the vertices, edges, and faces of the three-dimensional figure shown.



How many vertices, edges, and faces are there?

____

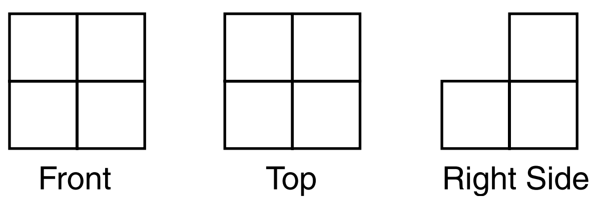
Name the vertices. ______________________________

Name the edges. ______________________________

Name the faces. ______________________________

Drawing a Figure When Given Different Perspectives

Draw the figure shown in the front, top, and side view.

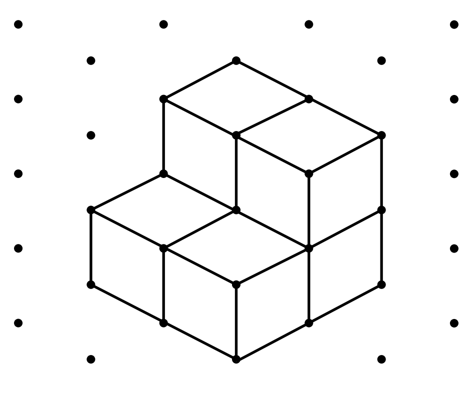


Which view tells you that the base is made up of 4 cubes? ____________

How many layers of cubes are there? ____

Look at the side view. How many cubes does it show in the front row of the second level? ____________

How many cubes are in the back row of the second level? ____



Complete the drawing of the figure. Every vertex you draw should be on a dot.

Name ______________________________________ Date ___________ Class ____________

LESSON **8-5**

Ready to Go On? Skills Intervention

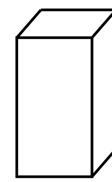
Volume of Prisms and Cylinders

Vocabulary
prism
cylinder

A **prism** is a three-dimensional figure named for the shape of its base. A **cylinder** is a geometric solid with two circular bases. The volume of a solid is the number of cubic units needed to fill the figure. Use these formulas to find the volume.

Prism: $V = Bh$ Cylinder: $V = Bh = (\pi r^2)h$

Finding the Volume of Prisms and Cylinders
Find the volume to the nearest tenth of a unit.



A. What shape is the base of the figure? ________________

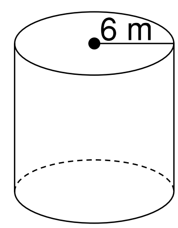
How do you find the area of a rectangle? ________________

$B = 2 \cdot 4 =$ ___ m^2 Find the area of the base.

$V =$ _____ What is the formula for the volume of a prism?

$V = 8 \cdot$ ___ Substitute known values into the formula.

$V =$ ___ m^3 What is the volume?



B. What shape is the base of the figure? ________________

How do you find the area of the base? ________________

What is the length of the radius? ________________

$B = \pi(6^2)$ Find the area of the base.

$B =$ _____ m^2

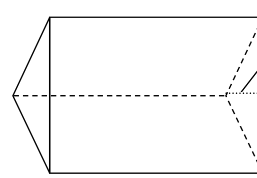
$V =$ _____ Write the formula for the volume of a cylinder.

$V =$ _____ $\cdot$ _____ What values do you substitute for B and h?

$V =$ _______π Multiply.

$V \approx$ _______ m^3 Multiply.

C. What shape is the base of the figure? ____________



How do you find the area of a triangle? ________________

$B = \frac{1}{2} \cdot$ ______ $=$ ___ ft^2 What is the area of the base?

What is the formula for the volume of a prism? ______________

What values do you substitute for B and h? ________________

$V = Bh$ Find the volume of the prism.

$V =$ ___ $\cdot$ ___

$V =$ ____ ft^3

Name ______________________________________ Date ___________ Class ____________

LESSON **8-6**

Ready to Go On? Skills Intervention

Volume of Pyramids and Cones

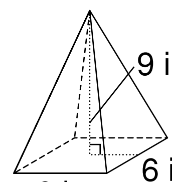
A **pyramid** is named for the shape of its base. A **cone** has a circular base. The height of a pyramid or cone is the distance from the highest point to the base along a perpendicular line. Use these formulas to calculate volume.

Vocabulary
pyramid
cone

Pyramid: $V = \frac{1}{3}Bh$ Cone: $V = \frac{1}{3}\pi r^2 h$

Finding the Volume of Pyramids and Cones

Find the volume.



A. What type of base does the figure have? _______________

How do you find the area of the base? ____________________

$B = 6 \cdot 6 = 36$ in^2

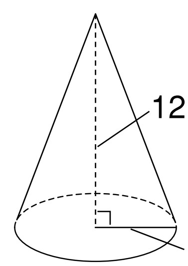
$V = \frac{1}{3}Bh$ In the volume formula what does the h represent?

____

What does the B represent? ________________

$V = \frac{1}{3}($______$)$ What values do you substitute for B and h?

$V =$ ____ in^3 What is the volume of the pyramid?



B. What type of figure is shown? ________________________

What shape is the base? ____________________________

How do you find the area of the base? ____________________

Find the area of the base. $A = \pi$___^{2} = ___π ft^2

What is the formula for the volume of a cone? _____________

Substitute for B and h. $V = \frac{1}{3}($___$\pi \cdot$ ___$)$

$V =$ ____π Use 3.14 for π.

$V =$ _______ ft^3 Multiply.

Name ______________________ Date ____________ Class ____________

LESSON **8-7**

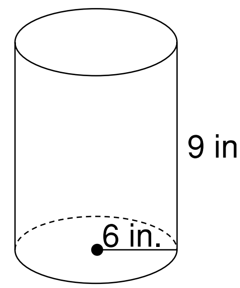
Ready to Go On? Skills Intervention

Surface Area of Prisms and Cylinders

Surface area, *S*, is the sum of the areas of all surfaces of a figure.
A **lateral surface** is the curved surface of a cylinder.
Prism: $S = 2B + F$
Cylinder: $S = 2\pi r^2 + 2\pi rh$

Vocabulary
surface area
lateral surface
lateral face

Finding Surface Area
Find the surface area of the figure.



A. What shape is the figure? ______________________

What is the formula for the surface area? $S =$ ______ + ______

What is the radius of the figure? ______________________

What is the height of the figure? ______________________

$S = 2\pi r^2 + 2\pi rh$

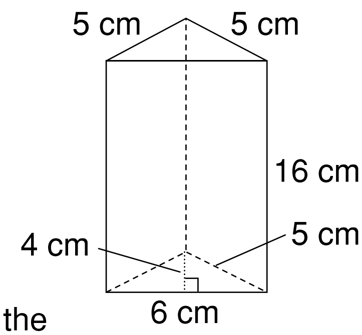
$S = 2\pi(\_\_)^2 + 2\pi(\_\_)(\_\_)$ Substitute values for *r* and *h*.

$S = 2\pi(\_\_) + 2\pi(\_\_)$ Follow the order of operations.

$S = \_\_\pi + 108\pi$ Multiply.

$S = \_\_\_\pi$ Add.

If you use 3.14 for π, the surface area of the figure is approximately ______ in^2.



B. What shape is the figure? ______________________

What shapes make up the base? ______________________
What shape makes up the **lateral face** (the parallelograms that connect the bases)? ______________________

How do you find the area of the base? ______________________

$S = 2B + Ph$ What does the 2 represent in the formula? ______________________

In the formula, *P* represents the base __________ and *h* represents ______________________.

$S = 2B + Ph$

$S = 2\left(\frac{1}{2} \cdot 6 \cdot 4\right) + (\_\_)(16)$ Substitute values into the formula.

$S = 2(\_\_) + \_\_\_$ Multiply.

$S = \_\_ + \_\_\_$ Multiply.

$S = \_\_\_ \text{ cm}^2$ Add.

Name ________________________________ Date __________ Class __________

LESSON 8-8

Ready to Go On? Skills Intervention

Surface Area of Pyramids and Cones

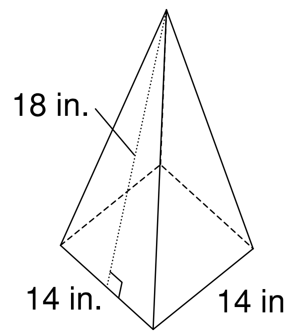
The **slant height** of a pyramid or cone is measured along its lateral surface. A **regular pyramid** has a regular polygon as its base and all lateral faces are congruent. In a **right cone,** the tip of the cone is directly above the center of the base. Use these formulas to find the surface area.

Vocabulary
slant height
regular pyramid
right cone

Pyramid: $S = B + \frac{1}{2}P\ell$ Cone: $S = \pi r^2 + \pi r\ell$

Finding Surface Area

Find the surface area.



A. What is the name of the figure? ______________________

In the formula $S = B + \frac{1}{2}P\ell$, B represents the ______ of the base.

How do you find the area of the base? ______________________

How do you find the perimeter, P, of the base? ______________

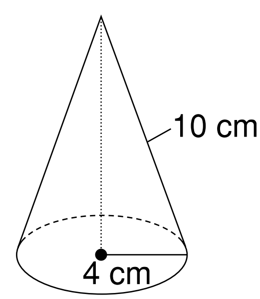
What is the slant height, ℓ, of the pyramid? ______________

$S = \_\_ + \frac{1}{2}\_\_$ Write the surface area formula.

$S = (14 \cdot \_\_) + \frac{1}{2}(\_\_)(18)$ Substitute known values.

$S = (\_\_)(\_\_)$ Multiply.

$S =$ _______ in^2 Multiply.



B. What is the name of the figure shown? ________________

In the formula $S = \pi r^2 + \pi r\ell$, what does r represent? __________

What is the slant height ℓ? ______________________________

$S = \_\_\_\_ + \pi r\ell$ Write the formula.

$S = \pi(\_\_)^2 + \pi(\_\_)(\_\_)$ Substitute values into the formula.

$S = \_\_\pi + \_\_\pi$ Multiply.

$S =$ _____ Add.

$S \approx$ _______ cm^2 Use 3.14 for π.

Name ______________________________________ Date ___________ Class ____________

LESSON 8-9

Ready to Go On? Skills Intervention

Spheres

Vocabulary
sphere
hemisphere
great circle

A **sphere** is a set of points in three dimensions that are a fixed distance from a given point.

Volume Formula: $V = \frac{4}{3}\pi r^3$

Surface Area Formula: $S = 4\pi r^2$

Finding the Volume of a Sphere

Find the volume of a sphere with radius 2 ft, both in terms of π and to the nearest tenth of a unit.

What is the formula for the volume of a sphere? $V =$ ________

What value will you substitute for r? $V = \frac{4}{3}\pi(\_\_)^3$

Simplify the power. $V = \frac{4}{3}\pi\_\_$

Multiply. $V = \frac{\_\_}{3}\pi$

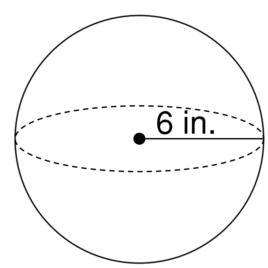
Use 3.14 for π. $V \approx$ _____ ft^3

The volume of a sphere with a radius of 2 ft is ________.

The surface area of a sphere is 4 times the area of a great circle. A **great circle** is the edge of a **hemisphere.** A hemisphere is one half of a sphere.

Finding Surface Area of a Sphere

Find the surface area of the sphere shown in terms of π and to the nearest tenth of a unit.



$S =$ ______ Write the formula for the surface area of a sphere.

$S = 4\pi(\_\_)^2$ What value should you substitute for r?

$S = 4\pi(\_\_)$ Simplify the power.

$S =$ ____ π Multiply.

$S \approx$ ______ in^2 Use 3.14 for π.

The surface area of a sphere with a radius of 6 in. is _________.

Name ______________________________________ Date ___________ Class ____________

LESSON 8-10

Ready to Go On? Skills Intervention

Scaling Three-Dimensional Figures

Vocabulary
capacity

Multiplying the linear dimensions of a solid by n creates n^2 as much surface area and n^3 as much volume, also called **capacity.**

Scaling Models That Are Cubes

A 3 cm cube is built from small cubes, each 1 cm on a side. Compare the following values.

A. the edge length of the two cubes

What is the ratio of corresponding edges? $\frac{\_\_\text{cm}}{1\text{cm}} = \_\_$

The edges of the larger cube are how many times longer than the smaller cube? ___

B. the surface area of the cubes

How many sides are on a cube? ___

How many dimensions do you use when calculating area? ___

What is the ratio of corresponding areas? $\frac{\_\_\ \text{cm}^2}{6\ \text{cm}^2} = \_\_$

The surface area of the larger cube is how many times larger than the smaller cube? ___

C. the volume of the two cubes

How many dimensions do you use when calculating volume? ___

What is the ratio of corresponding volumes? $\frac{\_\_\ \text{cm}^3}{1\ \text{cm}^3} = \_\_$

The volume of the larger cube is how many times larger than that of the smaller cube? ___

Application

A swimming pool has dimensions of 40 ft long, 15 ft wide, and 6 ft deep. If the pool fills at a rate of 16 cubic feet per minute, how long will it take to fill the pool?

$V = 40 \text{ ft} \times 15 \text{ ft} \times 6 \text{ ft} =$ ________ What is the volume of the pool?

$\frac{1 \text{ min}}{16 \text{ ft}^3} = \frac{x}{\_\_\_\_ \text{ ft}^3}$ Set up a proportion.

1 min (________) = ________x Cross multiply.

$x =$ ________ Solve for x

How long will it take to fill the pool in hours and minutes? ________________________

Name ________________________________ Date __________ Class ___________

LESSON 8-10

Ready to Go On? Problem Solving Intervention

Scaling Three-Dimensional Figures

You can use what you know about scaling to solve problems involving weight and volume.

A 125-kg statue is made of a metal with a density of 2.5 g/cm^3.

What is the volume of a $\frac{1}{5}$ scale model of the statue?

Understand the Problem

1. How much does 1 cubic centimeter of the statue weigh? ____________________

Make a Plan

2. The statue is 5 times longer, 5 times higher, and 5 times wider than the model. How many times greater is the volume of the statue than the volume of the model?

____

3. If you knew the volume of the statue, how could you find the volume of the model?

____

4. How can you use the density and weight information to find the volume of the statue? $\left(\textit{Hint:}\ \text{Density} = \frac{\text{weight}}{\text{volume}}.\right)$

____

Solve

5. What is the volume of the statue? (*Hint:* Convert kg to g before dividing.)

____

6. What is the volume of the model?

____

Check

7. Check your calculations by working backwards. See if you get 2.5 g/cm^3 as the density of the statue.

Volume of model = _______ cm^3

Volume of statue = 125 • Volume of model

= 125 • _______ cm^3

= _______ cm^3

Density of statue = $\frac{\text{Weight of statue}}{\text{Volume of statue}}$

= $\frac{\_\_\_\_\_\_\_ \text{ g}}{\text{cm}^3}$

= _______ g/cm^3

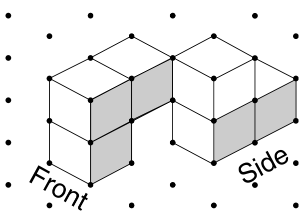
Name ________________________ Date ____________ Class ____________

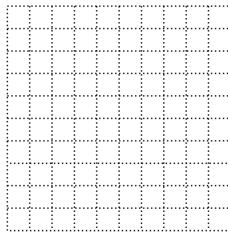
SECTION **8B**

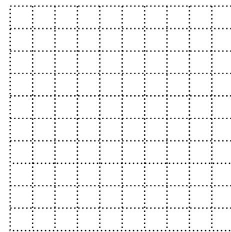
Ready to Go On? Quiz

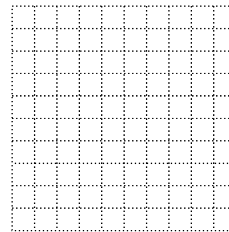
8-4 Drawing Three-Dimensional Figures

1. Draw the top, front, and side views of the welded sculpture.



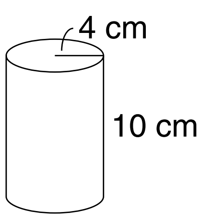

Top

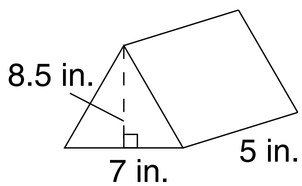

Front

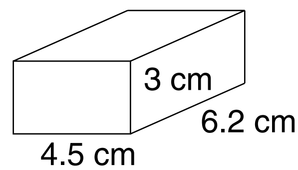

Side

8-5 Volume of Prisms and Cylinders

Find the volume of each figure to the nearest tenth. Use 3.14 for π.

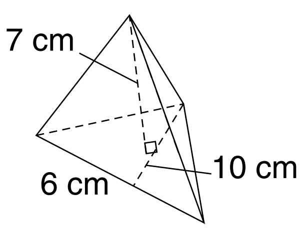
2. 

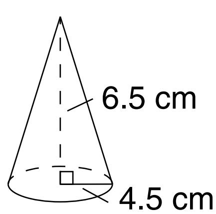
3. 

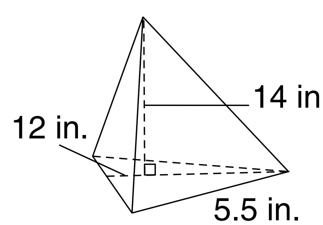
4. 

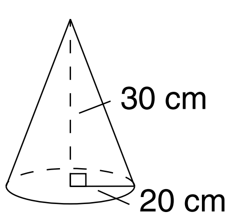
8-6 Volume of Pyramids and Cones

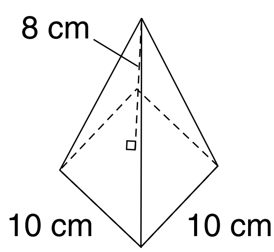
Find the volume of each figure to the nearest tenth. Use 3.14 for π.

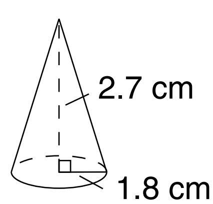
5. 

6. 

7. 

8. 

9. 

10. 

Name ______________________ Date ____________ Class ____________

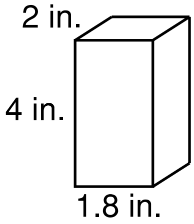
SECTION **8B**

Ready to Go On? Quiz continued

8-7 Surface Area of Prisms and Cylinders

Find the surface area of each figure to the nearest tenth. Use 3.14 for π.

11.



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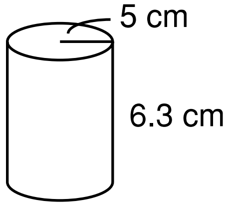
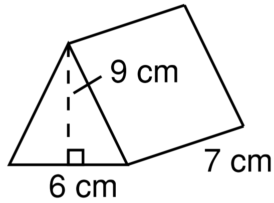
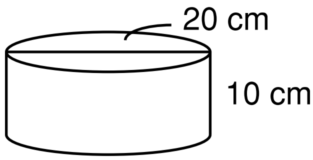


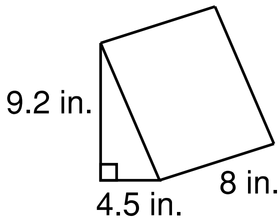
13.



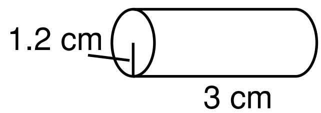
14.



15.



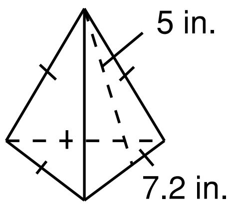
16.



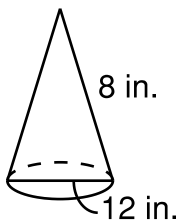
8-8 Surface Area of Pyramids and Cones

Find the surface area of each figure to the nearest tenth. Use 3.14 for π.

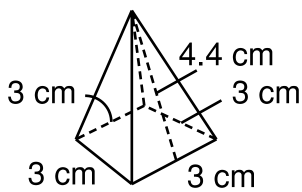
17.



18.



19.



8-9 Spheres

Find the surface area and volume of each sphere with the given measurements, both in terms of π and to the nearest tenth. Use 3.14 for π.

20. radius 7 m

21. radius 1.5 cm

22. radius 2.2 ft

8-10 Scaling Three-Dimensional Figures

23. The dimensions of a new office building are 100 ft wide, 125 ft deep, and 340 ft high. The scale model of the building is 13.6 in. tall. Find the width and depth of the scale model. ____________

Name ______________________________ Date __________ Class __________

SECTION 8B

Ready to Go On? Enrichment

Giant Pyramids

The Pyramid of the Sun is located in the valley of Teotihuacan, 30 miles north of Mexico City, Mexico. It was built in 150 C.E. in what was then a great city. The Great Pyramid in Gizeh, Egypt, was constructed around 2500 B.C.E. It has an estimated weight of 6.5 million tons.

	Pyramid of the Sun	Great Pyramid
Height	233 ft	481 ft
Side of Base	733 ft	756 ft

1. The bases of both pyramids are squares. Use the information in the table to calculate the slant height of each pyramid. Use a calculator and show your work.

Pyramid of the Sun Slant Height = ______________________________

Great Pyramid Slant Height = ______________________________

2. If *s* is the side of a square pyramid and *l* is the slant height of each side, show that the surface area of the pyramid, including the base, is $s(2l + s)$.

____

____

____

____

3. How does the surface area of the Great Pyramid compare to that of the Pyramid of the Sun?

$$\frac{\text{surface area of the Great Pyramid}}{\text{surface area of Pyramid of the Sun}} = \qquad \_\_\_\_$$

____

____

4. How does the volume of the Great Pyramid compare to that of the Pyramid of the Sun?

$$\frac{\text{volume of Great Pyramid}}{\text{volume of Pyramid of the Sun}} = \qquad \_\_\_\_$$

____

____

Name ________________________ Date ____________ Class ____________

LESSON 9-1

Ready to Go On? Skills Intervention

Samples and Surveys

Surveys are used to study an entire group or **population.**
In order to evaluate the survey, you must be aware of the **sample,** or the part of the population, being surveyed. If the sample is not a good representation of the entire group or population being studied, then the sample is considered to be a **biased sample.**

Sampling methods used to make sure that the sample will result in accurate information are:

random	choosing a member by chance
systematic	choosing a member according to a rule or formula
stratified	choosing a member at random from a randomly chosen subgroup
convenience	choosing a member who is easiest to reach
voluntary-response	member chooses to be in the sample

Vocabulary
- population
- sample
- biased sample
- random sample
- systematic sample
- stratified sample
- convenience sample
- voluntary-response sample

Identifying Sampling Methods

Identify the sampling method used.

A. Five teams are chosen. One captain is selected from each team.

This is random and from a subgroup so it is a ________________ sample.

What is the subgroup? ________________

B. Every third name on the volunteer list is called.

A rule is used so it is a ________________ sample.

What is the rule? ____________________

C. Every shopper puts comments in a suggestion box. The manager draws out one comment to discuss with employees.

The comment is selected by chance so it is a ________________ sample.

Identifying Biased Samples

Identify the population and sample. Give a reason why the sample could be biased.

A hotel worker asks the first fifty people who check out on Sunday if they enjoyed the new pool.

Fill in the chart.

Population	Sample	Possible Bias

Name ______________________________________ Date ___________ Class ____________

LESSON 9-1

Ready to Go On? Problem Solving Intervention

Samples and Surveys

When you use a sample, try to choose a sampling method that is not biased so that the information you get reflects the population.

You want to find out how much time students in your school read and watch television. Which sampling method would you use? Why?

Method A: Choose every 3rd person that comes into the school library until you have 60 students.

Method B: Randomly choose 20 students at a school soccer game, 20 at a baseball game, and 20 at a basketball game.

Method C: From an alphabetical list of students' names, pick every other name until you have 60 names.

Method D: Write each student's name on a slip of paper, put them in a bowl, and randomly pick 60 slips.

Understand the Problem

1. What is the population you want to find out about?

____

Make a Plan

2. As you examine each method, what will you look for?

____

____

Solve

3. Why won't the samples in A and B represent the population?

____

____

4. Look at Method C. Why don't all the students have an equal chance of being selected?

____

____

5. Does Method D give all students an equal chance to be picked? ____________

Check

6. Which method would you use? Why?

____

Name ______________________ Date __________ Class __________

LESSON **9-2**

Ready to Go On? Skills Intervention

Organizing Data

A **line plot, back-to-back stem-and-leaf plot,** and **Venn diagram** are three ways to organize and display data.

Vocabulary
line plot
back-to-back stem-and-leaf plot
Venn diagram

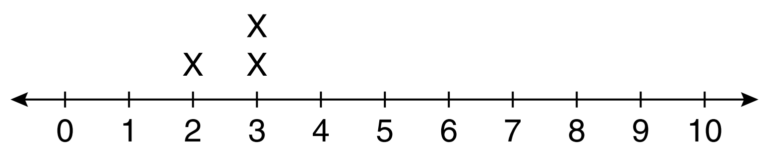
Organizing Data in Line Plots

Use the given data to make a line plot:
3, 2, 4, 4, 6, 7, 8, 8, 6, 5, 4, 3.

How many 4s are there? ____

Place ____ Xs above 4.

Complete the line plot.



Organizing Data in Back-to Back Stem-and-Leaf Plots

Use the given data to make a stem-and-leaf plot.

Identify the stems. ________

Baseball Scores for High School Championships						
Year	**97**	**98**	**99**	**00**	**01**	**02**
Win	7	12	13	6	3	9
Loss	5	7	10	1	2	6

Fill in the stems.

Fill in the leaves; losses will be read backwards.

What does the key 1| 0 | represent? ________

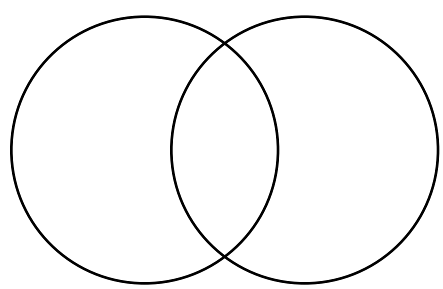
What does the key | 1 | 2 represent? ________

Loss		Win

Organizing Data in Venn Diagrams

Use the data in the table to make a Venn diagram showing how many ropes are blue and how many are 12 inches or longer.

Rope Inventory	
Color	**Length (in.)**
red	18
red	12
blue	8
blue	18
blue	12
red	8
blue	18



How many ropes are blue? ____ How many ropes are 12 inches or longer? ____

How many ropes are blue AND 12 inches or longer? ____

Label your Venn diagram. Give it a title.

Name ______________________ Date ___________ Class ___________

LESSON 9-2

Ready to Go On? Problem Solving Intervention

Organizing Data

Match each stem-and-leaf plot to its corresponding description.

Plot A

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

Plot B

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

Plot C

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

1. Length of some TV shows in minutes not counting commercials

2. Size of classes at Oak School

3. Number of hits by each baseball player so far this season

Understand the Problem

1. How are the 3 stem-and-leaf plots different?

____

____

Make a Plan

2. What do you know about the length of television shows?

____

____

3. How can you use what you know about television shows to find the plot that goes with description 1?

____

____

Solve

4. Use what you know about television shows, class sizes, and baseball to match the plots to the descriptions.

____

Check

5. How can 30-minute TV shows be different lengths?

____

Name ______________________________ Date __________ Class ____________

LESSON 9-3

Ready to Go On? Skills Intervention

Measures of Central Tendency

Vocabulary
mean
median
mode
range
outlier

The measures of central tendency are:
mean average
median middle value
mode occurs most often
range difference between the greatest and least data values
outlier an extreme data value

Choosing the Best Measures of Central Tendency

These are ages of the people at the playground.
2, 6, 4, 8, 9, 4, 7, 46

A. What is the average age of people at the playground?

Mean: 2 + 6 + 4 + 8 + 9 + 4 + 7 + 46 = _________ Find the total of the values.

Mean = $\frac{\_\_}{\_\_}$ = _________ Divide by _________, the total number of values.

B. What is the middle age of people at the playground?

Median: ____________________ Order the values.

The median is the number between which two values? _________ and _________

$\frac{\_\_ + \_\_}{2}$ = _________ Average the two middle values to find the median.

C. What is the most frequent age of people at the playground?

Mode: _________ What number occurs the most often?

D. What is the difference between the ages of the oldest and youngest persons?

Range: 46 − ____ = ____ Difference between the greatest and least data values.

E. Is there an extreme value in the data? _________ Identify the outlier. _________

Without the outlier, the mean would be about _________.

Planets	Diameter (km)
Mercury	4,800
Venus	12,103.6
Earth	12,756.3
Mars	6,794
Jupiter	142,984
Saturn	120,536
Uranus	51,118
Neptune	49,532
Pluto	2,274

Application

Find the average diameter of all the planets.

$\frac{4{,}800 + \_\_\_\_ + \_\_\_\_ + \_\_\_\_ + \_\_\_\_ + \_\_\_\_ + \_\_\_\_ + \_\_\_\_ + \_\_\_\_}{9}$

= _________ km

Name ______________________________ Date __________ Class __________

LESSON **9-4**

Ready to Go On? Skills Intervention

Variability

Variability describes the spread of a data set.
First Quartile: median of lower half
Third Quartile: median of upper half

A **box-and-whisker plot** shows the distribution of the data. Use the box to represent the middle half of the data and the whiskers to represent the lower and upper fourth of the data.

Vocabulary
variability
quartile
box-and-whisker plot

Finding Measures of Variability
Find the range and the first and third quartiles for the set of data.
12 19 16 20 13 14 13 17 19 14 16

Place the values in order. ______________________________

What is the median of the data? ______ Put a box around it.

Put a box around the lower half of the data and find its median (first quartile). ________

Put a box around the upper half of the data and find its median (third quartile). ________

Making a Box-and-Whisker Plot
Use the given data to make a box-and-whisker plot.
13 41 15 49 17 15 12 20 51 13 55 43 56

Step 1

Order the data. ______________________________

Find the items listed below.

smallest value: ______

first quartile: ______________

median: ______

third quartile: ______________

largest value: ______

Step 2
Draw a number line with a vertical line above each value from Step 1.

10 20 30 40 50 60

Step 3
Draw horizontal lines to make the box and whiskers.

10 20 30 40 50 60

Name ______________________ Date ___________ Class ___________

SECTION 9A

Ready to Go On? Quiz

9-1 Samples and Surveys

Identify the sampling method used.

1. The winning raffle ticket for a new bicycle was drawn from a hat.

____

2. A store promotion gave every twelfth customer that purchased Acme bread a free loaf.

____

Identify the population and sample. Give a reason why the sample might be biased.

3. A coach asks the starting players on the soccer team to tell their favorite sport.

____

____

4. The first 30 bikers to come back from the trail were surveyed whether the ride was fun.

____

____

9-2 Organizing Data

5. Use a line plot to organize the data of the number of pages read so far by each member of the book club: 47, 39, 44, 46, 42, 48, 44, 46, 43, 41, and 39.

39 40 41 42 43 44 45 46 47 48

6. Use the given data to make a back-to-back stem-and-leaf plot.

Fish Caught at Lake Paden					
	April	May	June	July	August
North shore	72	68	81	47	52
East shore	64	59	53	51	43

North Shore		East Shore
	4	
	5	
	6	
	7	
	8	

Name ______________________________ Date __________ Class __________

SECTION 9A

Ready to Go On? Quiz continued

9-3 Measures of Central Tendency

Determine and find the most appropriate measure of central tendency or range for each situation.

7. The height of the players on the basketball team are 63, 71, 66, 74, 62, 67, 68, 72, and 67 inches. What is the spread of the height of the players? ____________

8. The number of milk cartons sold during lunch were 60 on Monday, 67 on Tuesday, 84 on Wednesday, 82 on Thursday, and 51 on Friday. What number best describes the middle number? ____________

9. Each student checked to see how many pencils were in their backpacks. Students found 1, 2, 0, 7, 5, 3, 4, 8, 3, 6, and 5 pencils in their backpacks. Find the average number of pencils. ____________

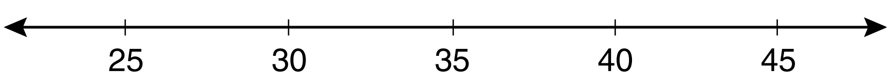
9-4 Variability

Use the data given to make a box-and-whisker plot.

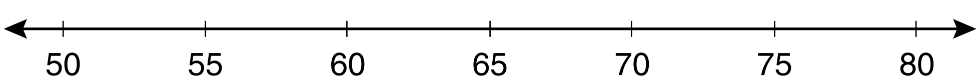
10. Find the first and third quartiles of the following data set: 15, 16, 17, 20, 15, 21, 16, 17, 18, 15, 20, 16, 18, 15, 19, 20, 22, 24, 19, 17, 21.

____

11. 42, 36, 39, 26, 41, 27, 34, 31, 29



12. 63, 48, 71, 77, 57, 49, 68, 64, 66



Name ______________________ Date __________ Class __________

SECTION 9A

Ready to Go On? Enrichment

Track Meet Preparation

Last year, Frederico made improvements in his times and distances at league track meets. He wants to do even better in the coming season so he practices often and charts his progress.

Find the most appropriate measure of central tendency or range for each situation.

1. The best times in seconds for the 400-meter run were 59.2, 58.7, 60.1, 60.0, 58.8, and 58.4. What was the spread of the times? ______________

2. Ten attempts at the high jump yielded heights of 63, 64, 64, 63, 62, 64, 65, 64, 66, and 65 inches. Find the mean of his high jumps. ______________

3. His top discus throws for one week were 11.4, 12.1, 13.6, 12, 14.2, 11.8, and 13.8 meters. What is the median of his throws? ______________

4. In one day, Frederico ran ten 100-meter sprints. His finishing times were 13.2, 12.7, 13.4, 12.9, 12.4, 12.6, 12.7, 12.2, 13.1, and 14.9 seconds. If the outlier is removed, what was his average time? ______________

5. During a six-month period, Frederico practiced 27, 24, 29, 30, 29, and 28 days a month. Find the mode for the number of days practiced in a month. ______________

6. His top long jumps were 6.94, 6.87, 7.06, 7.02, 7.11, 7.09, and 7.16 meters. What is the median of his jumps? ______________

7. His javelin throws during one week were 16, 18, 16, 14, 29, 16, and 17 meters. What are the mean, median, mode, and range of his javelin throws? Which figure makes Frederico look the best?

____

____

8. What is the outlier in Frederico's javelin throws? If it is removed, how does that affect the other measures of central tendency?

____

Name ______________________________________ Date ___________ Class ____________

LESSON **9-5**

Ready to Go On? Skills Intervention
Displaying Data

Displaying Data in a Double-Bar Graph
Organize the data into a frequency table and make a bar graph.

The following are the ages of a randomly chosen group of 30 teenagers when got their first job:
Girls 15 16 15 17 19 17 18 16 17 18 18 17 16 19 18
Boys 16 16 15 18 18 15 16 17 17 15 19 16 18 17 18

First organize the data into a frequency table.

How many times does each value occur?

Age at First Job	15	16	17	18	19
Girls	2	3	4	4	2
Boys	3	4	3	4	1

What is the title of the double-bar graph?

____

Label the *x*- and *y*-axis on the graph.
Determine and fill in the scale for each axis.
Use the frequency table to complete the double-bar graph.

Displaying Data in a Histogram
For their big summer sale, a catalog company wants to display their products grouped together by price range. Make a histogram of the given merchandise prices. Use an interval of $5.00.
$11 $8 $2 $4 $17 $9 $10 $13 $7 $11 $19 $3 $6 $4 $12 $14 $8 $9

How many items are in each price range? Fill in the table.

Price ($)	**Frequency**
1–5	4
6–10	7
11–15	5
16–20	2

How is the *x*-axis labeled? *y*-axis?

____

Label the intervals of both the *x*- and *y*-axes.
Complete the histogram by drawing the bars.

Should there be any space in between the bars? ______

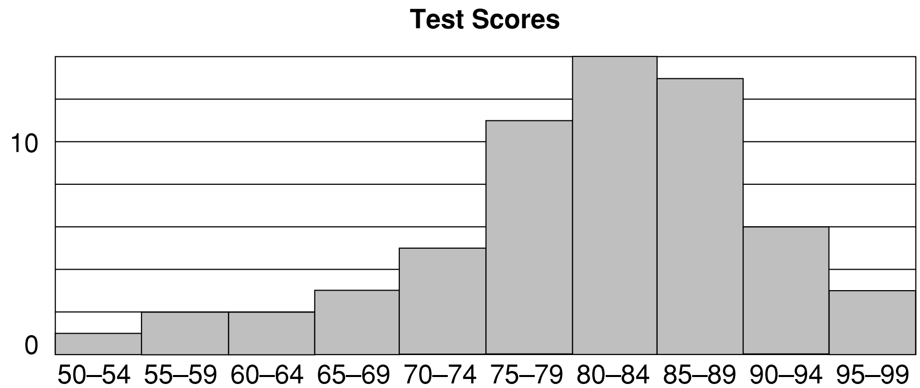
Name ______________________________ Date __________ Class __________

LESSON 9-5

Ready to Go On? Problem Solving Intervention

Displaying Data

What is the greatest difference between two adjacent bars in this histogram? Suppose the intervals were changed so they had a range of 10 instead of 5. What would the greatest difference be?



Understand the Problem

1. How many scores are in the 70–74 interval? How many more than that number are in the 75–79 interval? ____________

Make a Plan

2. How can you find the greatest difference between adjacent bars in the histogram shown?

____

3. When the intervals are changed to have a range of 10, what will the first two intervals be? What will be the heights of the first two bars? What will be the difference between those first two bars?

____

Solve

4. What is the greatest difference between adjacent bars for the histogram shown? For the new histogram? Explain.

____

____

____

____

Check

5. Sketch a histogram with the new intervals.

Name ______________________________ Date __________ Class __________

LESSON 9-6

Ready to Go On? Skills Intervention

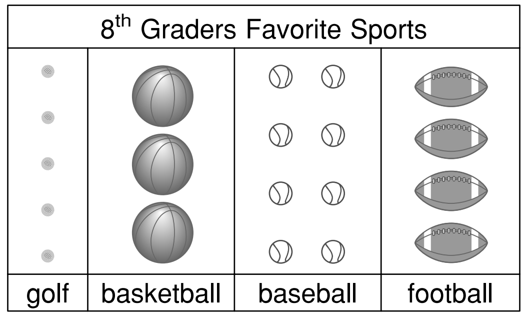
Misleading Graphs and Statistics

Data can be presented in a way that may intentionally distort or indicate misleading information.

Identifying Misleading Graphs

Explain why each graph is misleading.

A.



How many 8^{th} grade students like golf? ___

How many 8^{th} grade students like basketball? ___

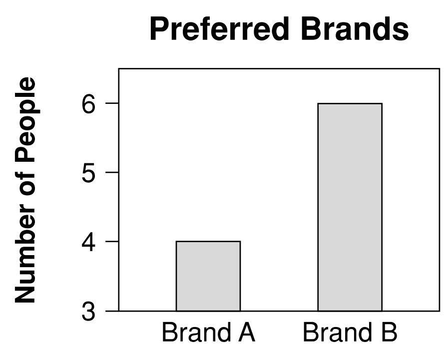
How many 8^{th} grade students like baseball? ___

How many 8^{th} grade students like football? ___

Why does the graph look like more students prefer basketball over golf? ______________________

What is the most preferred sport according to this graph? ______________________

B.



Where does the scale start? ___

How many people prefer brand A? ___

How many people prefer brand B? ___

Do twice as many people prefer Brand B over Brand A as the bars seem to show? ______

What happens when the scale does not start at 0?

____

Identifying Misleading Statistics

Explain why the statistic is misleading.

An advertiser for a local pizzeria asks 10 people what their favorite topping is on their pizza. Six people said pepperoni, 3 said sausage, 1 said mushrooms, and 1 said bacon. The ad read "Try our Pepperoni Pizza. It is preferred 2 to 1 over all other toppings."

How many people did the advertiser ask? ___

How many people voted for pepperoni? ___

How many people voted for sausage? ___

Is the difference between 3 and 6 people meaningful? ______________________

Is the advertisement statement truthful or misleading? ______________________

Name ______________________________ Date __________ Class __________

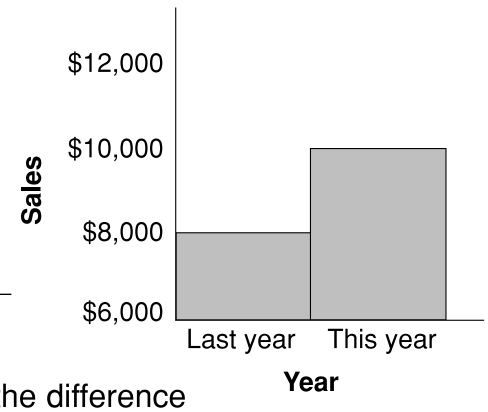
LESSON **9-6**

Ready to Go On? Problem Solving Intervention

Misleading Graphs and Statistics

Even if a graph is misleading, you can still figure out the truth.

This year's sales are $2,000 more than last year's. To make it appear that sales have doubled from last year, a bar graph starts at $6000 instead of 0. In reality, how many times greater are this year's sales than last year's?



Understand the Problem

1. On the misleading graph, how many times taller is the bar for this year's sales than for last year's?

____

Make a Plan

2. If one bar is twice as high as another, how does the difference compare to the short bar?

____

Solve

3. How many dollars is it from the bottom of last year's bar to the top?

____

4. If the vertical scale starts at $2,000, what were last year's sales? What were this year's sales?

____

5. In actuality, how many times greater are this year's sales than last year's? Show your work.

____

Check

6. Sketch the graph using your answers to Exercise 4.

Name ______________________ Date ____________ Class ____________

LESSON 9-7

Ready to Go On? Skills Intervention

Scatter Plots

A **scatter plot** shows a relationship between two sets of data. **Correlation** describes the relationship between the data sets. The **line of best fit** is a line that comes closest to the most points on the scatter plot.

Vocabulary
scatter plot
correlation
line of best fit

Making a Scatter Plot of a Data Set

A teacher studying the effects of sleep on test scores gathered the data shown in the table. Use the data to make a scatter plot.

Hours Slept	Test Score	Hours Slept	Test Score
5	69	**8.5**	87
5	65	**9**	91
6	80	**9**	93
6.5	77	**10**	85
7	79	**10.5**	92
7	85	**11**	100
8	83	**12**	97

Label the *x*- and *y*-axes.

Determine and fill in the scale for each axis.

How many data points do you need to plot?

____

Plot the data from the table. For instance plot a point at (5, 69).

Does the data appear to have a positive, negative, or no correlation?

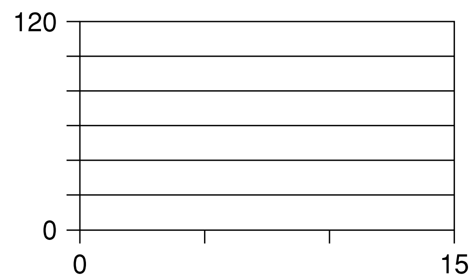
____

How can you tell? ______________________

____

____

Test of Sleep



Identifying the Correlation of Data

Do the data sets have a positive, negative, or no correlation?

A. The age and weight of a baby

As a baby gets older his weight ______________. Both sets of data

______________, so the data has a ______________ correlation.

B. The amount of free time you have and the number of sports that you play

Your free time ______________ as the number of sports you play

______________; therefore, the data has a ______________ correlation.

C. The price of a shirt and the color of its buttons

The price is not affected by the color of its buttons so the data has ______________.

Name ______________________ Date ____________ Class ____________

LESSON 9-8

Ready to Go On? Skills Intervention

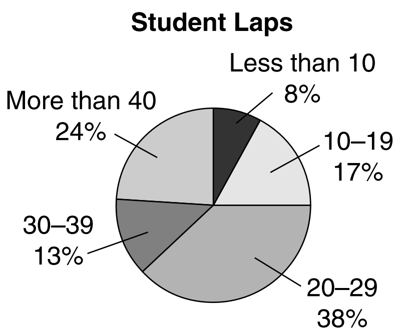
Choosing the Best Representation of Data

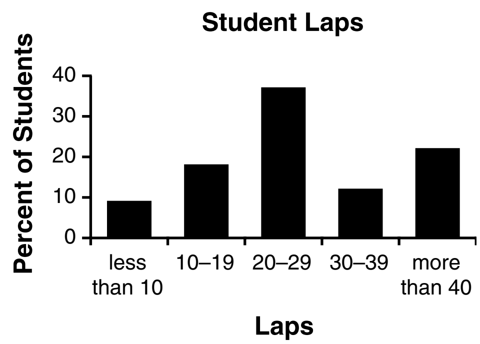
Data can be represented in many different ways, depending on both the type of data and the message being displayed. When data is shown in the most appropriate way it will be understood more easily.

Graph Type	Common Use
Line graph	Shows change in data over time.
Bar graph	Shows relationships or comparisons between groups.
Circle graph	Compares parts to a whole.
Histogram	Shows the frequency of data divided into equal groups.
Box-and-whisker plot	Shows the distribution and spread of data.
Line plot	Shows the distribution of data.
Scatter plot	Shows the relationship of two data sets.

Selecting a data display

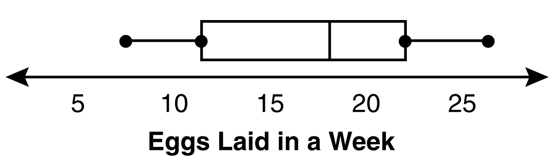
Which graph is a better display of the data on the number of laps students completed for their run, walk, or jog fundraiser?

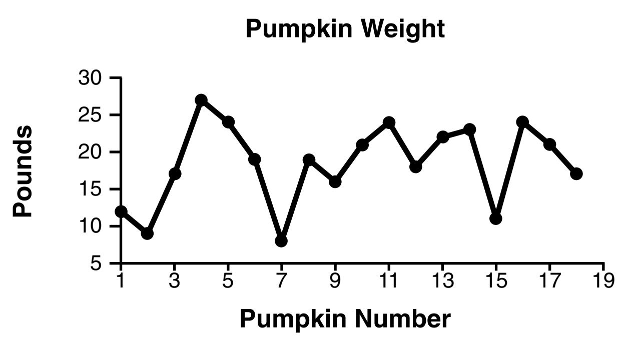




The ______________ is the better representation.

Which graph better shows the distribution of eggs laid?





The ______________________ is the better representation because the question asks about eggs. The ________ of the line graph shows it does not display the correct data.

Name ______________________________ Date ___________ Class ___________

LESSON **9-8**

Ready to Go On? Problem Solving Intervention

Choosing the Best Representation of Data

An assistant basketball coach recorded the distance from the basket of each shot that was made. She wanted to develop the most fitting offensive strategy to help her team win more games.

Shots were made from 12, 16, 10, 4, 2, 2, 2, 12, 18, 10, 17, 18, 13, 8, 15, 19, 11, 7, 3, 2, 8, 12, 2, 3, 14, 2, and 7 feet away from the basket. The coach chose to group made shots in 5 foot increments.

Understand the Problem

1. Which representation would most clearly display all of the baskets made and how many baskets were made from each distance? Explain.

____

2. What is the coach most interested in learning?

____

Make a Plan

3. What will show all made baskets?

____

4. What will show baskets in 5-foot groups?

____

5. What will show the percent of the whole for each group?

____

Solve

6. Put data in the circle graph.

Check

7. Is there another display that would show the data clearly? Explain.

____

____

Name ________________________________ Date __________ Class ___________

SECTION **9B**

Ready to Go On? Quiz

9-5 Displaying Data

1. Organize the data into a frequency table and make a double-bar graph.

Data set 1: 4, 2, 6, 3, 3, 4, 7, 5, 6, 3, 4, 7, 3, 5, 6
Data set 2: 3, 4, 2, 2, 4, 4, 6, 3, 7, 4, 2, 6, 7, 4, 5

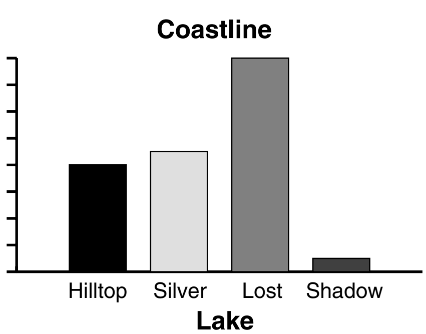
2. A marching band tallied the number of minutes they practiced each day. Use the data to make a histogram with intervals of 10 minutes.

38, 44, 48, 37, 51, 34, 47, 39, 46, 48, 62, 49, 53, 45, 37
43, 54, 52, 41, 36, 30, 46, 38, 53, 62, 47, 41, 38, 57, 47

9-6 Misleading Graphs and Statistics

Explain why each graph may be misleading.

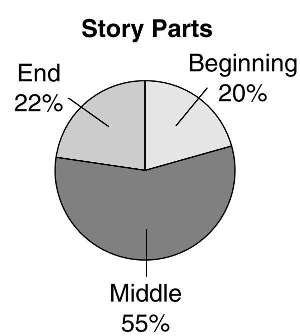
3.



____

____

4.



____

____

5. A survey found 29% of students like to read history best, 16% like science fiction, 28% enjoy reading about sports, and 27% prefer to read mysteries. The survey concludes that most students like to read history the best. Explain why the statistic is misleading.

____

____

SECTION **9B**

Ready to Go On? Quiz continued

9-7 Scatter Plots

6. Use the given data of class sizes to make a scatter plot.

Year	1999	2000	2001	2002	2003	2004	2005
Class size	235	264	216	385	372	361	406

Do the data sets have a positive, a negative, or no correlation?

7. the height of a mountain and its temperature

____

____

8. the color of a person's hair and his or her weight

____

9-8 Choosing the Best Representation of Data

9. One sunny afternoon two children skipped rocks across the lake. They wanted to know how many skips were in each range. Rocks were skipped 4, 3, 7, 9, 13, 4, 8, 3, 5, 8, 6, 11, 5, 7, 3, 6, 5, 6, 11, 8, and 7 times. Choose an appropriate data display and draw the graph.

Name ______________________________________ Date ___________ Class ____________

SECTION **9B**

Ready to Go On? Enrichment

Wingspan

A model plane contest had participants building their own planes in an attempt to travel the farthest distance. Different sized model airplanes were constructed to achieve the longest flight. The students made a table of their results.

Wingspan (in inches)	2	5	8	10	12	15	20
Flight distance (in feet)	10	16	20	24	30	36	44

1. Use the given data to make a scatter plot.

Tell whether the data sets have a positive, negative, or no correlation. Explain.

2. the school year of the person launching the airplane and the flight distance

____

____

3. the weight of the landing gear attached to the plane and the distance flown

____

____

4. the tailwind speed and the distance traveled

____

____

5. Predict how far a model plan will fly if it has a 25-inch wingspan.

____

Name ________________________________ Date ___________ Class ____________

LESSON 10-1

Ready to Go On? Skills Intervention

Probability

The **probability** of an **event** occurring is a number from 0 to 1 that tells how likely the event is to happen.

Vocabulary
probability
outcome

Finding Probabilities of Outcomes in a Sample Space
Give the probability of each outcome.

A. What is the probability that it will not snow?

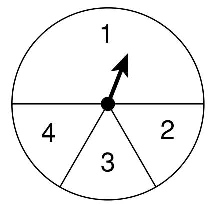
Outcome	Snow	No Snow
Probability	20%	?

What is the probability of snow? ______
Probabilities must add to 1:
P(snow) + *P*(no snow) = 1

P(no snow) = 1 − ______ = ______ or ______%

What is the probability that it will not snow? ______

B. Complete the table.



What fraction of the spinner is labeled 1? ____

The probability of the spinner landing on 1

is *P*(1) = ____.

If the spinner was divided evenly how many sections would there be? ______

Outcome	1	2	3	4
Probability				

What fraction of the spinner is labeled 2? ____

The probability of the spinner landing on 2 is *P*(2) = ____.

The probability of the spinner landing on 3 is *P*(3) = ____.

Finding Probabilities of Events
A quiz contains 4 multiple-choice questions. Suppose you guess randomly on every question. The table below gives the probability of each score.

Score	0	1	2	3	4
Probability	0.4096	0.4096	0.1536	0.0256	0.0016

What is the probability of guessing two or more correct answers?

What does two or more mean? ____________

P(2 or more) = ____________ + ____________ + ____________

P(2 or more) = ____________

Name ______________________________________ Date ___________ Class ____________

LESSON **10-1**

Ready to Go On? Problem Solving Intervention

Probability

The winner of a contest will get a CD player, a bicycle, or a television. For the winner, getting the CD player is twice as likely as getting the bike, which is three times as likely as getting the television. Create a table of probabilities for the sample space.

Understand the Problem

1. What probabilities will you show? What is their sum? Explain.

____

____

Make a Plan

2. Let t be P(television), the probability of the winner getting the television. Write expressions with t for P(bike) and P(CD player).

____

3. Write an equation to show that the sum of the three probabilities is 1.

____

Solve

4. Solve the equation you wrote in Exercise 3.

____

5. Make a table of the three probabilities.

Outcome			
Probability			

Check

6. Make sure your answer fits all the conditions in the problem.

____

____

Solve.

7. A flashlight is added to the possible prizes. P(flashlight) = 2.5 • P(CD player). The other conditions are still true. What are the 4 probabilities?

____

Name ____ Date ___________ Class ____________

LESSON **10-2**

Ready to Go On? Skills Intervention

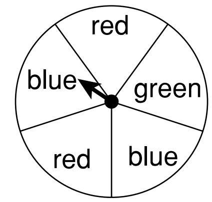
Experimental Probability

Experimental probability = $\frac{\text{number of times event occurs}}{\text{total number of trials}}$

Vocabulary
experimental probability

Estimating the Probability of an Event

A. After 550 spins of the spinner, the following information was recorded. Estimate the probability of the spinner landing on blue.



Outcome	Red	Blue	Green
Spins	216	185	149

How many spins landed on blue? _______

What is the total number of spins? _______

Find the probability of spinning blue: $\frac{\text{number of times event occurs}}{\text{total number of trials}} = \frac{\_\_}{\_\_}$

There is a ______% probability of spinning blue.

B. A marble is randomly drawn out of a bag and then replaced. The table shows the results after 200 draws. Estimate the probability of drawing a green marble.

Outcome	Red	Green	Orange	Purple	Yellow
Draws	65	72	32	18	13

Probability ≈ $\frac{\text{number of \_\_\_\_\_ marbles drawn}}{\text{total number of draws}} = \frac{\_\_}{200}$ = ______%

C. A researcher has been recording the number of people who stop to pick up a coin laying on the ground. Of the last 75 people observed, 32 stopped to pick it up, 12 kicked it, 18 picked it up and put it back down, and 13 stepped over it. Estimate the probability that a person will pick it up and put it back down.

Complete the table.

Outcome	pick it up	kick it		
Observations	32			

Probability ≈ $\frac{\text{number of people who will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_}}{\text{total number of \_\_\_\_\_\_\_\_\_\_\_}}$

$= \frac{\_\_}{\_\_}$ = ______%

The probability that a person will pick it up and put it back down is

______ (decimal) or ______%.

Name ______________________________ Date __________ Class __________

LESSON **10-3**

Ready to Go On? Skills Intervention

Use a Simulation

A **simulation** is a model of a real situation.

Vocabulary
simulation

Problem Solving Using Random Numbers

Children at the frog-hopper game at the carnival win about 35% of the time. Estimate the probability that at least 4 of the next 10 children will win the game.

48966	67122	23502	36056
56033	23817	30369	73211
28694	28131	96798	77484
93042	85734	16081	53686
74069	52580	18621	84479
92344	33648	80295	95300

Understand the Problem

The answer will be the probability that a child will win at least ______ out of the next ______ tries.

List the important information:

The probability that a child will win a game is what percent? ______.

Make a Plan

Use a simulation to model the situation. Use digits from the table shown above, grouped in pairs.

Since the probability of a win is 35%, the numbers 01 to ______ will represent a win. The numbers ______ to 00 will represent a loss.

List the first twenty digits in the table above, grouped in two's.

48	96	66							

How many of the numbers are between 01 and 35? ______

This represents ______ wins out of 10.

Complete the tables for the next 5 trials.

56	03	32							

How many wins? ______

How many wins? ______

How many wins? ______

How many wins? ______

How many wins? ______

Out of 6 trials, how many represented 4 or more wins? ______

Based on the simulation, the probability of at least four children out of the next ten winning the game is about ______ out of 6, or ______%.

Name ______________________________________ Date ___________ Class ____________

LESSON 10-3

Ready to Go On? Problem Solving Intervention

Use a Simulation

A baseball player gets on base an average of 400 times for every 1,000 times he bats. If he bats 5 times in a game, what is the probability he will get on base 3 or more times?

Understand the Problem

1. When the player bats, what is the probability he will get on base?

____

Make a Plan

2. If you model the problem with the random number table, why could you use a 1-digit number to represent a single time at bat?

____

3. What digits will represent getting on base? What digits will represent not getting on base? What will represent batting 5 times?

____

Solve

4. Look at 50 groups of 5 digits. Each group represents 5 times at bat in a game. Circle the groups that represent getting on base 3 or more times in a game.

87244	11632	85815	61766	19579	28186	18533	42633
74681	65633	54238	32848	87649	85976	13355	46498
53736	21616	86318	77291	24794	31119	48193	44869
86585	27919	65264	93557	94425	13325	16635	28594
18394	73266	67899	38783	94228	23426	76679	41256
39917	76373	59733	18588	22545	61378	33563	65161
96916	46278	78210	13906	82794	01136	60848	98713

____

5. Based on your simulation, what is the probability that the player will get on base at least 3 times in 5 times at bat?

____

Check

6. Make sure your answer is a number between 0 and 1.

Name ______________________ Date ___________ Class ___________

SECTION 10A

Ready to Go On? Quiz

10-1 Probability

Use the table to find the probability of each event.

Outcome	A	B	C	D
Probability	0.1	0.3	0.5	0.1

1. *P*(B) ______ **2.** *P*(A or B) ______ **3.** *P*(not C) ______ **4.** *P*(B, C, or D) ______

At an ice cream shop, customers can choose up to 6 different toppings to be blended with their ice cream. The table gives the probability of each outcome.

Outcome	0	1	2	3	4	5	6
Probability	0.013	0.142	0.361	0.254	0.136	0.083	0.011

5. What is the probability of someone getting less than 3 toppings? ______

6. What is the probability of someone getting 3 or 4 toppings? ______

People leaving a theater rated the movie they saw on a scale of 0 ("Hated it") to 6 ("Loved it"). The table gives the probability of each outcome.

Outcome	0	1	2	3	4	5	6
Probability	0.004	0.011	0.081	0.163	0.216	0.422	0.103

7. What is the probability that a rating is over 4? ______

8. What is the probability that a rating is *not* the highest or lowest possible? ______

9. Four students are finalists in the competition for best science essay. Kyle has a 45% chance of winning. Jim's chance of winning is one-third of Kyle's. Mia's chance is the same as Amy's. Create a table of probabilities for the sample space.

10. Five frogs are in a jumping contest. Luke has 20% chance of winning. Pip's chances are one-quarter of that. Croak, Jojo, and Max have equal chances. Create a table of probabilities for the sample space.

Name ______________________________________ Date ___________ Class ____________

SECTION 10A

Ready to Go On? Quiz continued

10-2 Experimental Probability

A colored chip is randomly drawn from a box and then replaced. The table shows the results after 300 draws.

Outcome	Red	Green	Blue	Yellow
Probability	78	57	141	24

11. Estimate the probability of drawing a blue chip. ________________

12. Estimate the probability of drawing a red chip or a yellow chip. ________________

13. Estimate the probability of drawing a chip that is not green. ________________

10-3 Use a Simulation

Use the table of random numbers to simulate each situation. Use 10 trials for each simulation.

57245	39666	18545	50534	57654	25519	35477
42726	58321	59267	72742	53968	63679	54095
82768	32694	62828	19097	09877	32093	23518
97742	58918	33317	34192	06286	39824	74264
48332	38634	20510	09198	56256	04431	22753
26700	40484	28341	25428	08806	98858	04816

14. A survey shows that in Central City, 71% of the households have more than one television set. Estimate the probability that at least 5 out of 10 randomly chosen households have more than one television set. ________________

15. A carton contains 100 pairs of socks. Of these, 33 pairs of socks are brown. If you randomly select 6 pairs of socks, what is the probability that at least 2 pairs will be brown? ________________

16. In a college town, 2 out of every 5 people is a college student. If you randomly select 7 people on the street, what is your estimate of the probability that at least 4 of those 7 people are college students? ________________

Name ______________________________ Date __________ Class __________

SECTION **10A**

Ready to Go On? Enrichment
Random Numbers and Codes

You have seen how random digits can be used to simulate random events. Random digits are also central to encryption, which means putting plain text into code.

The sender and receiver of a coded message have to use the same key. A simple key might be: Each code letter is 10 positions later in the alphabet than the text letter. Thus the text *We can meet at five in the park* would be encrypted as GO MKX WOOD KD PSFO SX DRO ZKBU.

1. Suppose the key is: Each code letter is 5 positions later in the alphabet than the text letter. Write the coded message for *I will call you tomorrow*.

____

2. If someone intercepted this message and suspected that the code involved a simple shift in the alphabet, how would they go about breaking the code?

____

____

A more complicated code involves the use of what is called a one-time pad (OTP). Used only for one message, the OTP contains a sequence of random numbers. Every character in the message is encrypted with a different number. Suppose the sequence in the OTP consists of random numbers in the range 00 to 26. If the sequence begins 052501, that means the first letter in the text is 5 positions later in the alphabet than the first letter in the code, the second is 25 positions later, and the third is 1 position later. Thus, if the first word in the text is *Why*, the code would read BFZ.

3. Use the OTP on the right to encrypt the message *I will call you tomorrow*.

020720 011215 262120 171311 032612 092324 072019

____

4. Compare the two encryptions you wrote for the same sentence. What clues about the original text does the simple code give someone that the OTP code does not?

____

____

____

5. Use the random number generator in a spreadsheet program to create your own OTP. Use the OTP to encode a message. Give the OTP and the coded message to a partner for decoding, and decode the message your partner gives you.

Name ______________________________ Date ___________ Class ____________

LESSON 10-4

Ready to Go On? Skills Intervention

Theoretical Probability

Vocabulary
theoretical probability

Theoretical probability is used to estimate probabilities by making assumptions about an experiment.

$$\text{Probability of an event} = \frac{\text{number of equally likely outcomes in an event}}{\text{total number of possible outcomes}}$$

Calculating Theoretical Probability

An experiment consists of rolling a specially-numbered fair number cube. There are 6 possible outcomes: 2, 4, 6, 8, 10, and 12. What is the probability of rolling a 6?

What does a fair number cube mean? ________________________________

How many 6's could be rolled? ________

The probability of rolling a 6 is $P(6) = \frac{\_\_}{6}$.

Calculating Probability for Two Fair Number Cubes

An experiment consists of rolling two fair number cubes.

A. What is the probability that the total shown on both number cubes is 4?

How many outcomes are possible?

______

$P(\text{total} = 4) = \frac{__}{36} = $ ______

B. What is the probability that the total shown on both number cubes is greater than 9?

List the outcomes that are possible:

______, ______, ______, ______,

______, and ______.

$P(\text{total} > 9) = $ ______ $=$ ______

	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
4	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
5	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

Finding the Probability of Mutually Exclusive Events

Suppose you are playing a game in which two fair number cubes are rolled. You need a total of 9 to finish the game by an exact count, or 5 to land on a "free space." What is the probability of landing on finish or a "free space"? Use the table above.

The event "total = 9" consists of how many outcomes? ______

The event "rolling a 5" consists of how many outcomes? ______

$P(\text{win or free space}) = \frac{__}{36} + \frac{__}{36} = $ ______ $=$ ______

Name ______________________________ Date __________ Class __________

LESSON **10-5**

Ready to Go On? Skills Intervention

Independent and Dependent Events

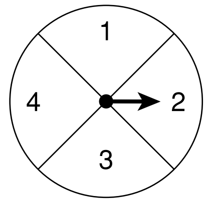
Vocabulary
independent events
dependent events

Independent events are events in which the outcome of the first event does not affect the outcome of the second event.

Dependent events are events in which the outcome of the first event affects the outcome of the second event.

Finding the Probability of Independent Events

An experiment consists of spinning a spinner 4 times. For each spin all outcomes are equally likely.



A. What is the probability of spinning a 1 all 4 times?

What is the probability of spinning a 1? ____

What is the formula for calculating independent events?

$P(A \text{ and } B) =$ ______________

$P(1, 1, 1, 1) = \frac{1}{4} \cdot \frac{1}{4} \cdot$ _____ $= \frac{1}{\_\_\_} \approx 0.0039$

B. What is the probability of spinning an even number all four times?

What is the probability of spinning an even number? ____

Does the probability change each time? ______

$P(\text{even, even, even, even}) = \frac{1}{2} \cdot$ ________ = __ = ________

Finding the Probability of Dependent Events

A bag contains 6 red marbles, 5 blue marbles and 4 green marbles. What is the probability of drawing 2 blue marbles from the bag?

The events are dependent.

How many blue marbles are in the bag? ______

How many total marbles are in the bag? ______

What is the probability of drawing a blue marble on the first draw? $\frac{\_\_}{15} =$ ______

How many blue marbles are left in the bag? ______

How many total marbles are left in the bag? ______

What is the probability of drawing a blue marble on the second draw? $\frac{\_\_}{14} =$ ______

The formula for calculating the probability of dependent events is $P(A)$ ________.

Substitute into the formula: $\frac{1}{3} \cdot \frac{2}{7} =$ __

The probability of drawing 2 blue marbles from the bag is _____.

Name ______________________________ Date __________ Class __________

LESSON 10-5

Ready to Go On? Problem Solving Intervention

Independent and Dependent Events

Three sisters take turns trying to guess a number that their mother is thinking of. It is a number from 1 to 3. The sister who goes last may not get a turn. But if she does get a turn, she will certainly guess right. Which gives a better chance of winning, going first or last?

Understand the Problem

1. What probabilities will you compare?

____

____

Make a Plan

2. Find $P(1)$, the probability of winning if you go first. ____________________

3. $P(2)$ and $P(3)$ are the probabilities of winning if you go second and if you go third. What is the sum of $P(1) + P(2) + P(3)$? Explain.

____

____

4. If you knew $P(1)$ and $P(2)$, how could you find $P(3)$? ____________________

Solve

5. Find $P(2)$. Hints: Find $P(\text{not } 1)$, the probability that the first guess is wrong. How many numbers will be left if the first guesser does not win?

____

6. What is $P(3)$?

____

7. Which gives you the better chance of winning, going first or last?

____

Check

8. Think of the probabilities if the mother does not say who wins until all 3 sisters have guessed.

____

____

Name ____ Date ____________ Class _____________

LESSON **10-6**

Ready to Go On? Skills Intervention

Making Decisions and Predictions

Using Probability to Make Decisions and Predictions

The table shows the colors of the last 100 sweaters that Clive sold. He is placing an order for 800 sweaters. How many tan sweaters should he order?

Sweaters Sold	
Color	**Number**
Blue	17
Peach	14
Plum	31
Tan	25
Yellow	13

Find the probability of selling a tan sweater.

$\frac{\text{number of tan sweaters sold}}{\text{total number of sweaters sold}} = \frac{\_\_\_\_}{100}$, or $\frac{}{}$

Set up a proportion. $\frac{1}{} = \frac{n}{}$ ____

Find the cross products. ____ • ______ = ____n

Solve for n. $\frac{}{} = \frac{n}{}$ ______ = n Clive should order ______ tan sweaters.

Deciding Whether a Game is Fair

In a game, two players each roll two fair number cubes and add the two numbers. Player A wins if the sum is 6. Player B wins if the sum is 7. Decide whether the game is fair.

Complete the table to list all the possible outcomes.

	1	**2**	**3**	**4**	**5**	**6**
1	2	3	4	5	__	7
2	3	4	__	6	__	8
3	4	__	6	7	8	__
4	5	__	7	8	__	10
5	6	7	8	9	10	11
6	7	__	9	10	11	__

Find the theoretical probability of each player's winning.

P(player A winning) = $\frac{}{\_\_\_\_}$ P(player B winning) = $\frac{}{\_\_\_\_}$

Since __________, the game ________ fair.

Name ______________________________ Date ___________ Class ____________

LESSON **10-6**

Ready to Go On? Problem Solving Intervention

Making Decisions and Predictions

A game of chance is fair if every player has the same probability of winning.

Fred and Marta are playing a game with two five-sided playing pieces. The digits on the red piece are 1, 2, 2, 4, 5. The digits on the green piece are 6, 7, 8, 9, 9. When the two pieces are thrown, Fred's number is the red digit in the tens place and the green digit in the ones place. Marta's number is the sum of the red and the green digits. Fred wins if his number is a multiple of 3. Marta wins if her number is 11. Is the game fair?

Understand the Problem

1. How can you tell if the game is fair?

____

Make a Plan

2. Why is a table a good way to list the possible outcomes?

____

____

Solve

3. Label and fill in the table to show all the possible outcomes. Hint: Think of each combination of <u>sides</u> as a different equally likely outcome

4. How many different possible outcomes are there? ____

5. What are Fred's favorable outcomes and probability of winning? Marta's? Is the game fair?

Fred: ________________

Marta: ________________

Is the game fair? _____

	1	2	2	4	5
6	$\frac{1}{6}$	$\frac{2}{6}$	$\frac{2}{6}$	$\frac{4}{6}$	___
7	$\frac{1}{7}$	___	___	___	___
8	___	$\frac{2}{8}$	$\frac{2}{8}$	___	$\frac{5}{8}$
9	$\frac{1}{9}$	___	___	$\frac{4}{9}$	$\frac{5}{9}$
9	$\frac{1}{9}$	___	___	$\frac{4}{9}$	$\frac{5}{9}$

Check

6. Circle all the favorable outcomes for both players, then check all the other numbers to make sure you did not miss any.

Solve

7. What are the odds that neither player wins when the game pieces are tossed? ________________

Name ______________________________________ Date ___________ Class ____________

LESSON **10-7**

Ready to Go On? Skills Intervention

Odds

Vocabulary
odds in favor
odds against

Odds in favor of an event is the ratio of favorable outcomes to unfavorable outcomes.
Odds against an event is the ratio of unfavorable outcomes to favorable outcomes.

Finding Odds

On a band trip, 75 students were given juice drinks. The drinks each had a prize game within the lid. Nine of the students won a free juice from the juice company.

A. Estimate the odds in favor of winning a free juice.

How many students won a free juice? ______ (favorable outcomes)

How many students did not win a free juice? ______ (unfavorable outcomes)

The odds in favor of winning are favorable outcomes to unfavorable outcomes. Therefore, the odds are about ______ to 66, or ______ to ______.

B. Estimate the odds against winning a free juice.

What were the odds of winning a free juice? ________
Reverse the order of the odds of winning. The odds against a free juice are 22 to ______.

Converting Odds to Probabilities

If the odds in favor of winning a free sandwich is 1:15, what is the probability of winning a free sandwich?

If the odds of an event are a:b, then the probability of the event occurring is $\frac{a}{a + b}$.

There is ______ winner for every ______ losses. Substitute into the formula:

$\frac{1}{1 + \_\_} = \_\_$

There is a ______ probability of winning a free sandwich.

Converting Probabilities to Odds

The probability of winning a free lunch is $\frac{1}{50}$. What are the odds in favor of winning a free lunch?

If the probability of an event is $\frac{m}{n}$, then the odds in favor of the event are m: $(n - m)$.

There is _____ winner out of every _____ people.
How many people do not win? _____
The odds in favor of winning are

1:(50 − 1), or _____.

Name ______________________________________ Date ___________ Class ____________

LESSON 10-7

Ready to Go On? Problem Solving Intervention

Odds

A bag contains red, blue, and green marbles. If you pick at random, the odds of picking a blue marble are 1 : 2. The odds of picking a red marble are 2 : 3. What are the odds of picking a green marble?

Understand the Problem

1. The odds of picking blue are 1:2. Does that mean you have a 50–50 chance of picking blue? Explain.

____

____

Make a Plan

2. If you knew *P*(green), the probability of picking green, how could you find the odds of picking green?

____

3. If you knew *P*(blue) and *P*(red), how could you find *P*(green)? Explain.

____

____

Solve

4. Find *P*(blue). *Hint:* If the odds of picking blue are 1:2, how many blues would you expect to pick in 3 tries?

____

5. What is *P*(red)?

____

6. What is *P*(green)? What is *P*(not green)?

____

7. What are the odds of picking green? *Think: P*(green):*P*(not green) ____________

Check

8. Make sure the sum of the probabilities is 1.

____

Name ____ Date ____________ Class _____________

LESSON 10-8

Ready to Go On? Skills Intervention

Counting Principles

Vocabulary
Fundamental Counting Principle

The **Fundamental Counting Principle** states that if there are *m* ways to choose the first item and *n* ways to choose a second item after the first item has been chosen, then there are $m \cdot n$ ways to choose all the items.

Using the Fundamental Counting Principle

A state plans to issue a series of license plates using codes consisting of 3 letters followed by 2 digits. Letters and digits may both be repeated and all license numbers are equally likely.

A. Find the number of possible license plates.
Use the Fundamental Counting Principle.
Draw and label a blank for each letter or number needed.

____

first letter   second letter   ____________   first digit   _____________

Fill in the blanks with the number of choices for each letter and number.

How many choices for letters are there? ______

How many choices are there for digits? _______

__________   __________   __________   ___10___   __________
first letter   second letter   third letter   first digit   second digit

Multiply: 26 • ______ • ______ • 10 • ______ • = ___________________.

The number of possible 3-letter, 2-digit license plates is ___________.

B. Find the probability of being assigned the license plate CAT 23.

Are all license plates equally likely? ______

Probability = $\frac{1}{\text{total number of license plates}}$; *P*(CAT 23) = $\frac{1}{\_\_\_\_\_\_\_\_}$ ≈ _________________

C. Find the probability that a license plate cannot contain the letter O.
Use the Fundamental Counting Principle to find the number of codes that *do not* contain an O.
Since the license plate cannot contain the letter O there are only

______ choices for letters and ______ choices for digits.

__________   __________   __________   __________   __________
first letter   second letter   third letter   first digit   second digit

There are __________________ possible codes without an O.

Probability = $\frac{\_\_\_\_\_\_\_\_}{1{,}757{,}600}$ ≈ ________

Name ______________________ Date ___________ Class ____________

LESSON **10-8**

Ready to Go On? Problem Solving Intervention

Counting Principles

Shape-Up crackers come in triangles and 4 other shapes. Each shape comes in red and 5 other colors. Suppose you have a box with 1 of each type of cracker and you pick one at random. What is the probability that it will be neither triangular nor red?

Understand the Problem

1. How many different shapes are there? How many different colors?

____

2. If you're finding the probability asked for in the problem, would it be a favorable outcome if you picked a green circle? A red square? A blue star? Explain.

____

Make a Plan

3. Why might you use the fundamental counting principle instead of a tree diagram in this problem?

____

____

Solve

4. How many types of cracker are there? How many types are there that are not triangular or red? Explain.

____

5. What is the probability that a cracker is not triangular or red?

____

Check

6. Why does it seem reasonable for the answer to be greater than $\frac{1}{2}$?

____

Solve

7. What is the probability of picking a cracker that is triangular or red?

____

8. Why should your answers to Exercises 5 and 7 add up to 1?

____

Name ____ Date ____________ Class _____________

LESSON 10-9

Ready to Go On? Skills Intervention

Permutations and Combinations

Vocabulary
permutation
combination
factorial

A **permutation** is an arrangement of things in a particular order.

$_nP_r = \frac{n!}{(n-r)!}$

A **combination** is a selection of things in any order.

$_nC_r = \frac{_nP_r}{r!} = \frac{n!}{r!(n-r)!}$

A **factorial** is the product of all whole numbers from the given number down to 1.

Evaluating Expressions Containing Factorials

Evaluate each expression.

A. 6!

What are the whole numbers less than or equal to 6? ___________________

Multiply. 6 • 5 • ______________ = ______

B. $\frac{8!}{3!}$

Write the factorial of each number.

$\frac{8 \cdot 7 \cdot \_\_\_\_\_\_\_\_\_\_\_\_\_\_}{\cancel{3} \cdot \_\_\_\_\_}$

Cancel common factors.

Multiply the remaining factors.

8 • ______________ = ______

Finding Permutations

There are 6 cross-country runners running a race. Find the number of orders in which all 6 runners can finish.

What is the formula for permutations?

$_nP_r$ = _____________

How many runners are in the race?

n = ______

How many runners are running at a time? r = ______

Substitute into the formula:

$_6P_{\_} = \frac{\_}{\_6 - 6\_} = \frac{}{\_\_\_} = \frac{\_\_\_\_\_\_\_\_\_\_}{1}$

= ______

There are ______ permutations. This means that there are ______ orders in which the 6 runners can finish running the race.

Finding Combinations

Student council needs to select a dance committee of 4 members from the group of 10 council members. Find the number of possible combinations.

Find the total number of council members. n = ______

How many are chosen at a time? r = ____

Substitute into the combination formula.

$_{10}C_{\_} = \frac{\_\_!}{4!(\_\_\_\_\_)!}$

Write out the factorials. Cancel and multiply.

$_{10}C_{\_} = \frac{\_\_!}{4!(6)!} =$

$\frac{\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_}{(4 \cdot 3 \cdot 2 \cdot 1)(\_\_\_\_\_\_\_\_\_\_\_\_\_\_)} = \frac{\_\_\_\_}{24}$

= ______

There are ______ 4-member committees that can be formed.

Name ______________________________ Date __________ Class __________

LESSON 10-9

Ready to Go On? Problem Solving Intervention

Permutations and Combinations

When you calculate permutations and combinations, you may get results that surprise you.

Think of a standard deck of 52 playing cards. Are there more possible 13-card hands or 39-card hands? Explain.

Understand the Problem

1. Is a hand a permutation or combination? *Hint:* Does order matter?

____

Make a Plan

2. Write an expression with factorials for the number of possible 13-card hands. *Hint:* Think of ${}_{52}C_{13}$.

____

3. Write an expression with factorials for the number of possible 39-card hands.

____

Solve

4. Without calculating the factorials, compare the two expressions you wrote.

____

____

5. Are there more possible 13-card hands or 39-card hands? Explain.

____

Check

6. Why does your answer make sense? *Hint:* Think of what is left each time you deal out a 13-card hand from a deck.

____

Solve

7. There are 73 students to choose from. Which is greater, the number of possible teams of 5 or the number of possible teams of 68? Explain.

____

Name ______________________ Date __________ Class __________

SECTION **10B**

Ready to Go On? Quiz

10-4 Theoretical Probability

An experiment consists of rolling two fair number cubes. Find the probability of each event.

1. *P*(total shown = 5) ____ **2.** *P*(2 and 6) ____ **3.** *P*(total less than 8) ____

10-5 Independent and Dependent Events

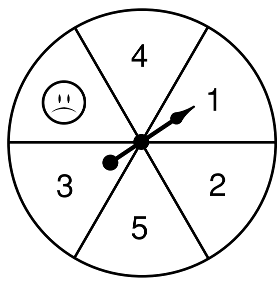
4. Two fair number cubes are rolled. What is the probability that the first number rolled is a 4 and that the second number rolled is a 1? ____________

5. A set of 10 cards is numbered 1–10. If two cards are chosen at random, what is the probability that they are both even? ____________

6. A bag contains 3 red tokens, 6 green tokens, 2 yellow tokens, and 1 blue token. If two tokens are chosen at random, what is the probability that 1 is yellow and the other is not yellow? ____________

10-6 Making Decisions and Predictions

7. The spinner shown is used to tell a player how many cards to draw. Landing on the sad face means no cards get drawn. Suppose the spinner is spun 120 times. Predict how many times it will land on the sad face.



____

8. A set of 40 cards is numbered 1–40. Player A wins the round if the card drawn is even and under 21. Player B wins the round if the card drawn is odd and over 20. Decide whether the game is fair and show why. ____________

9. The table shows the sizes of the last 500 T-shirts sold. Kia is placing an order for 1,200 T-shirts. How many medium size T-shirts should she order?

T-shirts Sold		
Small	**Medium**	**Large**
119	225	156

____

SECTION **10B**

Ready to Go On? Quiz continued

10-7 Odds

10. If the odds in favor of winning the grand prize in a drawing are 1:14,999, what is the probability of winning the grand prize? ________________

11. If you send in a letter to the *Ask Bess* TV show, the probability that Bess will read it aloud on her show is $\frac{}{999}$. What are odds that your letter will *not* get read aloud on the show? ________________

10-8 Counting Principles

12. The menu in a restaurant has a choice of 3 kinds of soup, 4 different main courses, and 5 different desserts. How many different orders can a waitress hear from someone who is ordering soup, a main course, and dessert? ________________

13. How many 7-digit phone numbers are there that contain only the digits 1, 3, and 5? ________________

14. Paul is making up password with 4 digits and 2 letters to use with his banking account on the Internet. How many choices of passwords does he have? ________________

10-9 Permutations and Combinations

Evaluate each expression

15. 6! ________ **16.** $\frac{8!}{5!}$ ________ **17.** $\frac{7!}{(5-2)!}$ ________

18. There are 5 dogsleds in a race. In how many possible orders can all 5 dogsleds finish the race? ________________

19. In a school board election, 8 candidates are running for 3 seats. How many different choices does Mrs. Lantera have if she is voting for 3 of the candidates? ________________

Name ________________________________ Date ___________ Class ____________

SECTION 10B

Ready to Go On? Enrichment

Combinations and Democracy

One of the many benefits of living in a democracy is being able to vote for the people you want to be your leaders. Sometimes the number of choices you have can be much greater than they seem.

Maddox Middle School is holding an election to choose the 9 members of the student council. Three members will be chosen from each of grades six, seven, and eight. There are 5 candidates from grade six, 8 candidates from grade seven, and 6 candidates from grade 8. Each student has three votes and votes only for the candidates in his or her grade.

1. Are the different possible election results for a grade combinations or are they permutations? Explain.

____

2. How many different results are possible for each of the grades?

____

3. How many different ways can the election turn out? _______________

4. Compare the probability that all the candidates a sixth-grader voted for get elected with the probability that all the candidates a seventh-grader voted for get elected.

____

5. Is it fair that sixth-grade voters have more of a chance of electing the council members from their grade than seventh- and eighth-grade voters do? Explain.

____

____

6. What rule could be made so that all voters had an equal probability of electing all the council members they voted for? What is good or bad about the rule?

____

____

____

Name ______________________________________ Date ___________ Class ____________

LESSON 11-1

Ready to Go On? Skills Intervention

Simplifying Algebraic Expressions

Vocabulary
term
like term
simplify

If **terms** have the same variable to the same power, then they are **like terms.** Combining like terms **simplifies** an expression.

Combining Like Terms to Simplify

Combine like terms. $9n + 8 - 5n + 10$

$9n + 8 - 5n + 10$	Identify like terms. ______________________________
$9n -$ ____ $+ 8 +$ ____	Rewrite and combine coefficients of the like terms.
____$n +$ ____	What is the coefficient of n? What is the constant?

Combining Like Terms in Two-Variable Expressions

Combine like terms.

$7m + 3n - m + 8n - 6$

$7m + 3n - m + 8n - 6$	Identify like terms. Circle terms with an m-variable. Draw a square around terms with an n-variable.
$7m -$ ____$m + 3n + 8n - 6$	Rewrite with like terms together. What is the coefficient on the term m?
____$m +$ ____$n - 6$	Combine the coefficients of like terms.

Using the Distributive Property to Simplify

Simplify. $3(6x + 5) - 4x + 12$

$3(6x + 5) - 4x + 12$	Simplify the parentheses using the
3 ______ + 3 ______ $- 4x + 12$	____________ property.
____ + ____ $- 4x + 12$	Multiply.
____ $- 4x +$ ___ $+ 12$	Rewrite with like terms together.
____$x +$ ____	Simplify. What is the coefficient of x? What is the constant?

Combining Like Terms to Solve Algebraic Equations

Solve. $7x + 2x = 81$

$7x + 2x = 81$	Circle like terms.
____ $= 81$	Add coefficients.
$\frac{\_x}{\_} = \frac{81}{\_}$	Divide both sides by ____.
$x =$ ____	

Name ______________________________ Date ____________ Class ____________

LESSON 11-2

Ready to Go On? Skills Intervention

Solving Multi-Step Equations

You solve an equation by isolating the variable. To isolate the variable you may have to combine like terms.

Solving Equations that Contain Like Terms

Solve.

$4x + 12 + 8x - 24 = 36$

$4x + 12 + 8x - 24 = 36$ Circle the terms that contain a variable.

$12x - 12 = 36$ Combine like terms.

$\_\_\_\_\_ \quad \_\_\_\_\_$ Add _____ to each side to isolate x.

$12x = \_\_\_\_\_$

$\frac{12x}{\_\_} = \frac{}{\_\_\_\_\_}$ ___________ each side by 12.

$x = \_\_\_\_\_$ Simplify.

Check:

$4x + 12 + 8x - 24 = 36$

$4(\_\_\_\_) + 12 + 8(\_\_\_\_) - 24 \stackrel{?}{=} 36$ What do you substitute for x? _____

$\_\_\_\_ + 12 + \_\_\_\_ - 24 \stackrel{?}{=} 36$ Simplify.

$\_\_\_\_ = 36$ ✔

Solving Equations that Contain Fractions

Solve.

$\frac{5y}{8} + \frac{7}{8} = \frac{-3}{8}$

$\_\_\_\_ \cdot \left(\frac{5y}{8} + \frac{7}{8}\right) = \_\_\_\_ \cdot \left(\frac{-3}{8}\right)$ Clear the denominators by multiplying both sides by ____.

$\_\_\_\_\left(\frac{5y}{8}\right) + \_\_\_\_\left(\frac{7}{8}\right) = \_\_\_\_\left(\frac{-3}{8}\right)$ Use the Distributive Property.

$\_\_\_\_ + 7 = \_\_\_\_$ Simplify.

$\_\_\_\_ \quad \_\_\_\_$ Undo the addition.

$5y = \_\_\_\_\_$

$\frac{5y}{\_\_} = \frac{-10}{\_\_}$ How do you isolate y?

____

$y = \_\_\_\_$ Solve for y.

Name ______________________________________ Date ___________ Class ____________

LESSON 11-2

Ready to Go On? Problem Solving Intervention

Solving Multi-Step Equations

A baseball player had 243 hits. He singled 21% of the times he batted. He doubled 6% of the times and he tripled 1.5% of the times. He also hit 37 home runs. About how many times did he bat?

Understand the Problem

1. Why don't the percents add up to 100%?

____

____

2. What is the sum of the player's singles, doubles, triples, and home runs?

____

Make a Plan

3. Let *n* be the number of times the player batted. What expression with *n* describes the number of times he singled? Doubled? Tripled?

____

4. Write an equation with *n* to show how the different types of hits add up to 243.

____

Solve

5. Solve the equation you wrote in Exercise 4.

____

6. About how many times did the player bat?

____

Check

7. Substitute your answer for *n* into the equation you solved to see if the answer checks.

____

____

____

Name ______________________________ Date __________ Class ___________

LESSON 11-3

Ready to Go On? Skills Intervention

Solving Equations with Variables on Both Sides

When solving multi-step equations, combine like terms or clear fractions before isolating the variable.

Solving Equations with Variables on Both Sides

Solve.

A. $5a + 6 = 6a$

_____ _____	To get the variable on the same side of the equation,
$6 = a$	subtract ____ from each side.

B. $7x - 9 = 6 + 2x$	What is the first step? ______________________
_____ _____	Subtract $2x$ from both sides.
____$x - 9 = 6$	Combine like terms.
_____ _____	Undo the – 9.
$5x =$ _____	Add.
$\frac{5x}{\_\_} = \frac{15}{\_\_}$	Isolate x.
$x =$ ____	What does x equal?

C. $2a - 6 = 2a + 8$	How do you get $2a$ to one side?
_____ _____	Subtract $2a$ from both sides.
$-6 = 8$	Is this a true statement? ____

There is no solution to the equation since there is no number that when substituted for the variable *a*, would make the equation true.

Solving Multistep Equations with Variables on Both Sides

Solve. $x + 9 + 6x = 2 + x + 1$

$7x + 9 = x + 3$	What is the first step? ______________________
_____ _____	Get x to one side of the equation.
____$x + 9 =$ ____	Subtract.
_____ _____	What is the next step? ______________________
$6x =$ _____	
$\frac{6x}{\_\_} = \frac{-6}{\_\_}$	How do you isolate x? ______________________
$x =$ ____	Solve for x.

Name ______________________________ Date __________ Class ___________

LESSON **11-3**

Ready to Go On? Problem Solving Intervention

Solving Equations with Variables on Both Sides

Jiffy Gym offers two plans. With Plan A, you pay a one-time membership fee of $145 and then $39 every month. With Plan B, you pay no membership fee but you pay $54 every month. After how many months does Plan A become a better deal?

Understand the Problem

1. With Plan A, how often do you pay the $145 membership fee?

____

2. With Plan A, how much do you pay for 1 month? 2 months?

____

3. With Plan B, how much do you pay for 1 month? 2 months?

____

Make a Plan

4. With n as the number of months, write expressions for the cost of both plans.

____

5. Set the two expressions from Exercise 4 equal to each other. How would solving this equation for n help you solve the problem?

____

Solve

6. Solve the equation you wrote in Exercise 5.

____

7. Why should the answer be a whole number of months?

____

8. After how many months does Plan A become a better deal?

____

Check

9. Complete the table to check your answer.

	months	Plan A	Plan B
$n - 1$ →			
n →			
$n + 1$ →			

Name ______________________ Date __________ Class __________

SECTION 11A

Ready to Go On? Quiz

11-1 Simplifying Algebraic Expressions

Simplify.

1. $2x + 7x$

____

2. $6y - 5y$

____

3. $8z + 4 - 3z$

____

4. $4m - 3 + 7m$

____

5. $4 + n + 5n - 3 - 2n$

____

6. $3k - 3 - 4k + 5 + 6k$

____

7. $3p + 8q + 6p - q$

____

8. $3(f + 2) + f$

____

9. $7a + 4b - 5b + 4a$

____

10. $-3c - 2 + 4d + 7c + 7d$

____

11. $6s - 3t + 9$

____

12. $5(2g - 1) - 4g$

____

Solve.

13. $3m + 2m = 15$

____

14. $10p - 7p = 18$

____

15. $4r + 5r = 45$

____

16. $2a + 9a = 88$

____

17. $-12z + 13z = 17$

____

18. $11x - x = 90$

____

19. $44b - 33b + 4b = 60$

____

20. $20s + 30s + 10s = 120$

____

SECTION **11A**

Ready to Go On? Quiz continued

11-2 Solving Multi-Step Equations

Solve.

21. $5y + 4y - 11 = 16$

____

22. $\frac{7x}{9} - \frac{2x}{9} = \frac{10}{9}$

____

23. $\frac{r}{3} - \frac{r}{5} = \frac{4}{15}$

____

24. $\frac{3b}{8} + \frac{b}{4} = \frac{5}{2}$

____

25. $\frac{1}{5}s + \frac{2}{3}s = 6$

____

26. $\frac{2}{3}t + 1 + \frac{1}{4}t = -5$

____

27. $\frac{7c}{10} - \frac{c}{5} = \frac{9}{2}$

____

28. $-6 - \frac{2}{3}d + \frac{13}{6}d = -4$

____

29. The Sunday newspaper sells for $2. Corner News had a supply of them worth $50 but has already sold 14. How many more Sunday newspapers remain to be sold?

____

11-3 Solving Equations with Variables on Both Sides

30. $3a + 13 = 5a + 5$

____

31. $8b + 14 = 4b + 38$

____

32. $7h + 34 = 4 - 3h$

____

33. $-p + 9 = 10p - 35$

____

34. $-3w + 4 + w = 4w + 28$

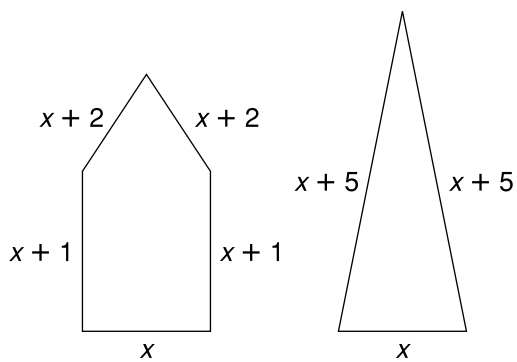
____

35. $\frac{5}{6}x - \frac{1}{3} = x - \frac{3}{2}$

____

36. The pentagon and the triangle have the same perimeter. What is the measure of this perimeter?

____



Name ______________________________ Date __________ Class __________

SECTION **11A**

Ready to Go On? Enrichment

Of Hippos and Chairs

Begin at **START**. Solve the equation in the box. Find the solution (in parentheses) in another box. Draw a line with an arrow from the box with the equation to the box with its solution. Now solve the equation in the second box and find its solution in a third box. Remember to draw a line with an arrow. Continue this way until you reach **FINISH**.

START $3x + 5x = 16$ "What"	$(x = \frac{9}{5})$ $3x + 18 = -2x + 11x - 21$ "time"	$(x = 3)$ $6x - 15 = 4x + 7$ "is"
$(x = 9)$ $\frac{11}{6}x - \frac{11}{4} = \frac{4}{3}x$ "the"	$(x = \frac{7}{2})$ $10x - 7x + 3 = 8$ "it"	$(x = 8)$ $6x - 9x = -15$ "a"
$(x = \frac{5}{3})$ $\frac{3x}{5} + \frac{4}{5} = \frac{7}{5}$ "when"	$(x = 11)$ $-3x - 1 = x - 14$ "sitting"	$(x = 5)$ $\frac{3}{4}x - \frac{3}{5}x - 3 = 0$ "chair?"
$(x = 20)$ $-3x + 2 + 4x = -4x + 11$ "It's"	$(x = \frac{13}{2})$ $\frac{3}{4}x + 13 = \frac{2}{3}x + 14$ "to"	$(x = 2)$ $5x - 2x = 30$ "time"
$(x \frac{13}{4})$ $\frac{x}{2} - 5 - \frac{x}{8} = -2$ "in"	$(x = 7)$ $\frac{x}{3} + \frac{x}{5} = \frac{8}{5}$ "hippopotamus"	$(x = 1)$ $\frac{2x}{5} - \frac{11}{5} = \frac{3}{5}$ "a"
$(x = 12)$ $-13x + 5x = -72$ "replace"	$(x = 10)$ $7x - 3x = 14$ "is"	$(x = \frac{11}{2})$ **FINISH** "chair"

Each box on your path has a word in quotation marks in it. Write these words below in the exact order in which you came upon them.

____

____

Name ____ Date ___________ Class ____________

LESSON 11-4

Ready to Go On? Skills Intervention

Solving Inequalities by Multiplying or Dividing

The steps for solving inequalities are similar to those for solving equations. If the number on each side of the inequality is to be multiplied or divided by a negative number, you must reverse the inequality sign when you perform this step.

Solving Inequalities by Multiplying or Dividing
Solve and graph each inequality.

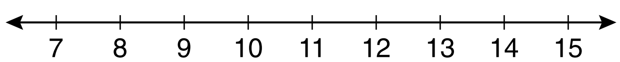
A. $5 \geq \frac{1}{2}x$

$5 \geq \frac{1}{2}x$ Multiply both sides by ____.

____ $\geq x$

Use a(n) ________ circle on the graph because the sign is

__________________________. Draw a line to the ______, because ________.



Check: 9 should be a solution because 10 ___ 9. 11 should not be a solution because 10 ___ 11. Substitute and check.

$5 \geq \frac{1}{2}(9) = 5 \geq$ ___ ✓ $5 \geq \frac{1}{2}(11) = 5 \geq$ ___ X

So 9 ________ a solution and 11 ________.

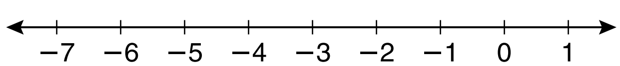
B. $10 > -2x$

$10 > -2x$ Divide both sides by ____. __________ the inequality sign.

_______ x

Use a(n) ________ circle on the graph because the sign is

___________. Draw a line to the right. Because ________.



Check: −3 should be a solution because −5 ___ −3. −6 should not be a solution because −5 ___ −6. Substitute and check.

$10 > -2(-3) = 10 >$ ____ ✓ $10 > -2(-6) = 10 >$ ____ X

So, −3 ________ a solution and −6 ________.

Name ______________________ Date ____________ Class ____________

LESSON 11-4

Ready to Go On? Problem Solving Intervention

Solving Inequalities by Multiplying or Dividing

Erica has no more than 6 times the number of snowglobes that James has. If Erica has 54 snowglobes, what is the greatest number of snowglobes James can have?

Understand the Problem

1. What quantity are you asked to find?

____

2. What sign should you use for "no more than"? ______________

Make a Plan

3. How can you solve this problem? ______________

4. What amount will be on the greater than or equal to side of the inequality? ______________

5. What amount will be on the less than or equal to side of the inequality? ______________

Solve

6. Set up the inequality. Use *s* to represent James's snowglobe collection. ______________

7. Solve the inequality. ______________

Check

8. Choose two numbers to test, one that should be a solution and one that should not. ______________

9. Substitute each number to check you answer.

____

____

Solve

10. If Erica has 72 snowglobes, what is the greatest number James can have? ______________

Name ______________________ Date __________ Class __________

LESSON 11-5

Ready to Go On? Skills Intervention

Solving Two-Step Inequalities

When solving two-step inequalities, combine like terms or clear fractions before isolating the variable. When multiplying or dividing by a negative number, remember to reverse the inequality symbol.

Solving Two-Step Inequalities

Solve. $4x - 5 > 11$

$4x - 5 > 11$ What do you add to both sides to undo the -5? ________

$\underline{\quad\quad}$ $\underline{\quad\quad}$

$4x > \underline{\quad\quad}$ What do you do to isolate x? ________________

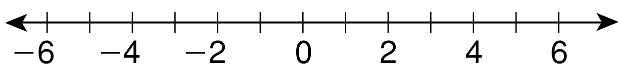
$\frac{4x}{\_\_} > \frac{16}{\_\_}$

$x > \underline{\quad\quad}$ How do you read the answer? ________________

Will you use an open or closed circle to graph the solution? ________

Will the graph extend to the left or right? ________

Graph the solution.



Solving Inequalities that Contain Fractions

Solve $\frac{3x}{4} + \frac{3}{8} \geq \frac{5}{12}$ and graph the solution.

$\underline{\quad\quad}\left(\frac{3x}{4} + \frac{3}{8}\right) \geq \underline{\quad\quad}\left(\frac{5}{12}\right)$ Multiply by the LCD ____.

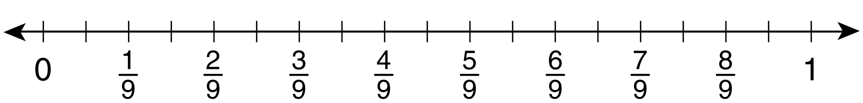
$\underline{\quad\quad}\left(\frac{3x}{4}\right) + \underline{\quad\quad}\left(\frac{3}{8}\right) \geq \underline{\quad\quad}\left(\frac{5}{12}\right)$ Use the Distributive Property.

$\underline{\quad\quad}x + \underline{\quad\quad} \geq \underline{\quad\quad}$ Undo + ____.

$\underline{\quad\quad}$ $\underline{\quad\quad}$ Subract ____ from both sides.

$\frac{\_\_x}{\_\_} \geq \frac{\_\_}{\_\_}$ Divide both sides by ____.

$x \geq \frac{\_\_}{\_\_}$



Name ______________________________ Date __________ Class __________

LESSON **11-5**

Ready to Go On? Problem Solving Intervention

Solving Two-Step Inequalities

You decide to buy and sell wallets. How many wallets can you buy from this catalog for $28?

Wallets: $3.75 each + $5.95 for shipping and handling per order

Understand the Problem

1. If you order 3 wallets, what will you be charged for shipping and handling?

____

2. What amounts would you add to find the total cost for one wallet?

____

Make a Plan

3. Write an expression for the total cost for *x* wallets.

____

4. Which of these inequalities would make sense for this problem? Explain.

total cost $<$ $28 total cost $\leq$ $28

total cost $>$ $28 total cost $\geq$ $28

____

____

5. Use your answers to Exercises 3 and 4 to write an inequality you can use to solve the problem.

____

Solve

6. Solve the inequality you wrote in Exercise 5.

____

____

7. How many wallets can you buy from this catalog for $28? ______________

Check

8. Complete the table to check your answer.

	wallets	cost
$x - 1$ →		
x →		
$x + 1$ →		

Name ______________________________________ Date ___________ Class ____________

LESSON **11-6**

Ready to Go On? Skills Intervention

Systems of Equations

A **system of equations** is a set of two or more equations. The **solution of a system** is a set of values that satisfy both equations.

> **Vocabulary**
> system of equations
> solution of a system of equations

Solving Systems of Equations

Solve the system of equations.

$y = -x + 6$
$y = x - 2$ What are both equations equal to?___

$-x + 6 = x - 2$ Set the equations equal to each other.

_______ _____ Get x on one side of the equation.

___ $=$ ___$x - 2$ Combine like terms.

___ $= 2x$ Get the constant terms to one side of the equation.

$\frac{8}{\_} = \frac{2x}{\_}$ How do you isolate x? _________________

___ $= x$ Solve for x.

$y = x - 2$ Choose one of the original equations to solve for y.

$y =$ ___ $- 2$ To find y, _____________ 4 for x into the original equation.

$y =$ ___

The solution to the system is (___, ___).

Solving Systems of Equations by Solving for a Variable

$2x - y = 4$
$6x + 3y = 12$

Solve each equation for y.

$2x - y = 4$	$6x + 3y = 12$
____ $= -2x + 4$	$3y =$ _____ $+ 12$
$y =$ _________	$y =$ _____ $+ 4$

_____ $+ 4 = 2x -$ ___ Set the equations equal to each other.

$4 =$ ___$x - 4$ Get x to one side of the equation.
$8 = 4x$ Add 4 to both sides.
$\frac{8}{\_} = \frac{4x}{\_}$ Divide both sides by ___.

___ $= x$ Solve for x.

Substitute x into either original equation: $y = 2x - 4 = 2(2) - 4 =$ ___

The solution set is (___, ___).

Name ______________________ Date __________ Class __________

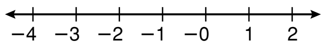
SECTION 11B Ready to Go On? Quiz

11-4 Solving Inequalities by Multiplying or Dividing

Solve and graph.

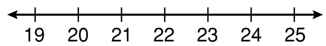
1. $-7x < 14$

____



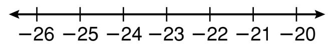
2. $\frac{p}{3} > 7$

____



3. $-\frac{k}{6} \leq 4$

____



4. Mildred has 35 ounces of hamburger meat for a small picnic. What are the possible numbers of 4-ounce hamburger patties she can make from this meat?

____

5. A chemist has prepared 151 mL of a certain liquid. What are the possible numbers of 20-mL beakers that she can fill with this liquid?

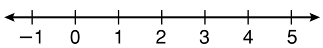
____

11-5 Solving Two-Step Inequalities

Solve and graph.

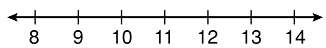
6. $3m + 7 < 19$

____



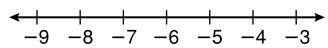
7. $0.5n + 1.5 \geq 6.5$

____



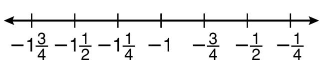
8. $\frac{1}{6} + \frac{r}{9} \leq -\frac{1}{2}$

____



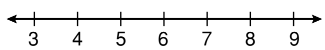
9. $-\frac{1}{3}x + \frac{1}{4} > \frac{1}{2}$

____



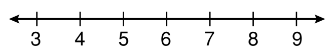
10. $-2 + 1.5y < 7$

____



11. $-13 \geq -7z + 15$

____



12. Veronica wants to average at least 140 points whenever she bowls. The first two games she scores 148 and 130. What scores can Veronica get in her third game and still meet her goal?

____

13. Hans wants to average at least 7 baskets out of every 10 shots he attempts. The first three games he scores 9, 3, and 8 baskets. What numbers of baskets can Hans make the fourth time and still meet his goal?

____

SECTION 11B

Ready to Go On? Quiz continued

11-6 Systems of Equations

Solve each system of equations.

14. $y = 2x + 5$
$y = 3x + 3$

______

15. $y = 6x - 8$
$y = 2x + 4$

______

16. $y = 2x - 1$
$y = -2x + 3$

______

17. $y = 5x - 5$
$y = 2x + 7$

______

18. $y = -3x - 1$
$y = -4x + 1$

______

19. $y = -5x + 7$
$y = -x - 1$

______

20. $y = 4x + 3$
$y = -x + 3$

______

21. $y = -6x - 6$
$y = -8x - 7$

______

22. $y = 10x - 46$
$y = 7x - 31$

______

23. $y = 2x - 7$
$y = -x + 8$

______

24. $y = x - 7$
$y = -11x - 7$

______

25. $y = -x$
$y = 5x - 12$

______

26. $x + y = 6$
$x + 3y = 8$

______

27. $2x - y = 2$
$3x - y = 5$

______

28. $-x + y = -6$
$-x - y = -2$

______

29. $x + 3y = -4$
$-x + y = 0$

______

30. $3x + y = 10$
$2x - y = -10$

______

31. $3x + y = 15$
$x = -2y + 10$

______

32. In a baseball game, two teams have a combined score of 11 runs. The difference in their scores is 5 runs. If the two run totals are x and y, write a system of equations to describe their sum and their difference. Solve this system to find the score of the game.

______

33. The sum of two winter temperatures is −10 degrees. Their difference is 34 degrees. Write a system of equations to describe the sum and the difference. Solve this system to find the two temperatures.

______

Name ________________________ Date ____________ Class ____________

SECTION **11B**

Ready to Go On? Enrichment

What Is It?

Solve each system of equations. Then graph each solution with a bold point. What do you find?

1. $y = \frac{1}{2}x + 1$
$y = -3x + 1$
____

2. $y = -x + 2$
$y = \frac{2}{3}x - 3$
____

3. $y - \frac{3}{5}x = -2$
$y + \frac{1}{2}x = -2$
____

4. $y = -x$
$y = \frac{3}{2}x + 5$
____

5. $y - \frac{1}{2}x = -\frac{5}{2}$
$y + x = -1$
____

6. $y - 3x = 4$
$y + \frac{8}{3} = -\frac{1}{3}x$
____

7. $y = -1$
$y - 1 = \frac{2}{3}x$
____

8. $y - 6 = \frac{3}{2}x$
$y + 1 = -\frac{1}{4}x$
____

9. $x = y$
$y + \frac{1}{4}x = \frac{5}{2}$
____

10. $y + \frac{5}{3} = \frac{1}{3}x$
$y - 5x = 3$
____

11. $y = \frac{4}{7}x$
$y = -\frac{5}{8}x$
____

12. $y = -\frac{3}{2}x$
$y = \frac{2}{5}x + \frac{19}{5}$
____

13. $x = \frac{4}{3}y - 2$
$y = 2x - 1$
____

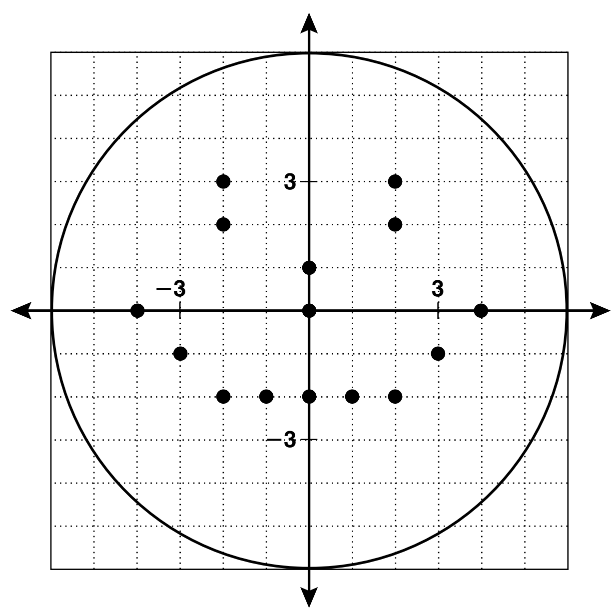
14. $y = \frac{3}{4}x - \frac{7}{2}$
$y = -x$
____

15. $x = \frac{4}{5}y + 4$
$x = 4 - y$
____

Connect those points that are exactly 1 unit apart. Connect diagonally those points that are opposite vertices of a unit square. Do not connect any other points.

16. What do the points you have just graphed look like to you?

____



Name ____ Date ___________ Class ____________

LESSON **12-1**

Ready to Go On? Skills Intervention

Graphing Linear Equations

A **linear equation** is an equation whose solutions fall on a line on the coordinate plane. If the equation is linear, a constant change in the *x*-value corresponds to a constant change in the *y*-value.

Vocabulary
linear equation

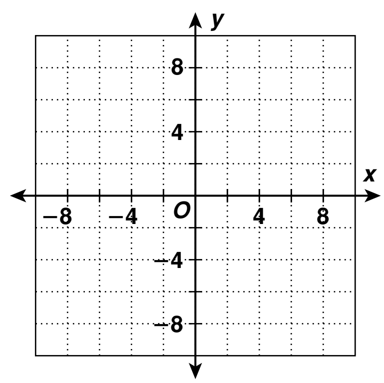
Graphing Equations

Graph each equation and tell whether it is linear.

A. $y = 3x - 2$

Create a table of values.

x	$3x - 2$	*y*	(*x*, *y*)
−2	3(−2) − 2	−8	(−2, −8)
−1	3(____) − 2		(−1, ____)
0	3(___) − 2		(0, ____)
1	3(___) − 2		
2	3(___) − 2		



Plot each coordinate pair from the table on the coordinate grid.

Does the equation form a straight line? _______

What is the change between each *y*-value? _____

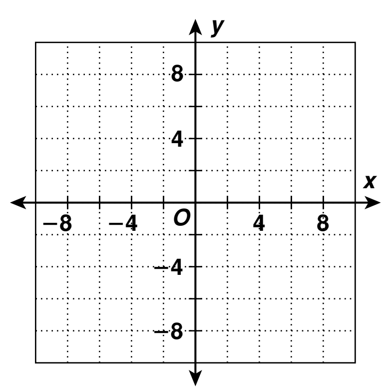
Is the change the same between every *y*-value? _______

The equation $y = 3x - 2$ is a ________ equation.

B. $y = x^2 + 1$

Create a table of values.

x	$x^2 + 1$	*y*	(*x*, *y*)
−2	$(-2)^2 + 1$	5	(−2, 5)
−1	$(-1)^2 + 1$		(−1, ___)
0	$(0)^2 + 1$		(0, ___)
1	$(1)^2 + 1$		
2	$(2)^2 + 1$		



Plot each coordinate pair from the table on the coordinate grid.

Does the equation form a straight line? _______

Is the change between the *y*-values constant? _______

The equation $y = x^2 + 1$ is ________ a linear equation.

Name ______________________ Date ____________ Class ____________

LESSON 12-1

Ready to Go On? Problem Solving Intervention

Graphing Linear Equations

You can use a graph to check your solution to a linear equation.

Sara's hair grows an average of 0.4 inches per month. She just cut it to a length of 14 inches on August 1. How long will her hair be at the beginning of February if she doesn't cut it again?

Understand the Problem

1. What do you know and what you need to find?

____

Make a Plan

2. Let n be the number of months since August 1. Write an expression with n for the number of inches Sara's hair grows. ____________

3. Fill in the blanks to write an equation that shows how Sara's hair length, ℓ, depends on the number of months since August.

Length of hair = original length + amount grown

↓ ↓ ↓

ℓ = __________ + __________

Solve

4. To find the length of Sara's hair at the beginning of February, what value of n should you use? Explain.

____

5. Use the equation you wrote in Exercise 3 to solve the problem.

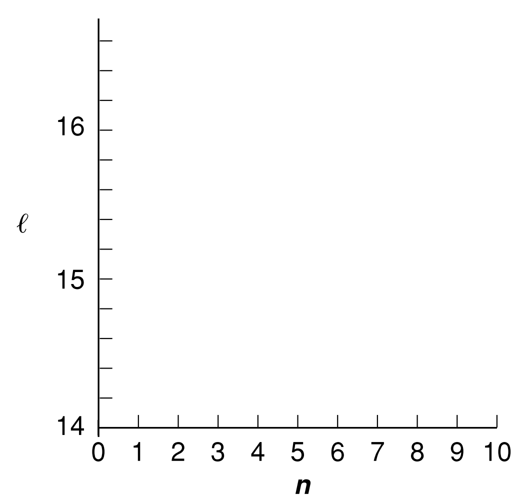
____

6. How long will Sara's hair be at the beginning of February?

____

Check

7. Check your answer by making a graph and finding the value of ℓ when $n = 6$.



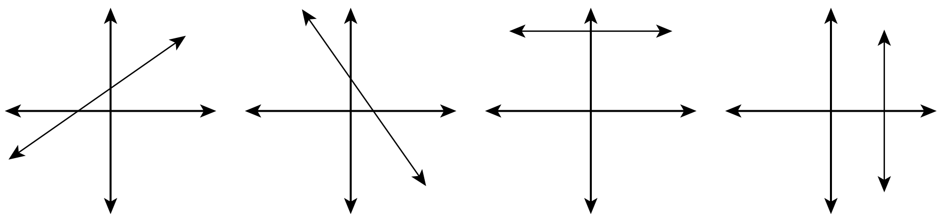
Name ________________________________ Date __________ Class ___________

LESSON 12-2

Ready to Go On? Skills Intervention

Slope of a Line

Linear equations have a constant slope. The formula for determining the slope between any two points is $m = \frac{y_2 - y_1}{x_2 - x_1}$.



Positive slope   Negative slope   Zero slope   Undefined slope

Finding Slope, Given Two Points

Find the slope of the line that passes through (2, 4) and (8, 2).

Let $x_1 = 2$, $y_1 =$ ____, $x_2 =$ ____ and ____ $= 2$.

$m = \frac{2 - \_}{\_ - 2} = \frac{-2}{\_} = \frac{\_\_}{3}$ Substitute the values into the slope formula.

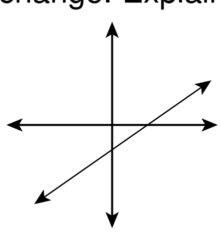
The slope of the line that passes through (2, 4) and (8, 2) is ____.

If the graph of an equation is a straight line, the graph shows a constant rate of change. This means that the slope between any two points on the line is the same. If a graph is not a straight line, it shows a variable rate of change. The slope of the graph changes, depending upon the points used to find the slope.

Identifying Constant and Variable Rates of Change in Graphs

Determine whether each graph shows a constant or a variable rate of change. Explain.

A.

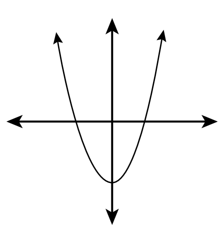


The graph is a ______________.

The slope is ______________ between all points.

The graph shows a ______________ rate of change.

B.



The graph is _______ a straight line.

The slope ___________ based on different points.

The graph shows a ___________ rate of change.

Name ______________________ Date ____________ Class ____________

LESSON **12-2**

Ready to Go On? Problem Solving Intervention

Slope of a Line

The points in the table are all on a line. Without graphing, find the slope of the line and tell whether it has a constant or a variable rate of change.

x	1	3	5	7
y	4	8	12	16

Understand the Problem

1. What do you know and what are you asked to find?

____

Make a Plan

2. How can you find the slope of a line without graphing it?

____

3. How can you tell the rate of change without graphing the line?

____

4. What is the formula for slope? ____________________

Solve

5. Use the formula from Exercise 4 to find the slope between (1, 4) and (3, 8). ____________________

6. Use the formula from Exercise 4 to find the slope between (5, 12) and (7, 16). ____________________

7. Are the slopes the same? ____________________

8. Answer the question in the problem.

____

Check

9. The equation for the line is $y = mx + 2$. Substitute the slope you found for m and any point on the line for x and y to see if your answer checks.

____

Name ______________________________ Date __________ Class __________

LESSON 12-3

Ready to Go On? Skills Intervention

Using Slopes and Intercepts

Vocabulary
x-intercept
y-intercept
slope-intercept form

The ***x*-intercept** is where the graph crosses the x-axis and the ***y*-intercept** is where the graph crosses the y-axis.

Finding *x*-intercepts and *y*-intercepts to Graph Linear Equations
Find the x-intercept and y-intercept of the line $4x + 5y = 20$. Use the intercepts to graph the equation.

Find the x-intercept. ($y = 0$)
$4x + 5y = 20$

$4x + 5(\_\_\_\_) = 20$ Substitute 0 in for y.

$\_\_\_\_x = 20$

$\frac{4x}{\_\_} = \frac{20}{\_\_}$ What do you divide each side by?

$x = \_\_\_\_$ Solve for x. The x-intercept is ____.

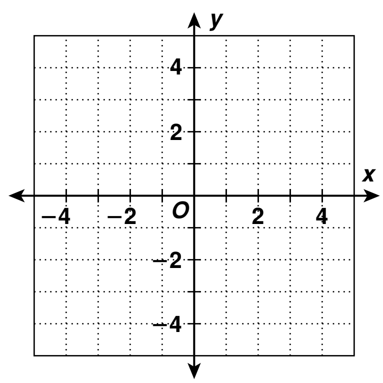
Find the y-intercept. ($x = 0$)
$4x + 5y = 20$

$4(\_\_\_\_) + 5y = 20$ Substitute 0 in for x.

$\_\_\_\_y = 20$

$\frac{5y}{\_\_} = \frac{20}{\_\_}$ What do you divide each side by?

$y = \_\_\_\_$ Solve for y. The y-intercept is ____.



To graph the equation plot the points (____, 0) and (0, ____).

For an equation written in **slope-intercept form,** $y = mx + b$, m is the slope and b is the y-intercept.

Using Slope-Intercept Form to Find Slopes and *y*-intercepts
Write the equation $3y = 8x$ in slope-intercept form and then find the slope and y-intercept.

What is the slope-intercept form of an equation? $y =$ ________
$3y = 8x$
$\frac{3y}{\_\_} = \frac{8x}{\_\_}$ By what number do you divide both sides?

$y = \_\_\_\_x$ What is the slope? ____ What is the y-intercept? ____.

Name ______________________________ Date __________ Class __________

LESSON 12-3

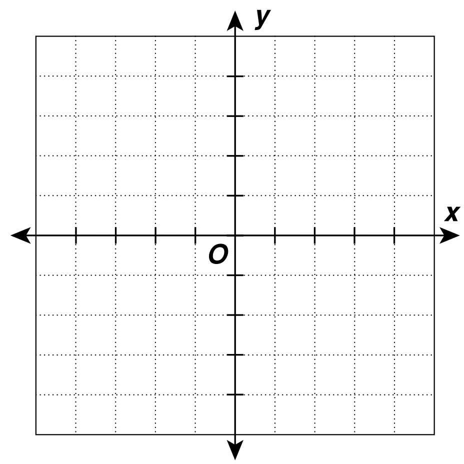
Ready to Go On? Problem Solving Intervention

Using Slopes and Intercepts

You can use geometric relationships to find distances on a coordinate plane.

The graph of the equation $y = \frac{3}{4}x + 3$ has an x-intercept and a y-intercept. What is the distance between the two intercepts?

Understand the Problem



1. In what form is the equation $y = \frac{3}{4}x + 3$?

____

2. In the equation $y = \frac{3}{4}x + 3$, what does the number $\frac{3}{4}$ tell you? What does the number 3 tell you?

____

3. What is the x-intercept of $y = \frac{3}{4}x + 3$? Graph the equation. Label the x-intercept A and the y-intercept B.

____

Make a Plan

4. $\overline{AB}$ is a side of $\triangle ABC$. What kind of triangle is $\triangle ABC$? ______________

5. If you know the lengths of the two legs of a right triangle, how can you calculate the length of the third side?

____

6. What are the lengths of the two legs of $\triangle ABC$? ______________

Solve

7. Use the Pythagorean theorem to find AB.

____

Check

8. Make sure you graphed the equation correctly. Also, look at $\overline{AB}$ to see if it seems to be about the length you calculated.

Solve

9. Find the distance between the x-intercept and y-intercept of the graph of the equation $y = -2.4x + 12$. ______________

Name ________________________________ Date __________ Class __________

LESSON 12-4

Ready to Go On? Skills Intervention

Point-Slope Form

The **point-slope form** of a linear equation is $y - y_1 = m(x - x_1)$, where m is the slope and (x_1, y_1) is a point on the line.

Vocabulary
point-slope form

Using Point-Slope Form to Identify Information About a Line

Identify a point the line passes through and the slope of the line, given the point-slope form of the equation.

A. $y - 6 = \frac{3}{4}(x - 12)$

$y -$ ____ $=$ ____$(x -$ ____$)$ Write the point-slope form of an equation.

What is m? ____ What is x_1? ____ What is y_1? ____

The line has slope $\frac{3}{4}$ and passes through the point (______).

B. $y - 4 = 5(x + 8)$

$y -$ ____ $=$ ____$(x -$ ____$)$ Write the point-slope form of an equation.

$y - 4 = 5(x - ($____$))$ Rewrite using subtraction instead of addition.

What is m? ____ What is x_1? ____ What is y_1? ____

The line has slope ____ and passes through the point (________).

Writing the Point-Slope Form of an Equation

Write the point-slope form of the equation with the given slope that passes through the indicated point.

A. the line with slope −3 passing through (5, 2)

Write the point-slope form. $y -$ ____ $=$ ____$(x -$ ____$)$

Substitute in known values. $y -$ ____ $=$ ____$(x -$ ____$)$

B. the line with slope 8 passing through (−2, 6)

Write the point-slope form. ____ − ____ = ____(____ − ____)

Substitute in known values. $y -$ ____ $=$ ____$(x - ($____$))$

Rewrite the equation. $y -$ ____ $=$ ____$(x +$ ____$)$

Name ______________________ Date __________ Class __________

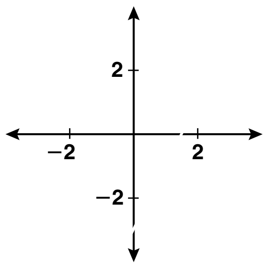
SECTION 12A

Ready to Go On? Quiz

12-1 Graphing Linear Equations

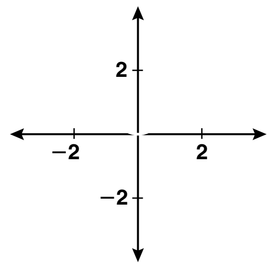
Graph each equation and tell whether it is linear.

1. $y = -3 + 2x$



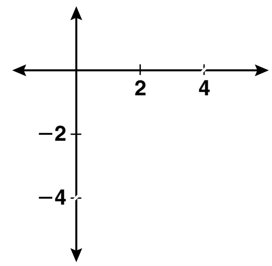
____

2. $y = \frac{1}{2}x^2$



____

3. $x = y + 4$



____

4. A bookstore buys back school books according to the formula $y = \frac{1}{2}x - 5$, where x is the price you originally paid for a book and y is the amount the store will now pay you for it. What is the buy-back price for each of the books listed in the table?

Original Price	Buy-Back Price
$40	______
$50	______
$70	______
$100	______

12-2 Slope of a Line

Find the slope of the line that passes through each pair of points.

5. (0, 1) and (4, 3) ____________

6. (−2, 6) and (1, 3) ____________

7. (1, −9) and (3, 1) ____________

8. (4, 0) and (1, −6) ____________

9. (5, 1) and (−4, 4) ____________

10. (−4, −1) and (2, −1) ____________

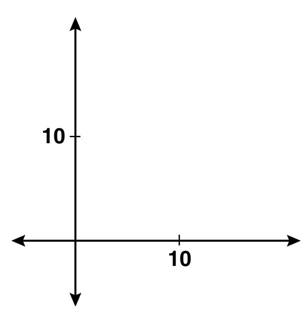
11. The table shows Sam's progress during an all-day hike. Graph the data, find the slope of the line, and explain what the slope shows.

____

____

____

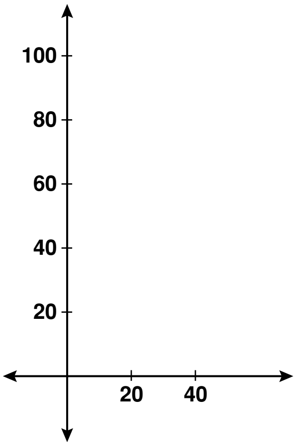
Time	Distance
3 h	9 km
4 h	12 km
5 h	15 km
7 h	21 km



SECTION 12A

Ready to Go On? Quiz continued

12-3 Using Slopes and Intercepts



12. An amusement park charges \$20 to get in plus \$2 for each ride. The equation $y = 2x + 20$ represents the total amount paid if a person goes on x rides. Identify the slope and the y-intercept and then use them to graph the equation.

____

Write the equation of the line that passes through each pair of points. Use the slope-intercept form.

13. $(-2, -2)$ and $(4, 1)$

____

14. $(1, -5)$ and $(-2, 4)$

____

15. $(0, 1)$ and $(-3, 10)$

____

16. $(-5, -3)$ and $(5, -3)$

____

17. $(-8, -2)$ and $(4, 1)$

____

18. $(3, 0)$ and $(1, 1)$

____

12-4 Point-Slope Form

Use the point-slope form of each equation to identify a point the line passes through and the slope of the line.

19. $y - 1 = 2(x - 2)$

____

____

20. $y = -x + 6$

____

____

21. $y + 3 = 4x + 2$

____

____

Write the point-slope form of the equation with the given slope that passes through the indicated point.

22. slope 2, passing through $(1, -1)$

____

23. slope $-\frac{1}{3}$, passing through $(-1, -2)$

____

24. slope -4, passing through $(5, 0)$

____

25. slope $\frac{2}{3}$, passing through $(-6, 3)$

____

Name ____ Date ____________ Class _____________

SECTION **12A**

Ready to Go On? Enrichment

Clown Face

For each of the following, graph the given point and draw a line with the indicated slope through the point.

1. point: (60, 110)
slope: 0

2. point: (105, 82)
slope: −2

3. point: (25, 25)
slope: −1

4. point: (82, 15)
slope: $\frac{1}{2}$

5. point: (10, 60)
slope: undefined

6. point: (38, 105)
slope: $\frac{1}{2}$

7. point: (105, 38)
slope: 2

8. point: (38, 15)
slope: $-\frac{1}{2}$

9. point: (82, 105)
slope: $-\frac{1}{2}$

10. point: (25, 95)
slope: 1

11. point: (110, 60)
slope: undefined

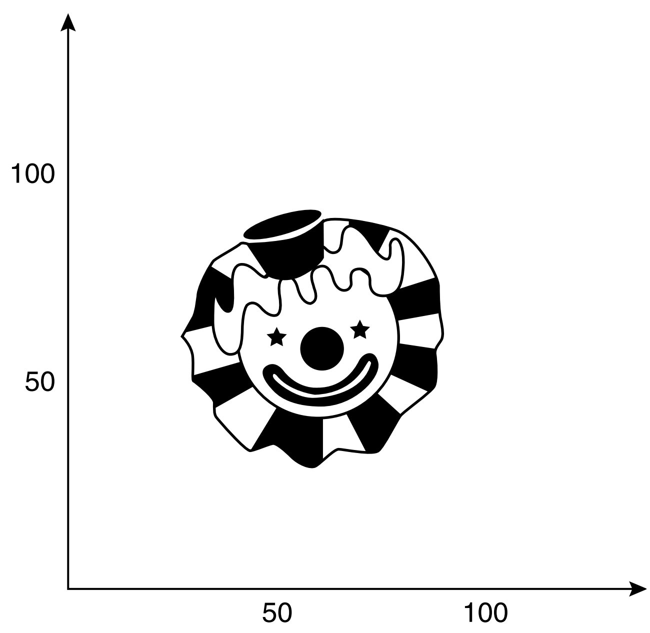
12. point: (15, 82)
slope: 2

13. point: (95, 95)
slope: −1

14. point: (60, 10)
slope: 0

15. point: (15, 38)
slope: −2

16. point: (95, 25)
slope: 1



Name ________________________________ Date __________ Class __________

LESSON **12-5**

Ready to Go On? Skills Intervention

Direct Variation

If two variables are related proportionally by a constant ratio, *k*, then they have a **direct variation.** The ratio is called the **constant of proportionality.**

$y = kx$ or $k = \frac{y}{x}$

Vocabulary

direct variation

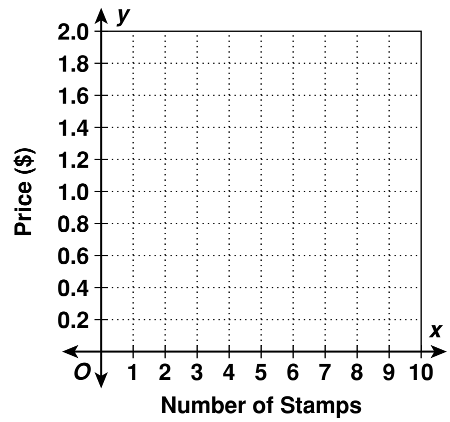
constant of proportionality

Determining Whether a Data Set Varies Directly

Determine whether the data set shows direct variation.

A.

Stamps	1	2	3	4	5
Price $	0.37	0.74	1.11	1.48	1.85



Make a graph of the data.

Does the line appear to be a straight line? _______

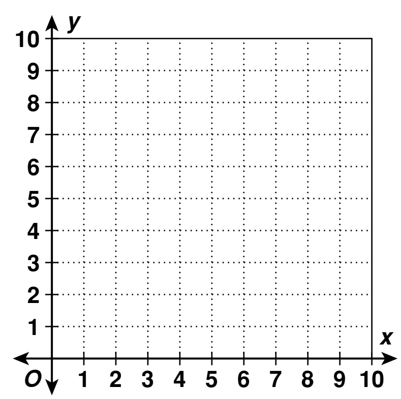
Compare the ratios. $\frac{0.37}{1} = \frac{0.74}{2} = \frac{\_\_\_}{3} = \frac{\_\_\_}{4} = \frac{\_\_\_}{5}$

Reduce each ratio: 0.37, 0.37, ______, ______, ______

Since the ratios are all the same this is a _______________.

B.

x	3	4	5	6	7
y	8	7.5	6	6.5	5



Make a graph of the data.

Does the line appear to be a straight line? _______

Compare the ratios. $\frac{8}{3} = \frac{7.5}{4} = \frac{\_\_}{5} = \frac{\_\_\_}{6} = \frac{\_\_}{7}$

Reduce each ratio: 2.7, 1.9, ______, ______, ______

Since the ratios are ______ all the same this is not

a _______ variation.

Finding Equations of Direct Variation

Find the equation of direct variation, given that *y* varies directly with *x*.
y is 32 when *x* is 8.

$y = kx$	Write the direct variation equation.
____ $= k \cdot$ ____	Substitute for *x* and *y*.
____ $= k$	Substitute 4 back into the original equation.
$y =$ ____x	

Name ________________________________ Date ___________ Class ____________

LESSON 12-5

Ready to Go On? Problem Solving Intervention

Direct Variation

When you travel at a constant speed, there is a direct variation between distance and time.

A driver sees a log in the road, but it takes time for her to react. During that *reaction time*, the car keeps going at the same speed. The distance the car travels before the driver brakes is the *reaction distance*. At 75 mi/h, the reaction distance is 165 ft. What is the reaction time in seconds?

Understand the Problem

1. Why does it make sense that there is a direct variation between reaction distance and speed?

____

____

2. Suppose the reaction time is 0.5 seconds. What would be the reaction distance at a speed of 100 ft /s? ____________

3. How far do you travel during the actual reaction time? ____________

Make a Plan

4. How many ft/s is 75 mi/h? Hint: How many times greater is 75 mi/h than 15 mi/h?

$15\ \frac{\text{mi}}{\text{h}} = 22\ \frac{\text{ft}}{\text{s}}$

____

5. Let *t* be the reaction time. Complete the proportion.

$$\frac{\_\_\_\_\text{ feet}}{t\text{ seconds}} = \frac{\_\_\_\_\text{ feet}}{1\text{ second}}$$ ← speed in ft/s

Solve

6. Solve the equation you wrote in Exercise 5.

____

7. How long is the reaction time in seconds? ____________

Check

8. Start with your answer. See if a car would travel 165 ft in that time if its speed were 75 mi/h.

____

Name ______________________________ Date ___________ Class ___________

LESSON **12-6**

Ready to Go On? Skills Intervention

Graphing Inequalities in Two Variables

A graph of a **linear inequality** divides the coordinate plane into three parts: the points on one side of the line, the points on the boundary line, and the points on the other side of the line. Any ordered pair that makes the linear inequality true is a solution. Use a dashed boundary line for inequalities with the $>$ or $<$ symbol and a solid boundary line for the $\le$ or $\ge$ symbol.

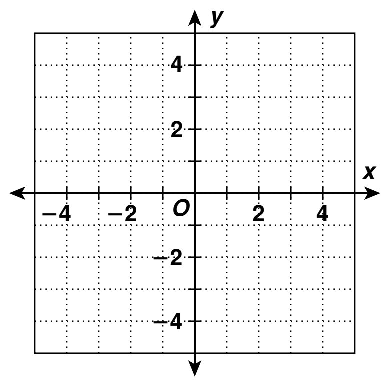
Vocabulary
boundary line
linear inequality

Graphing Inequalities
Graph each inequality.

A. $y > x + 2$

Will you use a dashed or solid boundary line? ________

Why? ____.



Graph the equation $y = x + 2$.
Pick a point on either side of the boundary line.

Which point is the easiest to use? _______

Substitute the point into the inequality.

$y > x + 2$

____ $>$ ____ $+ 2$

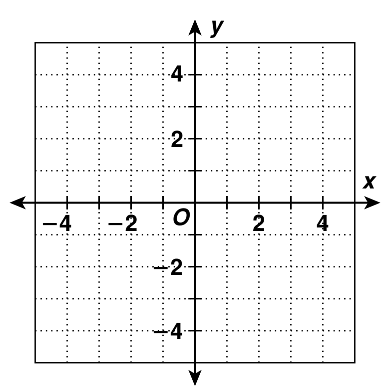
____ $>$ ____ Is this a true statement? _______

Shade the side of the line that does not include (0, 0).

B. $y \le x - 3$

Will you use a dashed or solid boundary line? _______

Why? ____.



Graph the equation $y = x - 3$.
Pick a point on either side of the boundary line.

Which point is the easiest to use? _______

Substitute the point into the inequality.

$y \le x - 3$

____ $\le$ ____ $- 3$

____ $\le$ ____ Is this a true statement? _______

Shade the side of the line that does not include (0, 0).

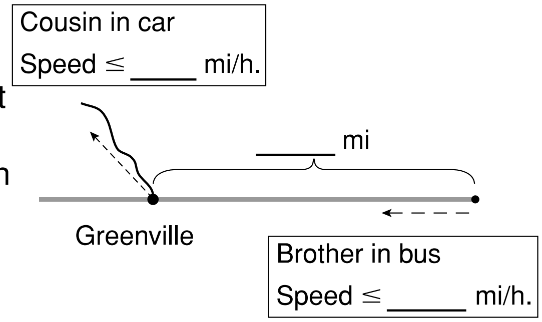
Name ____ Date ___________ Class ____________

LESSON 12-6

Ready to Go On? Problem Solving Intervention

Graphing Inequalities in Two Variables

Jenny's brother is coming to Greenville on a bus, which leaves at 8 A.M. from a city 340 miles away. The bus will travel on a highway with a speed limit of 65 mi/h. Also at 8 A.M., Jenny's cousin leaves Greenville in his car. He will drive on a dirt road on which he cannot go more than 35 mi/h. Could Jenny's brother and cousin each be 100 miles from Greenville at 11:30 A.M.?



Understand the Problem

1. Label the diagram with the information you know.

Make a Plan

2. Let *t* be the number of hours since 8 A.M. Write an expression for d_c, the distance Jenny's cousin is from Greenville and d_b, distance of her brother from Greenville after *t* hours.

____

3. Which pair of inequalities fits this problem, A or B? Explain.

A $d_c \leq 35t$ $d_b \geq 340 - 65t$	**B** $d_c \geq 35t$ $d_b \leq 340 - 65t$

____

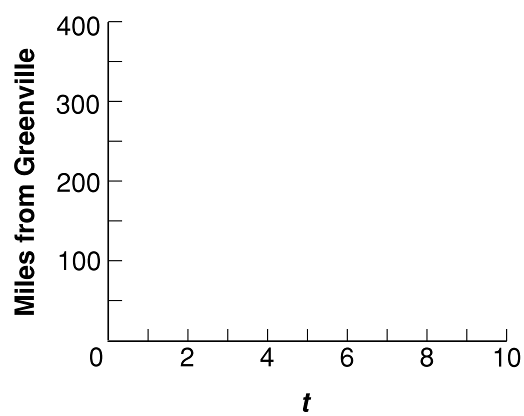
Solve

4. Graph the inequalities you chose in Exercise 3.

5. Is the point $\left(3\frac{1}{2}, 100\right)$ included in the shaded areas of each inequality? Use the graph to explain why Jenny's brother and cousin cannot both be 100 miles from Greenville at 11:30 A.M.

____

____



Check

6. Make sure you've shaded the correct side of each line.

Name ______________________________________ Date ___________ Class ____________

LESSON **12-7**

Ready to Go On? Skills Intervention

Lines of Best Fit

You can find the line of best fit for data that has a correlation. There are four steps to follow:

- Calculate the means of the *x*- and *y*-coordinates.
- Draw a line through the means that appears to be the best fit.
- Estimate the coordinates of another point on the line.
- Find the equation of the line.

Finding a Line of Best Fit
Plot the data and find a line of best fit.

x	3	5	6	2	4	9	7	8
y	3	7	6	2	3	7	4	8

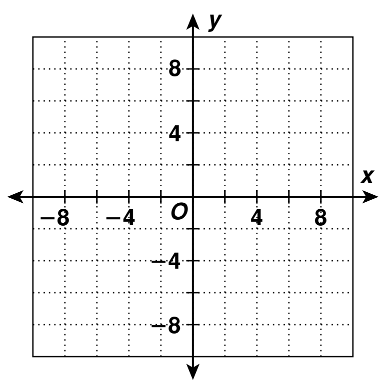
First, plot the data points on the coordinate grid.
Then, calculate the means of the *x*- and *y*-coordinates.

How do you find the mean?

____

$x_m = \dfrac{3 + 5 + 6 + 2 + \_\_ + \_\_ + \_\_ + \_\_}{\_\_} = 5.5$

$y_m = \dfrac{3 + 7 + 6 + 2 + \_\_ + \_\_ + \_\_ + \_\_}{\_\_} = 5$



Draw a line through (x_m, y_m) that best represents the data.

Estimate and plot the coordinates of another point on the line. Use (8, 7).

Find the slope of the line between (x_m, y_m) and (8, 7).

$m = \dfrac{7 - \_\_}{8 - \_\_\_} = \_\_\_\_\_\_ = \_\_\_\_$

What is the point-slope form of an equation? ______________________

Pick either point to substitute into the point-slope form.

$y - 7 = 0.8(x - 8)$	Substitute $x_1 = 8$ and $y_1 = 7$.
$y - \_\_\_\_ = 0.8x - \_\_\_\_$	Use the distributive property.
$\_\_\_\_ \quad \_\_\_\_$	Isolate *y*.
$y = 0.8x + \_\_\_\_$	

The equation of the line of best fit is ________________.

Name ________________________________ Date ___________ Class ___________

LESSON 12-7

Ready to Go On? Problem Solving Intervention

Lines of Best Fit

You can use lines of best fit to make projections based on past trends.

The table shows the attendance for women's NCAA basketball games for each year from 1982 to 1993. If the trend had continued, what would the attendance have been in 2000? Use a scatter plot to find out.

Year (1982 is 0)	Attendance (thousands)
1982	50
1983	60
1984	75
1985	100
1986	85
1987	100
1988	120
1989	150
1990	180
1991	150
1992	185
1993	220

Understand the Problem

1. If 1982 represents year 0, what ordered pair will be the first point?

____

Make a Plan

2. If you had an equation for a line that fit the data, how would you use it to solve the problem?

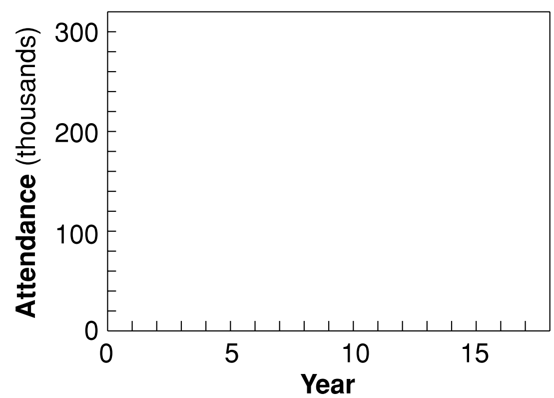
____

Solve

3. Make the scatter plot. Use 0 for 1982.

4. Find x_m and y_m, the mean of the x-coordinates and the mean of the y-coordinates.

____



5. Draw a line of best fit through (x_m, y_m). Choose another point on the line and use it to find the slope and the equation of the line.

____

____

6. Use the equation from Exercise 5 to estimate the attendance in 2000.

____

Check

7. Extend the line to $x = 18$ to check your solution. (The attendance in 2000 was actually 320,000. Did the trend continue as you projected?)

____

Name ______________________________ Date ___________ Class ___________

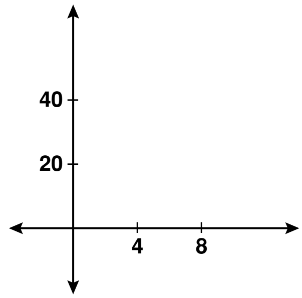
SECTION 12B

Ready to Go On? Quiz

12-5 Direct Variation

1. The table shows how many miles Julia has traveled after riding so many hours on her bicycle. Make a graph of the data and tell whether the data sets have a direct variation.

Hours	Miles
0	0
1	9
2	18
3	27
4	36
5	45
6	54



____

Find each equation of direct variation, given that y varies directly with x.

2. The variable y is 9 when x is 3.

____

3. The variable y is 2 when x is 8.

____

4. The variable y is 4.5 when x is 4.5.

____

5. The variable y is 5 when x is 0.5

____

6. The variable y is $\frac{7}{2}$ when x is $\frac{7}{2}$.

____

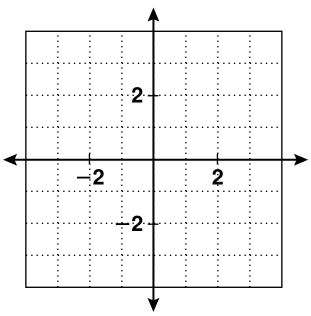
7. The variable y is 2 when x is 6.

____

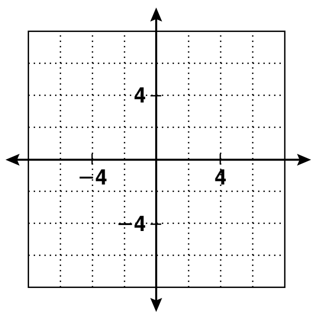
12-6 Graphing Inequalities in Two Variables

Graph each inequality.

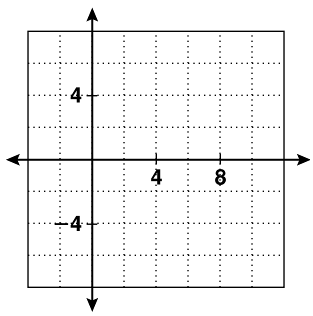
8. $y < \frac{2}{3}x - 1$



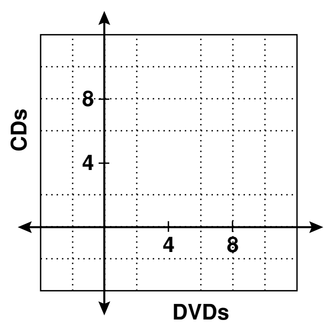
9. $y \geq -2x - 5$



10. $y > -\frac{1}{4}x + 2$



11. Buster's Movies and Music sells movie DVDs (d) for $16 and music CDs ($c$) for $12, tax included. Jeremy has $96. Write and graph an inequality showing the different ways Jeremy might spend all or part of his money. Could he buy 5 CDs and 2 DVDs?



____

Name ______________________________ Date ___________ Class ___________

SECTION **12B**

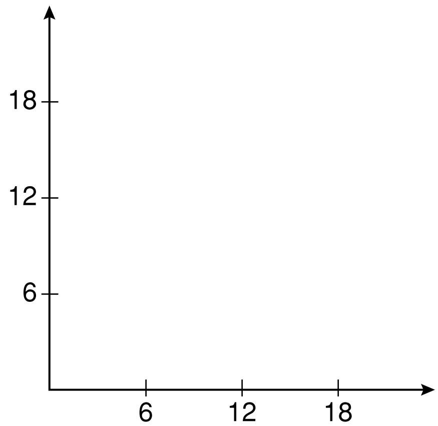
Ready to Go On? Quiz continued

12-7 Lines of Best Fit

Plot the data and find a line of best fit.

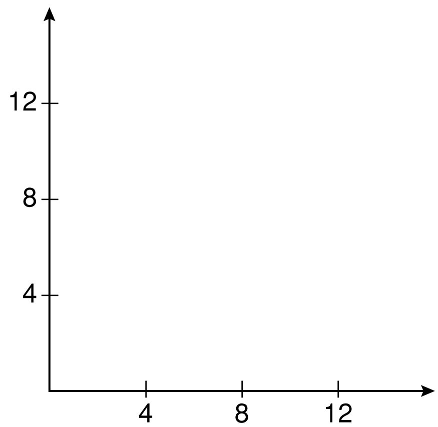
12.

x	*y*
1	4
4	11
5	17
8	23
7	21
3	9
2	6
6	18



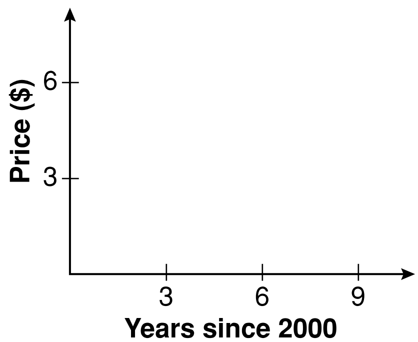
13.

x	*y*
3	9
8	5
4	8
3	10
2	10
1	11
5	7
6	6



14. Find the line of best fit for the price of a ticket to a baseball game.

Year	Price
2001	$5.50
2002	$5.60
2003	$5.75
2004	$5.75
2005	$5.95
2006	$6.15



15. Use the equation of this line to predict the ticket price in 2010 to the nearest 5 cents. ______________

16. Is this prediction reasonable? Explain.

____

Name ______________________________________ Date ___________ Class ____________

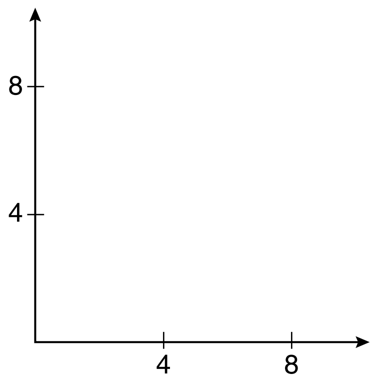
SECTION **12B**

Ready to Go On? Enrichment

Line of Best Fit

This page provides a simple illustration of one way mathematicians find the line of best fit. It can be used with any number of points and is more precise than our intuitive way.

1. Graph the following 12 points: (1, 2); (2, 2); (2, 3); (3, 4); (4, 2); (4, 4); (5, 3); (5, 5); (6, 4); (7, 7); (7, 8); (9, 9).



2. Draw two dashed *vertical* lines that separate these 12 points into 3 groups of 4 points each.

3. In each group, find the median of the *x*-coordinates and the median of the *y*-coordinates. Graph the median point using these two medians as the coordinates.

4. Draw a line through the first and last median points.

5. Now draw a line parallel to this line but $\frac{1}{3}$ of the distance to the second median point.

The second line you have just drawn is the line of best fit. Notice that there are precise rules for finding it. These rules define the *median-median method* of determining the line of best fit.

The other method you have been using is more intuitive because you have to guess the slope. However, there is no guessing with the median-median method; which is why mathematicians prefer it.

Name ______________________________________ Date ___________ Class ____________

LESSON **13-1**

Ready to Go On? Skills Intervention

Terms of Arithmetic Sequences

In an arithmetic sequence the difference between one term and the next is always constant and known as the common difference.

Identifying Arithmetic Sequences
Determine if each sequence could be arithmetic. If so, give the common difference.

A. 7, 13, 19, 25, 31, …

What is the difference between each term?

6 __ __ __ Is the difference the same? ____

The sequence __________ arithmetic with a common difference of __.

B. 1, 3, 4, 7, 11, 18, …

What is the difference between each term?

2 __ __ __ __ Is the difference the same? ____

The sequence _______ arithmetic.

C. 87, 84, 81, 78, 75, …

What is the difference between each term?

−3 ___ ___ ___ Is the difference the same? ____

The sequence _________ arithmetic with a common difference of ___.

The formula for finding the *n*th term is $a_n = a_1 + (n - 1)d$, where a_1 is the first term, n is the number of the term and d is the common difference.

Finding a Given Term of an Arithmetic Sequence
Find the given term in the arithmetic sequence.
12th term: −10, −5, 0, 5, 10, …

What is the general formula? a_n = _______________

What is the first term?	_____ This is a_1.
What is the common difference?	_____ This is d.
What term are you looking for?	_____ This is n.
a_{12} = −10 + (_____ − 1)_____	Substitute known values into the formula.
a_{12} = −10 + _____	Simplify.
a_{12} = _____	The 12th term in the sequence is _____.

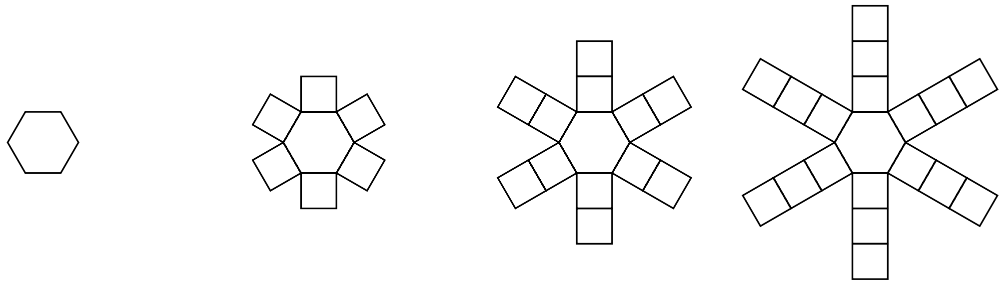
Name ______________________________________ Date ___________ Class ____________

LESSON 13-1

Ready to Go On? Problem Solving Intervention

Terms of Arithmetic Sequences

You can use an equation to make it easier to extend a sequence.



If the pattern in this sequence of figures continues, what will be the perimeter of the 51st figure?

n	*p*
1	6
2	
3	
4	

Understand the Problem

1. Find the perimeter of the 2nd, 3rd, and 4th figures in the sequence. Write the values in the table.

Make a Plan

2. How can you tell that the values of *p* form an arithmetic sequence? *Hint:* Look at the difference from one row to the next.

____

3. What formula can you use to find the *n*th term in an arithmetic sequence?

____

Solve

4. In the formula in Exercise 3, what values will you use for a_1, n, and d?

____

5. Substitute the values you wrote in Exercise 4 to find the 51st term.

____

Check

6. Check by finding the perimeter of each *arm* and multiplying.

number of *arms* • perimeter of each *arm* = total perimeter

______ • ______ ______

Name ____ Date ___________ Class ____________

LESSON 13-2

Ready to Go On? Skills Intervention

Terms of Geometric Sequences

Vocabulary
geometric sequence
common ratio

In a **geometric sequence** the ratio between one term and the next is always constant and known as the **common ratio.**

Identifying Geometric Sequences

Determine if each sequence could be geometric. If so, give the common ratio.

A. 7, −7, 7, −7, 7, …

What is the ratio between each term?

−1 ___ ___ ___

Are the ratios the same? ____

The sequence _________ geometric with a common ratio of ____.

B. 2, 4, 6, 8, 10, …

What is the ratio between each term?

$\frac{4}{2}$ ___ ___ ___

Are the ratios the same? ____

The sequence _______ geometric.

The formula for finding the *n*th term is $a_n = a_1 r^{n-1}$, where a_1 is the first term, *n* is the number of the term and *r* is the common ratio.

Finding a Given Term of a Geometric Sequence

Find the given term in the geometric sequence.

20th term: 800, 640, 512, 409.6, …

What is the general formula? $a_n = a_1$_____

What is the first term? _____ This is a_1.

What is the common ratio? ___________ This is *r*.

What term are you looking for? _____ This is *n*.

$a_n = a_1 r^{n-1}$ Substitute known values into the formula.

a_{20} = _____________ Simplify.

a_{20} = ______

The 20th term in the sequence is ______.

Name ______________________________________ Date ___________ Class ____________

LESSON 13-2

Ready to Go On? Problem Solving Intervention

Terms of Geometric Sequences

Sometimes a missing term is in the middle of a sequence.

The 3rd term of a geometric series is 16. The 5th term is 196. What is the 4th term?

term	value
a_3	
a_4	x
a_5	

Understand the Problem

1. Complete the table to show what you know. Let x be the 4th term.
2. In a geometric sequence, how does each term produce the one after it?

____

____

Make a Plan

3. Suppose the common ratio for the sequence were 2. What would a_4 be? Then what would a_5 be?

____

4. Explain why the common ratio cannot be 2. Hint: Look at Exercise 3.

____

5. Is the common ratio greater than 2 or less than 2? Explain.

____

____

6. Why might guess and check be useful for solving this problem?

____

____

Solve

7. What is the common ratio of the sequence? What is a_4?

____

Check

8. Complete to check your answer.

common ratio • a_3 = a_4 common ratio • a_4 = a_5

______ • 16 ______ ______ • ______ ______

Name ______________________ Date __________ Class __________

LESSON 13-3

Ready to Go On? Skills Intervention

Other Sequences

Using First and Second Differences

Use first and second differences to find the next three terms in each sequence. Complete each table.

A. 3, 8, 15, 24, 35, 48, 63, …

Sequence	**3**	**8**	**15**	**24**	**35**	**48**	**63**	**??**	**??**	**??**
1^{st} Differences		5	7							
2^{nd} Differences			2							

The next three terms are ____, ____, and ____.

B. 2, 8, 18, 32, 50, 72, …

Sequence	**2**	**8**	**18**	**32**	**50**	**72**	**??**	**??**	**??**
1^{st} Differences		6	10						
2^{nd} Differences			4						

The next three terms are ____, ____, and ____.

Finding a Rule Given Terms of a Sequence

Give the next three terms in the sequence using the simplest rule you can find.

1, 8, 27, 64, 125, …

Are the terms perfect squares? ____

Are the terms perfect cubes? ____

The next three terms are ____, ____, and ____.

Finding Terms of a Sequence Given a Rule

Find the first five terms of the sequence defined by $a_n = \frac{4n}{n+2}$.

What does the n stand for? ____________________

$a_1 = \frac{4(1)}{1+2} = \frac{4}{3}$ ⟶ ____ $= \frac{4(2)}{\_ + 2} = \frac{8}{4} =$ ____ ⟶ $a_3 = \frac{4\_\_}{\_ + 2} =$ ____

$a_4 = \frac{4\_\_}{\_ + 2} =$ ____ $=$ ____ ⟶ $a_5 = \frac{4\_\_}{\_ + 2} =$ ____

The first five terms are ____, ____, ____, ____, ____.

Name ______________________ Date __________ Class __________

SECTION 13A

Ready to Go On? Quiz

13-1 Terms of Arithmetic Sequences

Determine whether each sequence could be arithmetic. If so, give the common difference.

1. 9, 10, 12, 13, ... ______

2. 17, 34, 51, 68, ... ______

3. 39, 52, 65, 78, ... ______

4. 19, 31, 43, 55, ... ______

5. 56, 49, 42, 35, ... ______

6. 14, 51, 88, 125, ... ______

Find the given term in each arithmetic sequence.

7. 7th term: 4, 13, 22, ... ______

8. 10th term: 6, $6\frac{2}{3}$, $7\frac{1}{3}$, ... ______

9. 12th term: 4, 5.4, 6.8, ... ______

10. 8th term: 22, 19.5, 17, ... ______

11. Henriqueta earns $9.00 the first hour and $6.50 every hour after that. How much money has she earned after 8 hours? ______

13-2 Terms of Geometric Sequences

Determine whether each sequence could be geometric. If so, give the common ratio.

12. 3, −6, 12, −24, ... ______

13. 2, 4, −8, 16, ... ______

14. −1, 5, −25, 125, ... ______

15. 18, 9, 4.5, 2.25, ... ______

16. 4, 16, 64, 256, ... ______

17. 17, $8\frac{1}{2}$, $4\frac{1}{4}$, $2\frac{1}{8}$, ... ______

Find the given term in each geometric sequence.

18. 6th term: 9, 18, 36, ... ______

19. 7th term: –4, 12, –36, ... ______

20. 5th term: –3, –15, –75, ... ______

21. 5th term: 90, –30, 10, ... ______

22. Francesco buys $100.00 of stock in a fast-growth company. It grows by 50% each year. To the nearest, penny, what is Francesco's stock worth after 5 years? ______

SECTION 13A

Ready to Go On? Quiz continued

13-3 Other Sequences

Use the first and second differences to find the next three terms in each sequence.

23. 3, 3, 4, 6, 9, ...

24. 2, 11, 22, 35, 50, ...

25. 13, 9, 6, 4, 3, ...

26. 4, 6, 6, 4, 0, ...

27. −74, −49, −29, −14, −4, ...

28. 1, 3, 6, 10, 15, …

Give the next three terms in each sequence using the simplest rule you can find.

29. 1, 2, 4, 8, 16, ...

30. 63, 31, 15, 7, 3, ...

31. $\frac{2}{3}, \frac{4}{5}, \frac{6}{7}, \frac{8}{9}, \frac{10}{11}, ...$

32. 243, 81, 27, 9, 3, ...

33. 2, 4, 10, 28, 82, ...

34. 240, 120, 60, 30, …

Find the first five terms of each sequence as defined by the given rule.

35. $a_n = 3n - 5$

36. $a_n = -4n + 1$

37. $a_n = (-1)^n$

38. $a_n = (n - 3)^3$

39. $a_n = (n + 1)^2 + 10$

40. $a_n = 6n - 6$

Name ____ Date ___________ Class ____________

SECTION **13A**

Ready to Go On? Enrichment

Hidden Sequences

Find all the number sequences hidden in this array. Each sequence must have 4, 5, or 6 numbers. These must be arranged horizontally, vertically, or diagonally in a straight line without gaps. Ring each sequence that you find. A number may belong to more than one sequence.

10.2	7	5	4	4	5	7	$\frac{3}{2}$	$23\frac{1}{2}$
11	8.5	0	−53	−23	2	22	37	47
$-1\frac{1}{4}$	10	6.8	6.2	$1\frac{1}{3}$	14	1	101	94
$2\frac{1}{2}$	11.5	1	5.1	8	1	225	$\frac{1}{2}$	188
−5	−2	1	4	7	45	$\frac{2}{3}$	$3\frac{1}{7}$	$\frac{1}{4}$
10	−0.5	2	2.9	9	3	1	$\frac{1}{3}$	4
−20	2	4	1.8	116	16	6	5.9	5.89
40	0.1	7	8.5	33	29	25	21	$-2\frac{1}{4}$
7	9	11	13	13	$\frac{4}{5}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{2}$

How many sequences did you find? ____________________

Name ________________________________ Date __________ Class __________

LESSON **13-4**

Ready to Go On? Skills Intervention

Linear Functions

A **linear function** is the graph of a straight line. **Function notation** shows that the output of function *f* corresponds to input value *x* and is written *f*(*x*).

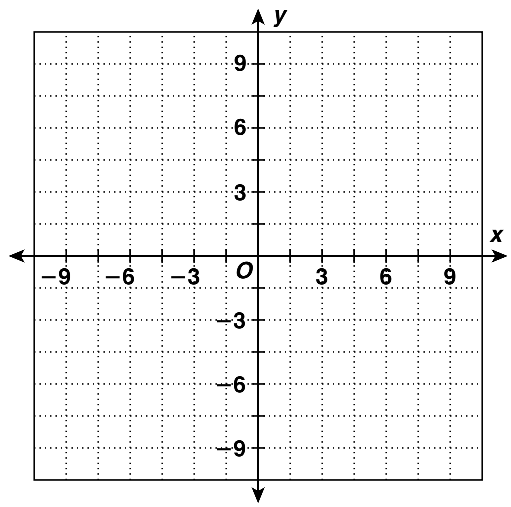
Vocabulary
linear function
function notation

Identifying Linear Functions

Determine whether $f(x) = \frac{1}{2}x + 3$ is linear.

$f(x) = \frac{1}{2}x + 3$

Graph the function.



What is the *y*-intercept? ____

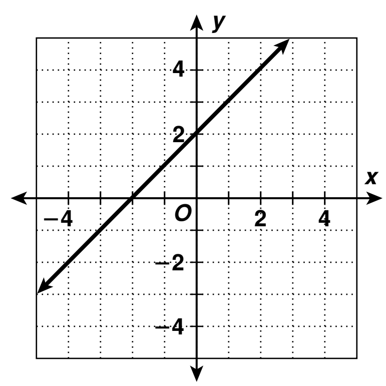
What is the slope? ____

What shape is the graph? __________

The function ____ linear.

Writing the Equation for a Linear Function

Write the rule for the linear function shown in the graph.



What is the general form of a linear function? __________

What is the *y*-intercept from the graph? $b =$ ____

Substitute the value of *b* into the equation. $f(x) = mx +$ ____

Use (−2, 0), another point on the graph, and substitute the *x*- and *y*-values into the equation.

$f(x) = mx + 2$	
$0 = m(-2) +$ ____	Substitute $x =$ ____ and $y =$ ____.
$0 = -2m +$ ____	Multiply.
____ $= -2m$	Isolate the variable.
$\frac{-2}{\_\_\_} = \frac{-2m}{\_\_\_}$	What do you divide both sides by?
____ $= m$	Solve for *m*.

Substitute the values for *m* and *b* into the function.

The rule is $f(x) =$ ____$x +$ ____.

Name ____ Date ___________ Class ____________

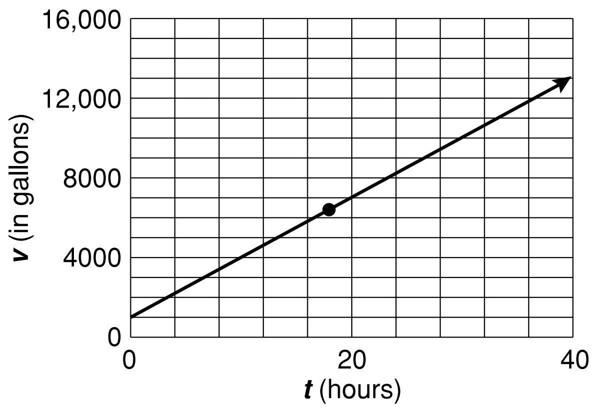
LESSON **13-4**

Ready to Go On? Problem Solving Intervention

Linear Functions

Sometimes you can use graphs to estimate and then use equations to find the exact solutions.

The graph shows a 13,000-gallon swimming pool being filled at the rate of 300 gal/hr. The pool is half full at 3:15 P.M. on May 21. There was already some water in the pool when the filling started at 10:00 P.M. on May 20. When will the pool be full?



Understand the Problem

1. How long did it take for the pool to be half full?

____

2. The point where the pool was half full is marked on the graph. Label the point with its coordinates.

Make a Plan

3. If you knew the equation of the graph, how could you find when the pool will be full?

____

Solve

4. Find m, the graph's slope. _______________

5. Substitute to find b.

$v = m$ ____ + ____

6500 = 300 • ________ + ____

$b = 1325$

6. Find t when $v = 13{,}000$. When will the pool be full?

____

Check

7. Why should it take more than $17\frac{1}{4}$ hours to fill the second half of the pool?

____

Name ______________________________ Date __________ Class __________

LESSON 13-5

Ready to Go On? Skills Intervention

Exponential Functions

An **exponential function** has the form $f(x) = p \cdot a^x$. If a is greater than 1 it is an **exponential growth** function. If a is less than 1 it is an **exponential decay** function.

Vocabulary

- exponential function
- exponential growth
- exponential decay

Graphing an Exponential Functions

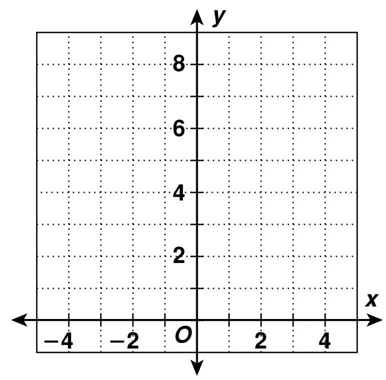
Create a table for each exponential function and use it to graph the function.

A. $f(x) = \frac{1}{3} \cdot 3^x$

Complete the table.

x	y
-2	$\frac{1}{3} \cdot 3^{-2} = \frac{1}{3} \cdot \frac{1}{9} = \frac{1}{27}$
-1	$\frac{1}{3} \cdot 3^{-1} = \frac{1}{3} \cdot \frac{1}{3} =$ ___
0	$\frac{1}{3} \cdot 3^{0} = \frac{1}{3} \cdot$ ___ $=$ ___
1	$\frac{1}{3} \cdot 3^{1} = \frac{1}{3} \cdot$ ___ $=$ ___
2	$\frac{1}{3} \cdot 3^{2} = \frac{1}{3} \cdot$ ___ $=$ ___

Plot the points and connect with a smooth curve.



Is the a value larger than 1?

____

The output value gets _______ as the input value gets larger.

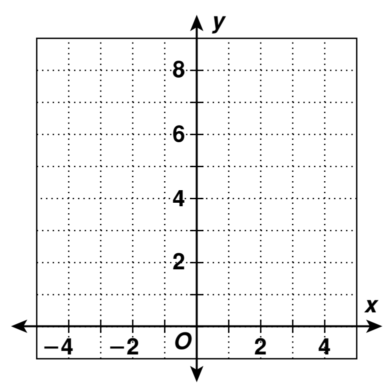
This is called an ____________________ function.

B. $f(x) = 4 \cdot \left(\frac{1}{4}\right)^x$

Complete the table.

x	y
-2	$4 \cdot \left(\frac{1}{4}\right)^{-2} = 4 \cdot 16 = 64$
-1	$4 \cdot \left(\frac{1}{4}\right)^{-1} = 4 \cdot 4 =$ ___
0	$4 \cdot \left(\frac{1}{4}\right)^{0} = 4 \cdot$ ___ $=$ ___
1	$4 \cdot \left(\frac{1}{4}\right)^{1} = 4 \cdot$ ___ $=$ ___
2	$4 \cdot \left(\frac{1}{4}\right)^{2} = 4 \cdot$ ___ $=$ ___

Plot the points and connect with a smooth curve.



Is the a value larger than 1?

____

The output value gets _________ as the input value gets larger.

This is called an ____________________ function.

Name ____ Date ___________ Class ____________

LESSON **13-5**

Ready to Go On? Problem Solving Intervention

Exponential Functions

The half-life of carbon-14 is 5730 years. A fossil has just 0.1% of the carbon-14 it had when it began to decay. How old is the fossil?

Understand the Problem

1. Every 5730 years, what fraction of a sample of carbon-14 will decompose? What percent is that? ______________

2. Write 0.1% as a fraction. ______________

Make a Plan

3. How might a table help you solve the problem?

____

____

Solve

4. Extend and fill in the table. How many 5730-year periods does it take for the fraction left to be less than $\frac{1}{1000}$? ______________

No. of 5730-year periods	1	2	3	4						
Fraction left	$\frac{1}{2}$	$\frac{1}{4}$								

5. How many years old is the fossil? Round to the nearest 5000. ______________

Check

6. Estimate to check your answer.

____

____

Solve

7. Technetium-99*m* has a half-life of 6 hours. At 2 P.M on Monday, 4 milligrams of a 1-gram sample remains. About when did the sample start decomposing?

____

Name ______________________________ Date __________ Class ___________

LESSON 13-6

Ready to Go On? Skills Intervention

Quadratic Functions

A **quadratic function** is of the form: $f(x) = ax^2 + bx + c$.

The graph of a quadratic function is a **parabola.**

Vocabulary
quadratic function
parabola

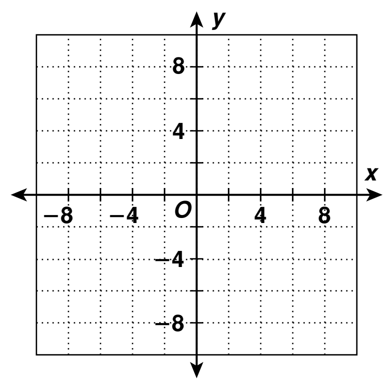
Graphing Quadratic Functions

Create a table for the quadratic function and use it to make a graph.

$f(x) = x^2 + x - 3$

Plot the points and connect with a smooth curve.

x	$f(x) = x^2 + x - 3$
-3	$f(x) = (-3)^2 + (-3) - 3 \quad = 9 - 6 \quad = 3$
-2	$f(x) = (\_\_\_\_)^2 + (-2) - 3 \quad = 4 - \_\_\_\_ = \_\_\_\_$
-1	$f(x) = (\_\_\_\_)^2 + (-1) - 3 \quad = 1 - \_\_\_\_ = \_\_\_\_$
0	$f(x) = (\_\_\_\_)^2 + 0 - \_\_\_\_ \quad = \_\_\_ - \_\_\_ = \_\_\_\_$
1	$f(x) = (\_\_\_\_)^2 + 1 - 3 \quad = \_\_\_ - \_\_\_ = \_\_\_\_$
2	$f(x) = (\_\_\_\_)^2 + \_\_\_\_ - \_\_\_\_ \quad = \_\_\_ - \_\_\_ = \_\_\_\_$
3	______________________________

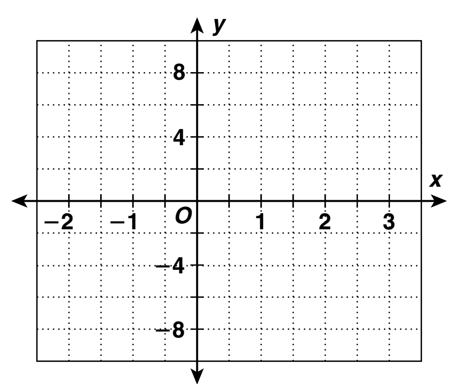


Sports Application

The height in meters of a ball tossed into the air after *s* seconds is given by the function $-5s^2 + 12s$. Graph the function and find the height the ball reaches after 2 seconds.

First, create a table of values.

s	$f(s)$
0	$-5(0)^2 + 12(0) = \_\_\_\_$
1	$-5(1)^2 + 12(\_\_\_\_) = \_\_\_\_$
2	$-5(\_\_\_\_)^2 + 12(\_\_\_\_) = \_\_\_\_$



Why can *s* not be negative?

____

Why is $f(2)$ less than $f(1)$? ______________________

What is the highest point the ball reaches? ______

What height does it reach after 2 seconds? ______

Name ______________________________________ Date ___________ Class ____________

LESSON 13-6

Ready to Go On? Problem Solving Intervention

Quadratic Functions

Find two ordered pairs that are solutions to both $y = 3x + 2$ and $y = x^2 + x - 6$.

Understand the Problem

1. What should happen when you substitute your answers into the equations $y = 3x + 2$ and $y = x^2 + x - 6$?

____

Make a Plan

2. How would a sketch of the graphs of the two equations help you estimate the answer?

____

Solve

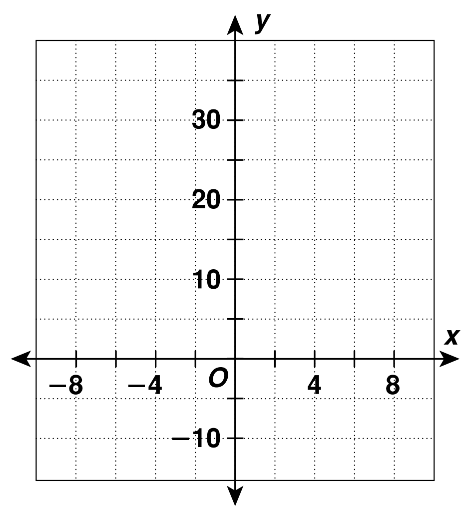
3. Complete the function table for each equation. Then sketch the graphs.

$y = 3x + 2$

x	y
−5	
0	
5	

$y = x^2 + x - 6$

x	y
−4	
−1	
0	
1	
6	



4. Estimate the coordinates of the points where the graphs meet. Test your estimates. If they don't work, try nearby points. Which ordered pairs satisfy both equations?

____

Check

5. Substitute your answers again into both equations.

____

____

Name ____ Date ___________ Class ____________

LESSON **13-7**

Ready to Go On? Skills Intervention

Inverse Variations

Vocabulary
inverse variation

In an **inverse variation** one variable increases in quantity while another variable decreases in quantity. The general form for an inverse variation is

$xy = k$ or $y = \frac{k}{x}$.

Identifying Inverse Variation

Tell whether the relationship is an inverse variation.

A car is traveling a distance of 20 miles. The table shows the length of time it will take to travel 20 miles at a particular speed.

Speed (mi/h)	5	20	40	50
Time (h)	4	1	0.5	0.4

Find each product:

5(4) = ____ (20)(1) = ____ (40)(____) = ____ (50)(____) = ____

Is the product of *xy* the same for each set of numbers? ____

Is the relationship an inverse variation? ____

Write the inverse variation: $y = \frac{20}{\_\_}$.

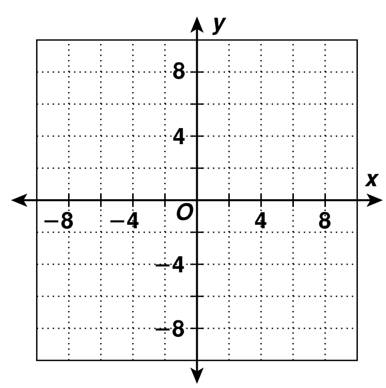
Graphing Inverse Variations

Graph the inverse variation function.

$f(x) = \frac{1}{2x}$

Create a table of values for the function. The graph will be in quadrants I and III.

x	$f(x) = \frac{1}{2x}$	**x**	$f(x) = \frac{1}{2x}$
−3	$f(x) = \frac{1}{2(-3)}$ = ____	**1**	$f(x) = \frac{1}{2(\_)}$ = ____
−2	$f(x) = \frac{1}{2(-2)}$ = ____	**2**	$f(x) = \frac{1}{2(\_)}$ = ____
−1	$f(x) = \frac{1}{2(-1)}$ = ____	**3**	$f(x) = \frac{1}{2(\_)}$ = ____
$-\frac{1}{2}$	$f(x) = \frac{1}{2\left(\frac{-1}{2}\right)}$ = ____	**4**	$f(x) = \frac{1}{2(\_)}$ = ____



Name ______________________________ Date __________ Class __________

SECTION 13B

Ready to Go On? Quiz

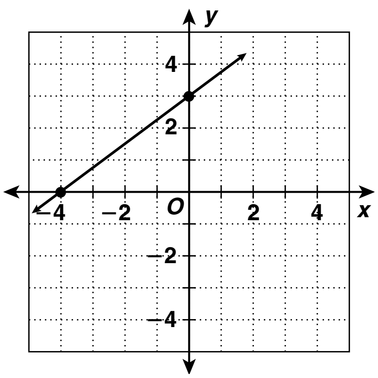
13-4 Linear Functions

Determine whether each function is linear.

1. $f(x) = \frac{4}{7}x - \frac{1}{7}$ _____ **2.** $f(x) = 1.85x + 9$ _____ **3.** $f(x) = 2x^4 + 1$ _____

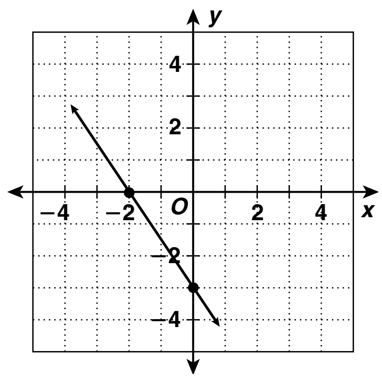
Write a rule for each function.

4.



____

5.



____

6. Angela has a base salary of \$220 per week. She also earns a commission of \$20 on every widget she sells. Find a rule for the linear function that describes Angela's weekly income if she sells *x* widgets. How much does Angela earn if she sells 8 widgets in one week?

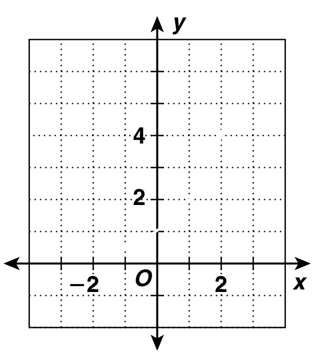
____

13-5 Exponential Functions

Create a table for each exponential function and use it to graph the function.

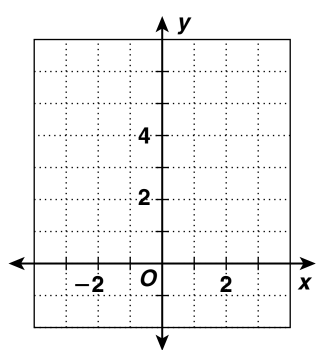
7. $f(x) = 2^x$

x	$f(x)$
−2	$\frac{1}{4}$
−1	$\frac{1}{2}$
0	1
1	2
2	4



8. $f(x) = \left(\frac{3}{4}\right)^x$

x	$f(x)$
−2	1.78
−1	1.33
0	1
1	0.75
2	0.56



Name ______________________________________ Date ___________ Class ____________

SECTION **13B**

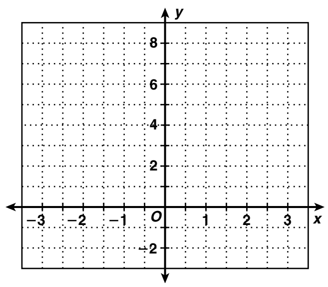
Ready to Go On? Quiz continued

13-6 Quadratic Functions

Create a table for each quadratic function, and use it to graph the function.

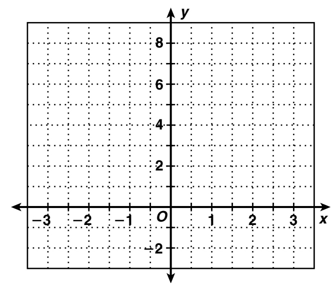
9. $f(x) = x^2 - 2$

x	$f(x)$
−3	7
−2	2
−1	−1
0	−2
1	−1
2	2
3	7



10. $f(x) = \frac{1}{3}x^2$

x	$f(x)$
−3	3
−2	$1\frac{1}{3}$
−1	$\frac{1}{3}$
0	0
1	$\frac{1}{3}$
2	$1\frac{1}{3}$
3	3



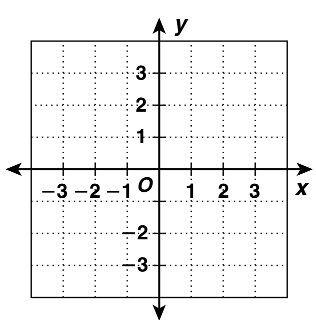
11. The function $f(x) = -16x^2 + 100x$ gives the height in feet after x seconds of an object shot upward from the ground at an initial velocity of 100 feet per second. After how many seconds is this height the greatest, 1, 2, 3, 4, or 5? What is this height? ____________________

13-7 Inverse Functions

Create a table. Then graph each inverse-variation function.

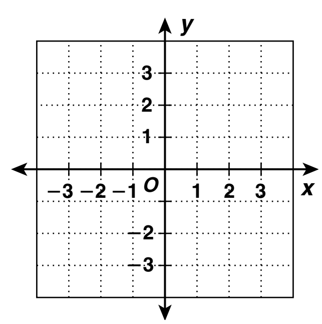
12. $f(x) = \frac{3}{x}$

x	$f(x)$
−3	−1
−2	−1.5
−1	−3
0	–
1	3
2	1.5
3	1



13. $f(x) = -\frac{2}{x}$

x	$f(x)$
−3	$\frac{2}{3}$
−2	1
−1	2
0	–
1	−2
2	−1
3	$-\frac{2}{3}$



Name ______________________ Date __________ Class __________

SECTION 13B

Ready to Go On? Enrichment

What You Are and What You Are Not

What are you about as a person? This activity will try to answer that question for you.

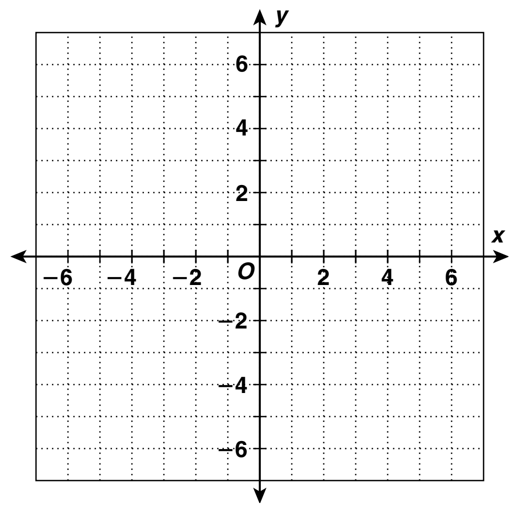
First, graph each of these four linear functions.

1. $f(x) = 2x + 4$

2. $f(x) = -\frac{1}{2}x + 4$

3. $f(x) = 2x - 6$

4. $f(x) = -\frac{1}{2}x - 1$



What figure is in the center? __________

This figure is telling you what you are not.

Now graph each of these five linear functions.

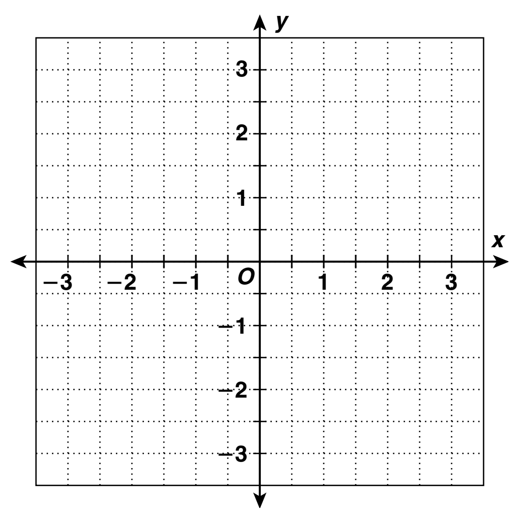
5. $f(x) = 3x + 3$

6. $f(x) = -3x + 3$

7. $f(x) = -\frac{2}{3}x - 1$

8. $f(x) = \frac{2}{3}x - 1$

9. $f(x) = 1$



What figure is formed by the graphs you draw? __________

This figure is telling you what you are.

Name ____ Date ___________ Class ____________

LESSON **14-1**

Ready to Go On? Skills Intervention

Polynomials

Vocabulary
monomial
polynomial
binomial
trinomial
degree of a polynomial

A **monomial** is a number or a product of numbers and variables with exponents that are whole numbers. A **polynomial** is one monomial or the sum or difference of polynomials. Polynomials can be classified by the number of terms. A monomial has 1 term, a **binomial** has 2 terms, and a **trinomial** has 3 terms. A polynomial can also be classified by its degree. The **degree of a polynomial** is the degree of the term with the greatest degree.

Identifying Monomials

Determine whether each expression is a monomial.

A. $5x^{2.3}y$

Is this expression a product of numbers and variables? ____

Are all the exponents whole numbers? Explain.

____

The expression ______ a monomial.

B. $\frac{1}{3}x^4y^2$

Is this expression a product of numbers and variables? ____

Are all the exponents whole numbers? Explain.

____

The expression ______ a monomial.

Classifying Polynomials by the Number of Terms

Classify each expression as a monomial, a binomial, a trinomial, or not a polynomial.

A. $20.42t - 15.73r$

How many terms in this expression? ____

Are all the terms monomials? ____

The expression is a ______________.

B. $10gh - 4g + 5h$

How many terms in this expression? ____

Are all the terms monomials? Explain.

____

The expression is a ______________.

Name ______________________________ Date __________ Class __________

LESSON 14-1

Ready to Go On? Problem Solving Intervention

Polynomials

You can use polynomials to describe projectile motion and to find the height of an object at any given time.

The height in feet of a toy rocket launched straight up into the air from *s* feet above the ground at velocity *v* after *t* seconds is given by the polynomial $-16t^2 + vt + s$. Find the height of a toy rocket launched from a 2 ft platform at 160 ft/s after 5 seconds.

Understand the Problem

1. What does the polynomial in the problem represent?

____

2. You have been given a polynomial with several variables. Two of them will be constant regardless of how much time passes. Which two variables will not change as time passes?

____

Make a Plan

3. Rewrite the polynomial expression for the height of the toy rocket by substituting the values for *v* and *s*.

____

4. Substitute $t = 0$ into the polynomial to find the height before the toy rocket is launched. Is the result consistent with the information given in the problem? Why or why not?

____

Solve

5. The problem asks for the height after 5 seconds, so substitute $t = 5$ into the polynomial and simplify.

____

6. Write your answer as a complete sentence. Be sure to include the appropriate units in your answer.

____

Check

7. Make sure your answer is reasonable by substituting another value of *t* close to 5, such as $t = 4$.

____

Name ______________________ Date __________ Class __________

LESSON **14-2**

Ready to Go On? Skills Intervention

Simplifying Polynomials

You can simplify a polynomial by adding or subtracting like terms. Remember that like terms have the same variables raised to the same powers.

Identifying Like Terms

Identify the like terms in each polynomial, or state that there are none.

A. $4b^2 - 2b + 2 + 3b^2 + 4b$

Which term(s) contain only b^2 as a variable? ____________

Which term(s) contain only b as a variable? ____________

Which are like terms, if any? ____________

B. $6g^2 + 5gh - 2g$

Which term(s) contain only g^2 as a variable? ______

Which term(s) contain only gh as a variable? ______

Which term(s) contain only g as a variable? ______

Which are like terms, if any? ____________

C. $5x^2y^5 - 7y^3 - 2x^2y^5 + 3x^2y^5$

Which term(s) contain only x^2y^5 as the variables? ____________

Which term(s) contain only y^3 as a variable? ______

What are the like terms, if any? ____________

Simplifying Polynomials by Combining Like Terms

Simplify.

A. $4y^4 - 2y^2 - 2y^4 + 3 + 5y^4 - y^2$

Arrange the terms in descending order. ____________

Name the terms that have the same variable raised to the same power.

____

Are these like terms? ____

What term results from combining these terms? ____________

What is the polynomial after combining *all* the like terms? ____________

Name ________________________ Date ____________ Class ____________

LESSON 14-2

Ready to Go On? Problem Solving Intervention

Simplifying Polynomials

Polynomials are often used to represent growth and decay of physical elements.

A scientist is studying an element that he has discovered. He has determined that the amount of the element at any given time can be approximated by the polynomial $-0.25(4t^2 + At) + A$, where A is the original amount of the element and t is the number of hours that have passed. If the scientist originally had 1,000 grams of the element, how much is left after 2 hours?

Understand the Problem

1. What are the two variables in the problem?

____

2. What is the value of A in the problem? Will it change for different values of t?

____

Make a Plan

3. Simplify the expression by substituting $A = 1{,}000$ and by multiplying the appropriate terms by -0.25.

____

4. What value of t will you need to substitute into the expression?

____

Solve

5. The problem asks for the amount of the element remaining after 2 hours, so substitute $t = 2$ into the polynomial and simplify.

____

6. Write your answer as a complete sentence. Be sure to include the appropriate units in your answer.

____

Check

7. Make sure your answer is reasonable by substituting another value of t close to 2, such as $t = 3$.

____

____

Name ________________________ Date ___________ Class ____________

SECTION 14A

Ready to Go On? Quiz

14-1 Polynomials

Determine whether each expression is a monomial.

1. $\frac{1}{4}x^3$ ________

2. $5a^7$ ________

3. $2n^4 + m$ ________

4. $\frac{3}{cd}$ ________

5. $\frac{p^2}{6}$ ________

6. $9r^2 + 1$ ________

Classify each expression as a monomial, a binomial, a trinomial, or not a polynomial.

7. $x^2 + 2x - \frac{4}{x}$ ________

8. $3mnp^5$ ________

9. $y - 6\sqrt{y}$ ________

10. $z^2 + 5 - 2z^3$ ________

11. $4b - 7$ ________

12. $13abc^2pq^5$ ________

13. $4m^{3/2}$ ________

14. $(x + 5)(x - 5)$ ________

15. $15r^3 - 2rs$ ________

Find the degree of each polynomial.

16. $4x^2 - 3x + 6$ ________

17. $c^5 + 4c^3 - 11$ ________

18. $9v^4 + 1$ ________

19. $-5 + 3q^6 + q^2$ ________

20. $b^2 + b - 2b^3$ ________

21. $m - 3 + 2m^4 - 8m^3$ ________

22. $12s^2$ ________

23. $-1 - 17z^3$ ________

24. $2w^3 + w^4$ ________

25. The polynomial $2s + \frac{s^2}{20}$ gives an estimate in feet of how far a car going s mi/h must travel to come to a complete stop. Estimate this distance for a car going 30 mi/h. ________

Name ______________________ Date __________ Class __________

SECTION **14A**

Ready to Go On? Quiz continued

14-2 Simplifying Polynomials

Identify the like terms in each polynomial.

26. $-xy^2 + x^2y + 5xy^2$

27. $p - 2p^3 + p^3 + 4p$

28. $wxy + 3wxy - 2wxy + xyz$

29. $-abc^2 + ab + bc^2 - 6abc^2$

30. $2m + 11n - m + m^4 + 3n$

31. $-9p^2q + p^2q + 5p^2q - 2p^2q$

32. $4v - w + wx + 4v$

33. $ab^2 - ab^2 + c^2d - 7c^2d + 2c^2d$

Simplify.

34. $4r + 10s - 3r + r^4 + 3s$

35. $x^2y + 7w - 2x^2y + z^4 + 8x^2y$

36. $-pq - 3pq - pq^5 + 6pq$

37. $2(a^2 + 5a^2) - 20a^2 + 7(4a^2 - 2a^2)$

38. $6d^2 + 3(t - 2d^2)$

39. $m + 4n - p^2 - m - 5q$

40. $ab^2 - ab^2 + c^2d - 2(7c^2d - 5c^2d)$

41. $14 - z^2 + 3u + 9z^2 + 100$

Solve.

42. One side of a regular pentagon is represented by the expression $3n - 2$. Write a polynomial to represent the perimeter of this pentagon. ______________

43. An apartment building is a rectangular prism with a square base. The area of each side of the building is given by the expression $3a^2 + 5a - 2$. Write a polynomial to represent the total area of all 4 sides of the building. ______________

Name ________________________________ Date __________ Class __________

SECTION **14A**

Ready to Go On? Enrichment

Riddles

Simplify each polynomial. Match the answers in the right column to each problem. Then write the letter of each answer in the order of the problems to solve the riddles.

1. $3a^2 - 4 - a + a^2 + 3$	**O.** $6a^2 - 2a + 6$
2. $4(a^2 + 3) - 2(-a^2 + a + 3)$	**L.** $-7a^2 + 2a - 8$
3. $-a + 3(a^2 + 3) - 2(a^2 - a + 2)$	**E.** $a^2 - 2a + 5$
4. $4a^2 - 4 - 5a - 3a^2 + 3a + 9$	**W.** $a^2 + a + 5$
5. $-5(2a^2 - a + 1) + 3(a^2 - a - 1)$	**T.** $4a^2 - a - 1$

What gets wetter as it dries? ____________

6. $(2mp - 3m^2p) + 3(-2mp + 2mp^2)$	**R.** $-2m^2p + mp^2 - 8mp$
7. $4mp^2 - mp + 2m^2p - mp^2 + 3m^2p$	**B.** $9m^2p + 4mp^2 - 2mp$
8. $-5m^2p - 2(mp - 2mp^2 - 7m^2p)$	**Y.** $3m^2p + 5mp^2 - 4mp$
9. $mp + 5mp^2 - 3m^2p + 4mp + 7m^2p$	**R.** $4m^2p + 5mp^2 + 5mp$
10. $-(2m^2p - mp + 3mp^2) + 4(mp + 2mp^2)$	**I.** $5m^2p + 3mp^2 - mp$
11. $-3mp^2 + 2(-4mp + 2mp^2 - m^2p)$	**A.** $-2m^2p + 5mp^2 + 5mp$
12. $2mp^2 - 3mp + 3mp^2 + 3m^2p - mp$	**L.** $-3m^2p + 6mp^2 - 4mp$

Name the building with the most stories. ____________

13. $-rst^2 - r^2st - 3rs^2t + 6r^2st + 2rs^2t$	**E.** $-r^2st + 2rs^2t - 4rst^2$
14. $2(rs^2t - 3rst^2) - (-4rst^2 + r^2st) - 2rst^2$	**T.** $-3r^2st + 7rs^2t + 3rst^2$
15. $3(rst^2 + 2rs^2t - r^2st) + rs^2t$	**W.** $5r^2st - rs^2t - rst^2$

Your sock is blue. It falls into the Red Sea. What does it become? ____________

Name ____ Date ___________ Class ____________

LESSON 14-3

Ready to Go On? Skills Intervention

Adding Polynomials

The Associative Property of Addition states that for any values of a, b, and c, $a + b + c = (a + b) + c = a + (b + c)$. You can use this property to add polynomials.

Adding Polynomials Horizontally

Add.

A. $(4x^2 + 3x - 2) + (5x + 7)$

Apply the Associative Property. ____________________________

Arrange in descending order. ______________________________

Combine like terms. _________________

B. $(-4g^2h - 5gh - 2) + (11gh + 6g^2h + 2)$

Apply the Associative Property. ____

Arrange in descending order. ____

Combine like terms. _________________

C. $(3cd^2 - 2c) + (4c - 5) + (cd^2 + 3c - 2)$

Apply the Associative Property. ____

Arrange in descending order. ____

Combine like terms. __________________

Adding Polynomials Vertically

Add.

A. $(2a^2 + 5a + 2) + (3a^2 + 4a + 1)$

Place like terms in columns.

$2a^2$ + ____ + 2

____ + 4a + __

The sum of the polynomials is _________________.

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

Place like terms in columns.

_____ + $3x$ − ____

$2x^2y$ − ____ + __

The sum of the polynomials is ___________________________.

Name ______________________________ Date __________ Class ___________

LESSON **14-3**

Ready to Go On? Problem Solving Intervention

Adding Polynomials

Adding polynomials sometimes makes a difficult problem easier to solve.

A swimming pool company is planning to fill its three pool models with water. The volume of the first model is $4b^2h + 6bh + h^2$; the volume of the second is $5bh + 2b^2h + 6h^2$; and volume of the third is $2h^2 + bh + 10b^2h$. Write and simplify an expression for the total volume of the three models.

Understand the Problem

1. What do the three polynomials represent?

____

Make a Plan

2. How can you find the total volume of the three models?

____

3. The first step when adding polynomials is to identify like terms. Sometimes it helps to reorder the polynomials so that the terms are in the same order. Reorder the second and third polynomials to match the order of the first polynomial.

____

Solve

4. Identify and combine like terms by adding their coefficients.

____

____

____

5. Write the terms in a single polynomial expression.

____

Check

6. Check your answer by adding the polynomials vertically.

____

Name ______________________________________ Date ___________ Class ____________

LESSON 14-4

Ready to Go On? Skills Intervention

Subtracting Polynomials

Subtraction is the opposite of addition. To subtract a polynomial, you need to find its opposite.

Finding the Opposite of a Polynomial
Find the opposite of each polynomial.

A. $3a^3b^5c$

The opposite of a is ____.

The opposite of $(3a^3b^5c)$ is ___ (_______).

The opposite of $3a^3b^5c$ is ____________.

B. $8a^2 - 2a$

The opposite of $(8a^2 - 2a)$ is $-(8a^2$ ___ $2a)$.

Remove the parentheses and distribute the sign. ____________

C. $-4x^2y + 2x - 3$

The opposite of $(-4x^2y + 2x - 3)$ is ___ (________________).

Remove the parentheses and distribute the sign. _________________

Subtracting Polynomials Horizontally
Subtract.

A. $(m^3 + 2m - 5m^2) - (4m - 3m^2 + 2)$

Add the opposite. $(m^3 + 2m - 5m^2) + (-4m$ ___ $3m^2$ ___ $2)$

Apply the Associative Property. $m^3 + 2m$ ______________ $+\ 3m^2\ -\ 2$

Combine the like terms. ____________________________________

B. $(-a^2b + 3ab - 4) - (-4a^2b + 5 - 6ab)$

Add the opposite. $(-a^2b + 3ab - 4) + ($_________________$)$

Apply the Associative Property. ____________________________________

Combine the like terms. ____________________________________

Subtracting Polynomials Vertically
Subtract.

$(7k^3 - 4kn^2 + 10) - (7k^3 - 3kn^2 + 6k + 6)$

$7k^3 - 4kn^2 \qquad + 10$

+ (_____) + _____ − _____ − _____ Add the opposite.

_____ − _____ + _____

Name ______________________________________ Date ___________ Class ____________

LESSON **14-4**

Ready to Go On? Problem Solving Intervention

Subtracting Polynomials

Profit is defined as revenue minus cost. Revenue and cost can be given as polynomials. By subtracting the polynomials, it is possible to find profit.

A laptop manufacturer has determined that its cost in dollars of producing n laptop computers is given by the polynomial $80n + 50{,}000$ and the revenue generated from sales is given by the polynomial $200n - 0.0002n^2$. Find a polynomial expression for the profit from making and selling n laptops, and determine how much profit the manufacturer would make if it produced 300,000 laptops.

Understand the Problem

1. What does the variable in the problem represent?

____

2. Why do you know to subtract the first polynomial from the second?

____

Make a Plan

3. Express profit as the difference of the two given polynomials.

____

4. Rewrite the difference as the sum of the first polynomial in Step 3 plus the opposite of the second.

____

Solve

5. Express profit as a single polynomial by simplifying the sum in Step 4.

____

6. Substitute the value $n = 300{,}000$ into the polynomial to find the amount of profit.

____

Check

7. Check your answer by substituting $n = 300{,}000$ into the revenue equation and into the cost equation, and then subtracting. You should get the same result.

____

____

____

Name ______________________________________ Date ___________ Class ____________

LESSON 14-5

Ready to Go On? Skills Intervention

Multiplying Polynomials by Monomials

Remember that when you multiply two powers with the same bases, you add the exponents. To multiply two monomials, multiply the coefficients and add the exponents of the variables that are the same.

Multiplying Monomials
Multiply.

A. $(2a^3b^4)(3a^2b^3)$

To solve $a^3 \cdot a^2$, do you add the exponents or multiply them? _____

$a^3 \cdot a^2 =$ _____

$b^4 \cdot b^3 =$ _____

$(2a^3b^4)(3a^2b^3) =$ ________

B. $(5y^2z)(-2x^2y^4z)$

$y^2 \cdot y^4 =$ _____

$z \cdot z =$ _____

Will x^2 appear in the product? _____

$(5y^2z)(-2x^2y^4z) =$ ____________

Multiply a Polynomial by a Monomial
Multiply.

A. $2x(y + z)$

What are the terms in the parentheses in $2x(y + z)$? ___________

What term is to be multiplied by y and z? _____

$2x \cdot y =$ _____

$2x \cdot z =$ _____

$2x(y + z) =$ ____________

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

What are the terms in the parentheses? _______________

What term is to be multiplied by $5x^2y$ and $4x^4y^3$? __________

Does the solution require adding exponents or multiplying them? _________

$-3x^3y^2 \cdot 5x^2y =$ __________

$-3x^3y^2 \cdot 4x^4y^3 =$ __________

$-3x^3y^2(5x^2y + 4x^4y^3) =$ ________________________

Name ______________________________ Date __________ Class ___________

LESSON **14-5**

Ready to Go On? Problem Solving Intervention

Multiplying Polynomials by Monomials

Geometric formulas, such as area, involve multiplying quantities. If the dimensions of a figure are represented by variables, you will need to be able to multiply polynomials.

The formula for the area of a triangle is $A = \frac{1}{2}bh$, where b is the length of the triangle's base and h is the height of the triangle. The base of a particular triangle is given by the monomial $4x^2y$ and the height is given by the binomial $x^2 + 3xy$. Write and simplify an expression for the area of triangle. Then find the area of the triangle if $x = 2$ and $y = 3$.

Understand the Problem

1. Which polynomial represents the length of the triangle's base?

____

2. What does the polynomial $x^2 + 3xy$ represent?

____

Make a Plan

3. Write an expression for the area of the triangle by substituting the given polynomials for b and h.

____

4. Simplify the expression by multiplying the first polynomial by $\frac{1}{2}$. Then, rewrite the area as the product of this new polynomial and the height.

____

Solve

5. Express the area of the triangle as a simplified polynomial by multiplying.

____

6. To find the area when $x = 2$ and $y = 3$, substitute the values into the polynomial.

____

Check

7. Check your answer by substituting $x = 2$ and $y = 3$ into the original polynomials for the base and height of the triangle and then multiplying. You should get the same result.

____

Name ______________________ Date ___________ Class ___________

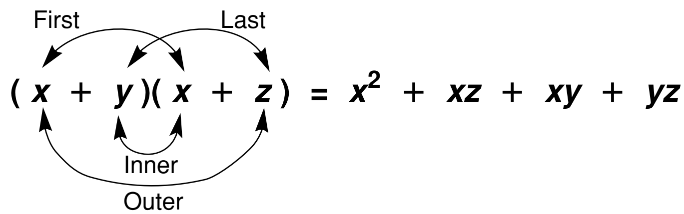
LESSON **14-6**

Ready to Go On? Skills Intervention

Multiplying Binomials

You can use the Distributive Property to multiply two binomials. The product can be written as **FOIL:** The **F**irst terms, the **O**uter terms, the **I**nner terms, and the **L**ast terms of the binomials.

Vocabulary
FOIL



Multiplying Two Binomials

Multiply.

A. $(a + 2)(5 - b)$

What are the “First” terms, including sign? ______________

What is the result of combining the “First” terms? ________

What are the “Outer” terms? ______________

What is the result of combining the “Outer” terms? _______

What are the “Inner” terms and the result of combing these terms? _________________

What are the “Last” terms and the result of combing these terms? __________________

$(a + 2)(5 - b) = 5a$ ___________ $- 2b$

B. $(x + 4)(x + 3)$

What are the “First” terms, including sign? ______________

Is the term $2x$ part of the thinking for the solution? _______

What is the result of combining the “First” terms? _____

What are the “Outer” terms and the result of combing these terms? _________________

What are the “Inner” terms and the result of combing these terms? _________________

What are the “Last” terms and the result of combing these terms? __________________

Identify any like terms and combine these terms. _______________

$(x + 4)(x + 3) =$ ________________

Name ________________________________ Date ___________ Class ___________

LESSON 14-6

Ready to Go On? Problem Solving Intervention

Multiplying Binomials

Finding volume also involves multiplying expressions.

The base of a metal box is formed by cutting a 2-inch square out of each corner of a sheet of metal and folding up the sides. Write and simplify an expression for the volume of the box if the length of the sheet of metal is x inches, the width of the metal is y inches, and the height of the box is 2 inches.

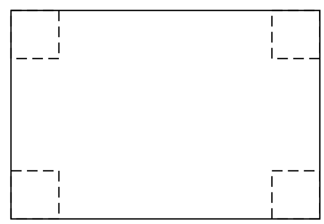
Understand the Problem

1. List the different variables that you will be using to answer the question. Then write a general formula for finding the volume of a rectangular box. Which of the three quantities is a constant in this problem?

____

Make a Plan

2. Begin by drawing a diagram. Label the diagram using the dimensions (and variables) given in the problem.



3. Use your diagram to rewrite the formula for volume using x and y.

____

Solve

4. You will need to multiply the two binomials and the number 2. Begin by multiplying the binomials.

____

5. Next, multiply each of the terms by 2 to find the expression for the volume of the box.

____

Check

6. Check your answer by choosing a value for x and y. Substitute your choices into the equation you wrote in Exercise 3 and into the simplified expression you wrote in Exercise 5. If you multiplied correctly, you should get the same result.

____

____

Name ______________________ Date __________ Class __________

SECTION 14B

Ready to Go On? Quiz

14-3 Adding Polynomials

Add.

1. $(2x^2 + 5x - 4) + (x^3 - 5x + 3)$ ______________

2. $(2a^4 + a - 6) + (a^4 - 3a + 10)$ ______________

3. $(4m^5n + mn^2 - 5) + (-2m^5n + 3mn^2 + 11) + (m^5n + 5mn^2 - 2)$

____

4. $(7v^2 - 9v - 1) + (2v^2 + 2v + 11) + (-3v^2 + v - 7)$ ______________

5. $(3w^3 + 3w^2 - 4) + (w^3 - 2w + 5) + (-w^3 + w^2)$ ______________

6. Each side of a regular pentagon has a length of $2d + 1$.
Each side of a regular hexagon has a length of $3d - 7$.
Write an expression for the sum of the two perimeters. ______________

14-4 Subtracting Polynomials

Find the opposite of each polynomial.

7. $-y^2 + 4y + 5$

____

8. $2n^5 - 6n$

____

9. $-7a^2b - a^2 + 3c$

____

10. $pqr^3 + 5pqr^2 + pqr + q^4$

____

Subtract.

11. $(3z^2 - z) - (5z^2 + 6z - 1)$

____

12. $(a + 9) - (4a^2 - 2)$

____

13. $(12p^3 + 5p) - (7p^3 + 6p)$

____

14. $(4t^2 - 3t + 6) - (-2t^2 + t + 7)$

____

15. One solid figure has a volume of $12u^3 - u^2 + 4u + 7$. A smaller solid figure has a volume of $5u^3 + 5u^2 - 5u - 4$. Write an expression to show the difference between these two volumes.

____

Name ______________________ Date ____________ Class ____________

SECTION 14B

Ready to Go On? Quiz continued

14-5 Multiplying Polynomials and Monomials

Multiply.

16. $(-3a^2b^2)(2ab^3)$ ________

17. $(hj^2)(5h^5)$ ________

18. $(-4p^7q)(-3p^4q^3)$ ________

19. $(3x^8y^2)(-3y^2)$ ________

20. $(-r^6s^2)(5rs)$ ________

21. $(4n^3z^2)(5nz)$ ________

22. $2u^2v(2u^3v - uv^2 + 4uv)$ ________

23. $-3st^4(-2s^2t + st^2 + 4st^3)$ ________

24. A parallelogram has a base of $4xy$ and a height of $3x^3 + 2xy^2 - y^2$. Write and then simplify an expression for the area of this parallelogram. Last, find the area of the parallelogram if $x = 1$ and $y = 2$.

____

14-6 Multiplying Binomials

Multiply.

25. $(m - 3)(m + 7)$ ________

26. $(2j - 4)(j - 5)$ ________

27. $(g + 9)(g + 6)$ ________

28. $(3z + 1)(2z - 2)$ ________

29. $(2q - 3)(2q - 4)$ ________

30. $(4a - 1)(2a + 3)$ ________

31. A swimming pool is built in a 30 m • 20 m area so that there is a walkway x m wide all the way around the pool. Find the area of the pool in terms of x. What would the area of the pool be if x were 2?

____

Name ______________________________ Date ___________ Class ____________

SECTION 14B

Ready to Go On? Enrichment

Multiplying Binomials and Factoring Polynomials

Multiply.

A. $(x + 2)(2x - 1)$ ______________________

B. $(2x - 3)(2x + 3)$ ______________________

C. $(3x + 1)^2$ ______________________

D. $(3x + 2)(4x - 3)$ ______________________

E. $(2x + 1)(x - 2)$ ______________________

F. $(x - 1)(5x - 2)$ ______________________

G. $(4x - 1)(2x + 3)$ ______________________

H. $(3x - 2)(3x + 2)$ ______________________

Now use the exercises you have just completed, together with your answers, to find the binomial factors of each polynomial below.

1. $9x^2 + 6x + 1$ ______________________

2. $9x^2 - 4$ ______________________

3. $5x^2 - 7x + 2$ ______________________

4. $2x^2 + 3x - 2$ ______________________

5. $12x^2 - x - 6$ ______________________

6. $8x^2 + 10x - 3$ ______________________

7. $4x^2 - 9$ ______________________

8. $2x^2 - 3x - 2$ ______________________

You know how to multiply two binomials to get a polynomial product. Explain why it is possible to go the other way and factor a polynomial into binomial factors.

____

____