(1)

Name ______________________ Date ______________ Class ______________ 8th Math

LESSON 2-1

Integer Exponents ☆ Give Best Effort

Reteach

A positive exponent tells you how many times to multiply the base as a factor. A negative exponent tells you how many times to divide by the base. Any number to the 0 power is equal to 1.

$4^2 = 4 \bullet 4 = 16$ $\quad 4^5 = 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 = 1{,}024$ $\quad a^3 = a \bullet a \bullet a$

$4^{-2} = \frac{1}{4^2} = \frac{1}{4 \bullet 4} = \frac{1}{16}$ $\quad 4^{-5} = \frac{1}{4^5} = \frac{1}{4 \bullet 4 \bullet 4 \bullet 4 \bullet 4} = \frac{1}{1{,}024}$ $\quad a^{-3} = \frac{1}{a^3} = \frac{1}{a \bullet a \bullet a}$

When you work with integers, certain properties are always true. With integer exponents, there are also certain properties that are always true.

When the bases are the same and you multiply, you add exponents.

$$2^2 \bullet 2^4 = 2^{2+4}$$
$$2 \bullet 2 \bullet 2 \bullet 2 \bullet 2 \bullet 2 = 2^6$$

$$a^m \bullet a^n = a^{m+n}$$

When the bases are the same and you divide, you subtract exponents.

$$\frac{2^5}{2^3} = 2^{5-3}$$
$$\frac{2 \bullet 2 \bullet \not{2} \bullet \not{2} \bullet \not{2}}{\not{2} \bullet \not{2} \bullet \not{2}} = 2^2$$

$$\frac{a^m}{a^n} = a^{m-n}$$

When you raise a power to a power, you multiply.

$$(2^3)^2 = 2^{3 \bullet 2}$$
$$(2 \bullet 2 \bullet 2)^2$$
$$(2 \bullet 2 \bullet 2) \bullet (2 \bullet 2 \bullet 2) = 2^6$$

$$(a^m)^n = a^{m \bullet n}$$

Tell whether you will add, subtract, or multiply the exponents. Then simplify by finding the value of the expression.

1. $\frac{3^6}{3^3} \rightarrow$ ______________________
2. $8^2 \bullet 8^{-3} \rightarrow$ ______________________
3. $(3^2)^3 \rightarrow$ ______________________
4. $5^3 \bullet 5^1 \rightarrow$ ______________________
5. $\frac{4^2}{4^4} \rightarrow$ ______________________
6. $(6^2)^2 \rightarrow$ ______________________

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LESSON 2-3

Scientific Notation with Negative Powers of 10

Reteach

You can convert a number from standard form to scientific notation in 3 steps.

1. Starting from the left, find the first non-zero digit. To the right of this digit is the new location of your decimal point.
2. Count the number of places you moved the decimal point. This number will be used in the exponent in the power of ten.
3. Since the original decimal value was less than 1, your power of ten must be negative. Place a negative sign in front of the exponent.

Example

Write 0.00496 in standard notation.

4.96	1) The first non-zero digit is 4, so move the decimal point to the right of the 4.
4.96×10^3	2) The decimal point moved 3 places, so the whole number in the power of ten is 3.
4.96×10^{-3}	3) Since 0.00496 is less than 1, the power of ten must be negative.

You can convert a number from scientific notation to standard form in 3 steps.

1. Find the power of ten.
2. If the exponent is negative, you must move the decimal point to the left. Move it the number of places indicated by the whole number in the exponent.
3. Insert a leading zero before the decimal point.

Example

Write 1.23×10^{-5} in standard notation.

10^{-5}	1) Find the power of ten.
.0000123	2) The exponent is –5, so move the decimal point 5 places to the left.
0.0000123	3) Insert a leading zero before the decimal point.

Write each number in scientific notation.

1. 0.0279 ______________
2. 0.00007100 ______________
3. 0.0000005060 ______________

Write each number in standard notation.

4. 2.350×10^{-4} ______________
5. 6.5×10^{-3} ______________
6. 7.07×10^{-5} ______________

Name ______________________ Date ____________ Class ____________

LESSON 4-2

Determining Slope and *y*-Intercept

Reteach

The **slope** of a line is a measure of its tilt, or slant.

The slope of a straight line is a constant ratio, the "rise over run," or the vertical change over the horizontal change.

You can find the slope of a line by comparing any two of its points.

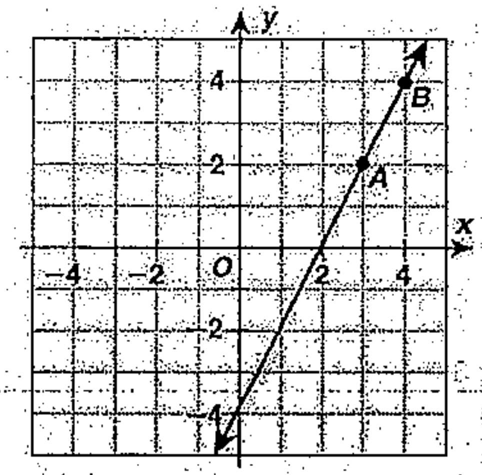
The vertical change is the difference between the two *y*-values, and the horizontal change is the difference between the two *x*-values.

The ***y*-intercept** is the point where the line crosses the *y*-axis.

A. Find the slope of the line shown.
point *A*: (3, 2) point *B*: (4, 4)

$$\text{slope} = \frac{4-2}{4-3}$$
$$= \frac{2}{1}, \text{ or } 2$$

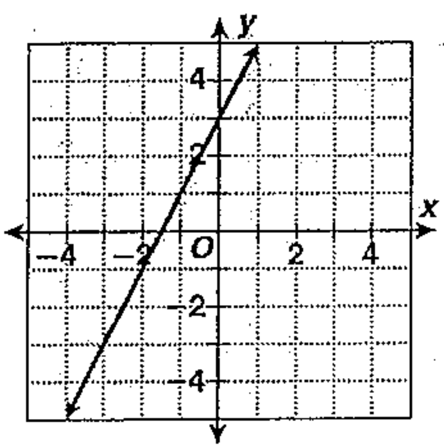
So, the slope of the line is 2.



B. Find the *y*-intercept of the line shown.
The line crosses the *y*-axis at (0, –4).
So, the *y*-intercept is –4.

Find the slope and *y*-intercept of the line in each graph.

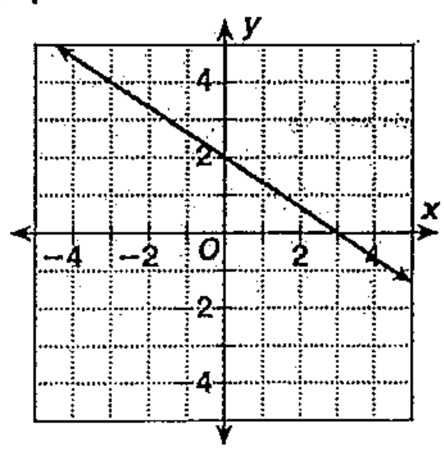
1.



slope *m* = ____________

y-intercept *b* = ____________

2.



slope *m* = ____________

y-intercept *b* = ____________

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LESSON 6-1

Identifying and Representing Functions

Reteach

A **relation** is a set of ordered pairs.	{(1, 2), (3, 4), (5, 6)}
The **input** values are the first numbers in each pair.	{(**1**, 2), (**3**, 4), (**5**, 6)}
The **output** values are the second numbers in each pair.	{(1, **2**), (3, **4**), (5, **6**)}

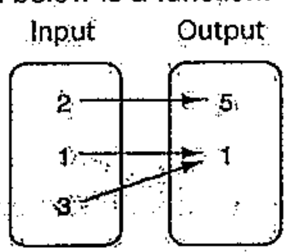
Circle each input value. Underline each output value.

1. {(1, 1), (2, 3), (3, 5)}

2. {(6, 2), (5, 3), (4, 8)}

A relation is a **function** when each input value is paired with *only one* output value.

The relation below is a function.

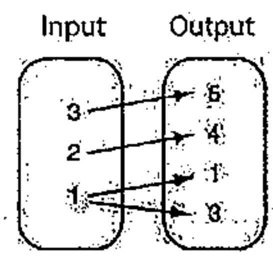


Input value 2 is paired with *only one* output, 5.

Input value 1 is paired with *only one* output, 1.

Input value 3 is paired with *only one* output, 1.

The relation below is **not** a function.



Input value 1 is paired with *two* outputs, 1 and 3.

Tell whether each relation is a function. Explain how you know.

3. {(1, 5), (3, 7), (6, 5), (9, 8)}

____

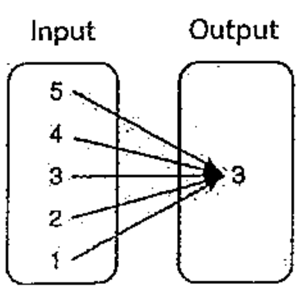
____

4. {(1, 2), (1, 8), (3, 6), (4, 8)}

____

____

5.



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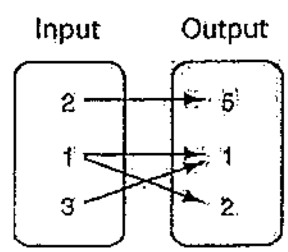
6.



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LESSON 6-2

Describing Functions

Reteach

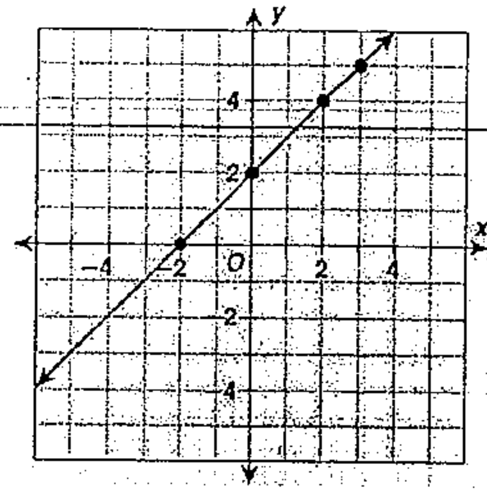
Graph $y = x + 2$.

Step 1: Make a table of values.

Input, x	$x + 2$	Output, y	(x, y)
–2	$-2 + 2 = 0$	0	(–2, 0)
0	$0 + 2 = 2$	2	(0, 2)
2	$2 + 2 = 4$	4	(2, 4)
3	$3 + 2 = 5$	5	(3, 5)

Step 2: Graph the ordered pairs, (x, y).

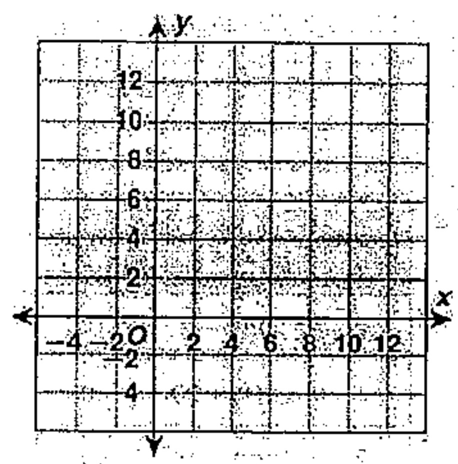
Step 3: Draw a line through the points.



Complete the table. Graph the function.

1. $y = x + 4$

Input, x	$x + 4$	Output, y	(x, y)
–2	$-2 + 4 =$ ___		(–2, ___)
0	___ $+ 4 =$ ___		
2			
6			
8			



A function is **linear** if:
- the graph is a line, and
- the equation can be written in the form $y = mx + b$.

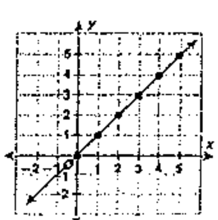
A linear function is **proportional** if its graph passes through the origin, (0, 0).

If the graph is not a line, then the function is **nonlinear**.

Linear:		$y = mx + b$
$y = 4 - 3x$	$\longrightarrow$	$y = -3x + 4$
$y = 5x$	$\longrightarrow$	$y = 5x + 0$
Proportional:		$y = 5x$
		$0 = 5(0)$
Not proportional:		$y = 4 - 3x$
		$0 \neq 4 - 3(0)$

Describe each function. Write *linear*, *proportional*, or *nonlinear*.

2.



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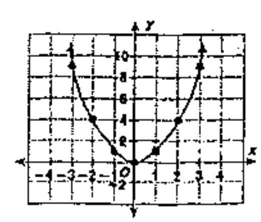
3. $y = -2x + 5$

____

4.



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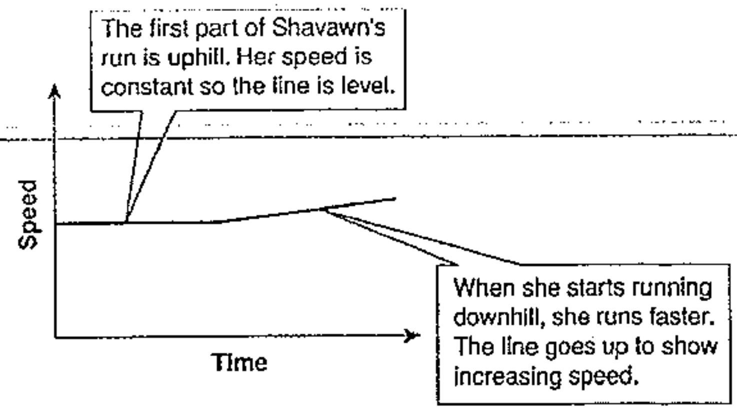
LESSON 6-4

Analyzing Graphs

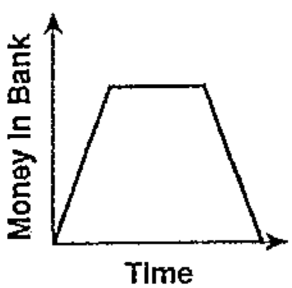
Reteach

Graphs are often used to model situations. This graph shows Shavawn's daily jogging routine. She jogs uphill at a steady speed. When she starts to run downhill, her speed increases.



You have a savings account in a bank. The graphs below show how the amount in your account changes. Describe what each graph shows.

1.



____

____

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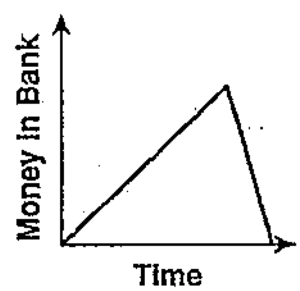
2.



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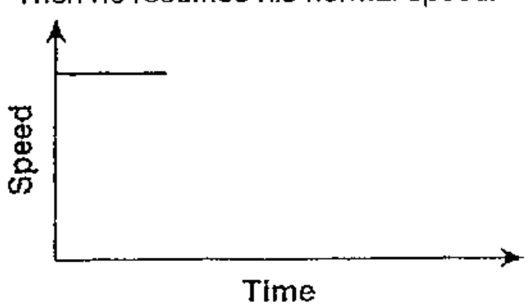
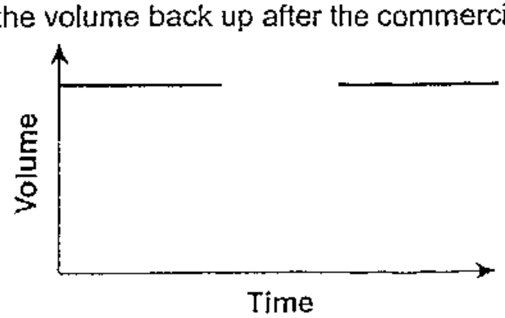
Complete the graph for each situation.

3. Mr. Wyatt drives for a while at a steady speed. A traffic jam slows him down. Then he resumes his normal speed.



4. You are watching television. You turn down the volume during a commercial. You turn the volume back up after the commercial.



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LESSON 7-1

Equations with the Variable on Both Sides

Reteach

If there are variable terms on both sides of an equation, first collect them on one side. Do this by adding or subtracting. When possible, collect the variables on the side of the equation where the coefficient will be positive.

Solve the equation $5x = 2x + 12$.

$$\begin{array}{rcl} 5x &=& 2x + 12 \\ -2x && -2x \\ \hline 3x &=& 12 \\ \frac{3x}{3} &=& \frac{12}{3} \\ x &=& 4 \end{array}$$

To collect on left side, subtract $2x$ from both sides of the equation.

Divide by 3.

Check: Substitute into the original equation.

$5x = 2x + 12$

$5(4) \stackrel{?}{=} 2(4) + 12$

$20 \stackrel{?}{=} 8 + 12$

$20 = 20$

Solve the equation $-6z + 28 = 9z - 2$

$$\begin{array}{rcl} -6z + 28 &=& 9z - 2 \\ +6z && +6z \\ \hline 28 &=& 15z - 2 \\ +2 && +2 \\ \hline 30 &=& 15z \\ \frac{30}{15} &=& \frac{15z}{15} \\ 2 &=& z \end{array}$$

To collect on right side, add $6z$ to both sides of the equation.

Add 2 to both sides of the equation.

Divide by 15.

Check: Substitute into the original equation.

$-6z + 28 = 9z - 2$

$-6(2) + 28 \stackrel{?}{=} 9(2) - 2$

$-12 + 28 \stackrel{?}{=} 18 - 2$

$16 = 16$

Complete to solve and check each equation.

1. $9m + 2 = 3m - 10$

$$\begin{array}{rcl} 9m + 2 &=& 3m - 10 \\ -[\quad] && -[\quad] \\ \hline 6m + 2 &=& -10 \\ -[\quad] && -[\quad] \\ \hline 6m &=& [\quad] \\ \frac{6m}{[\quad]} &=& \frac{-12}{[\quad]} \\ m &=& [\quad] \end{array}$$

To collect on left side, subtract ____ from both sides.

Subtract ____ from both sides.

Divide by ____.

Check: Substitute into the original equation.

$9m + 2 = 3m - 10$

$9(\_\_\_) + 2 \stackrel{?}{=} 3(\_\_\_) - 10$

$\_\_\_ + 2 \stackrel{?}{=} \_\_\_ - 10$

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

2. $-7d - 22 = 4d$

$$\begin{array}{rcl} -7d - 22 &=& 4d \\ +[\quad] && +[\quad] \\ \hline -22 &=& 11d \\ \frac{-22}{[\quad]} &=& \frac{11d}{[\quad]} \\ [\quad] &=& d \end{array}$$

To collect on right side, add ____ to both sides.

Divide by ____.

Check: Substitute into the original equation.

$-7d - 22 = 4d$

$-7(\_\_\_) - 22 \stackrel{?}{=} 4(\_\_\_)$

$\_\_\_ -22 \stackrel{?}{=} \_\_\_$

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

Name ______________________ Date ______________ Class ______________

LESSON 8-1

Solving Systems of Linear Equations by Graphing

Reteach

When solving a system of linear equations by graphing, first write each equation in slope-intercept form. Do this by solving each equation for y.

Solve the following system of equations by graphing.

$y = -2x + 3$
$y + 4x = -1$

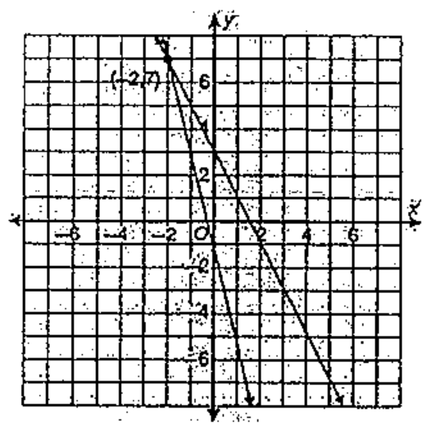
The first equation is already solved for y.

Write the second equation in slope-intercept form.
Solve for y.

$y + 4x - 4x = -1 - 4x$

$y = -4x - 1$

Graph both equations on the coordinate plane.



The lines intersect at (–2, 7). This is the solution to the system of linear equations.

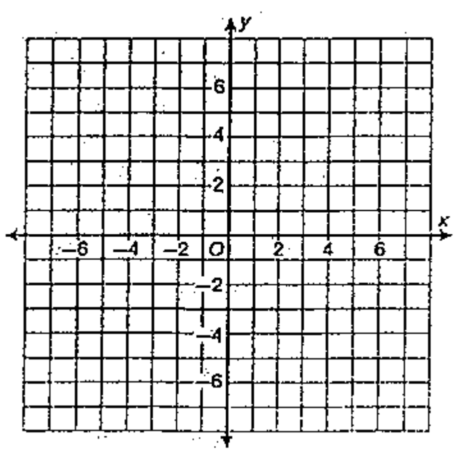
To check the answer, substitute –2 for x and 7 for y in the original equations.

$y = -2x + 3;\ 7 = -2(-2) + 3;\ 7 = 4 + 3;\ 7 = 7$

$y + 4x = -1;\ 7 + 4(-2) = -1;\ 7 - 8 = -1;\ -1 = -1$

Solve each linear system by graphing. Check your answer.

1. $y = x + 1$
   $y = -x + 5$



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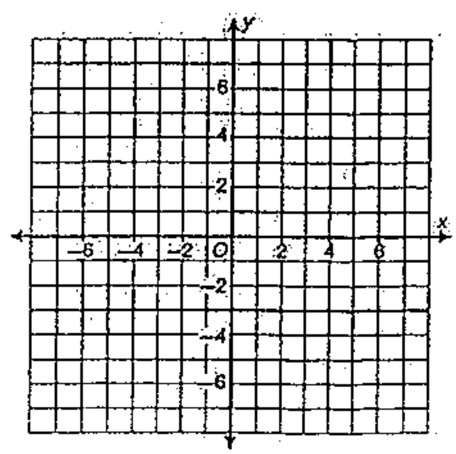
2. $y + 3x = 1$
   $y - 6 = 2x$



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Name ______________________ Date ____________ Class ____________

LESSON **9-1**

Properties of Translations

Reteach

The description of a translation in a coordinate plane uses a combination of two translations – one translation slides the figure in a horizontal direction, and the other slides the figure in a vertical direction. An example is shown below.

A translation slides a figure 8 units right and 5 units down.

8 units right: horizontal distance

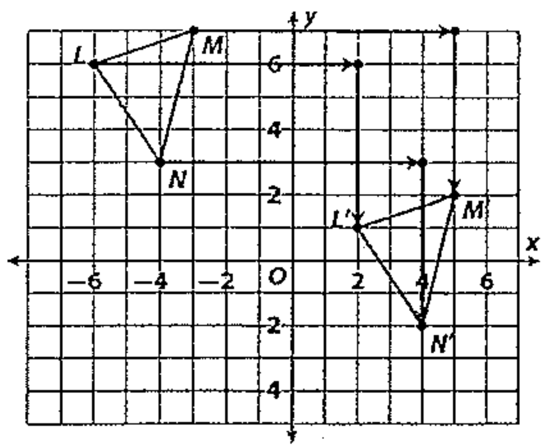
5 units down: vertical distance

Triangle *LMN* is shown in the graph. The triangle can be translated 8 units right and 5 units down as shown below.

Step 1 Translate each vertex 8 units right.

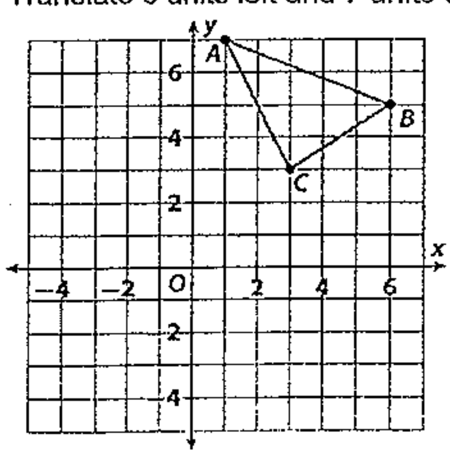
Step 2 Translate each vertex 5 units down.

Step 3 Label the resulting vertices and connect them to form triangle *L'M'N'*.

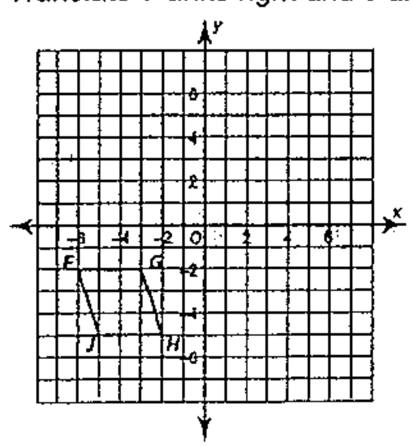


Use a combination of two translations to draw the image of the figure.

1. Translate 6 units left and 7 units down.



2. Translate 7 units right and 9 units up.



3. When translating a figure using a combination of two translations, is the resulting figure congruent to the original figure? Explain.

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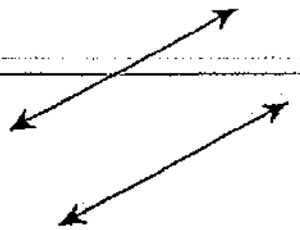
Name ______________________ Date ____________ Class ____________

LESSON 11-1

Parallel Lines Cut by a Transversal

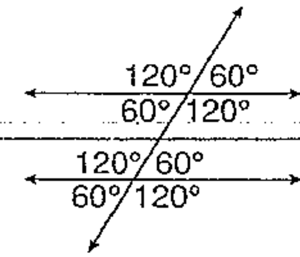
Reteach

Parallel Lines



Parallel lines never meet.

Parallel Lines Cut by a Transversal



A line that crosses parallel lines is a **transversal**.

Eight angles are formed. If the transversal is not perpendicular to the parallel lines, then four angles are acute and four are obtuse.

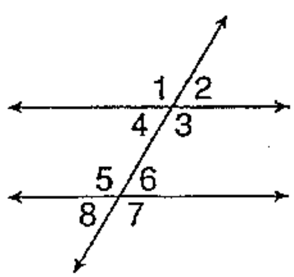
The acute angles are all congruent.

The obtuse angles are all congruent.

Any acute angle is supplementary to any obtuse angle.

In each diagram, parallel lines are cut by a transversal. Name the angles that are congruent to the indicated angle.

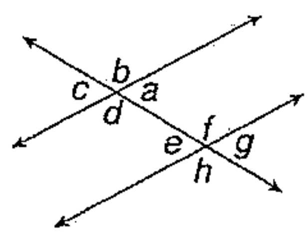
1.



The angles congruent to

∠1 are: ______________

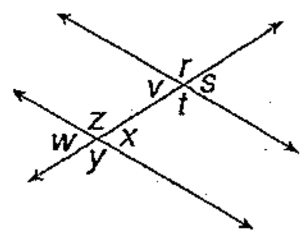
2.



The angles congruent to

∠*a* are: ______________

3.

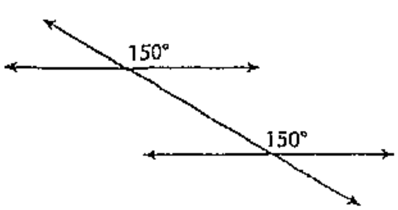


The angles congruent to

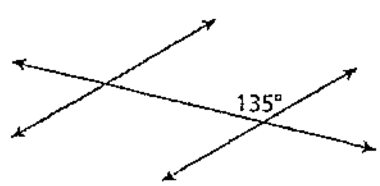
∠*z* are: ______________

In each diagram, parallel lines are cut by a transversal and the measure of one angle is given. Write the measures of the remaining angles on the diagram.

4.



5.



6.

Name ______________________ Date ____________ Class ____________

LESSON 12-1

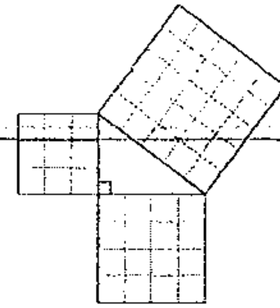
The Pythagorean Theorem

Reteach

In a **right triangle,**

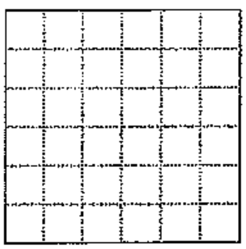
the sum of the areas of the squares on the legs
is equal to
the area of the square on the hypotenuse.

$3^2 + 4^2 = 5^2$
$9 + 16 = 25$

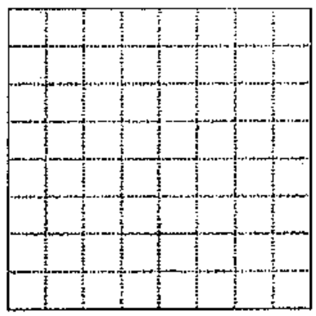


Given the squares that are on the legs of a right triangle, draw the square for the hypotenuse below or on another sheet of paper.

1. leg



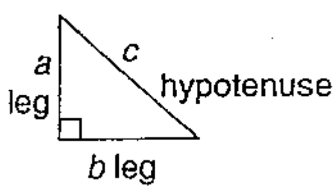
leg



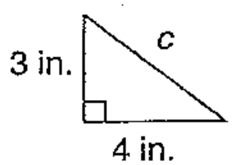
hypotenuse

Without drawing the squares, you can find a missing leg or the hypotenuse when given the other sides.

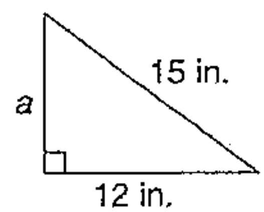
Model



Example 1



Example 2



Solution 1

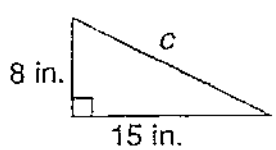
$a^2 + b^2 = c^2$
$3^2 + 4^2 = c^2$
$9 + 16 = c^2$
$25 = c^2$, so $c = 5$ in.

Solution 2

$a^2 + b^2 = c^2$
$a^2 + 12^2 = 15^2$
$a^2 = 225 - 144$
$a^2 = 81$, so $a = 9$ in.

Find the missing side.

2.



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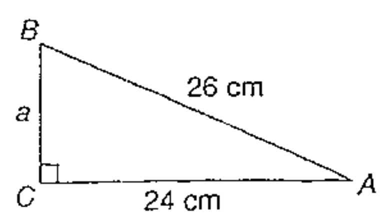
3.



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Name ______________________ Date ______________ Class ______________

LESSON 12-2

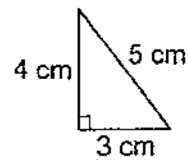
Converse of the Pythagorean Theorem

Reteach

Step 1 The first step in verifying that a triangle is a right triangle is to name the three sides. One side is the hypotenuse and the other two sides are legs.

- In a right triangle, the hypotenuse is opposite the right angle.

  → The hypotenuse is 5 cm.



- The hypotenuse is greater than either leg.

  → 5 cm > 4 cm and 5 cm > 3 cm

Step 2 Next, the lengths of the hypotenuse and legs must satisfy the Pythagorean Theorem.

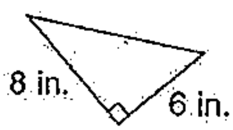
$$(\text{hypotenuse})^2 = (\text{first leg})^2 + (\text{second leg})^2$$

In the example above, $5^2 = 3^2 + 4^2 = 25$, so the triangle is a right triangle.

Conclusion If the lengths of the hypotenuse and the two legs satisfy the conditions of the Pythagorean Theorem, then the triangle is a right triangle. If they do not satisfy the conditions of the Pythagorean Theorem, the triangle is not a right triangle.

Find the length of each hypotenuse.

1.



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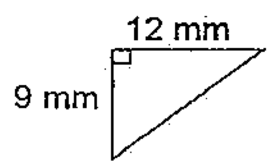
2.



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First, fill in the length of the hypotenuse in each problem. Then, determine if the sides form a right triangle.

3. 1, 2, 3

   Hypotenuse: ________

   ____

4. 8, 7, 6

   Hypotenuse: ________

   ____

5. 15, 20, 25

   Hypotenuse: ________

   ____

Show that these sides form a right triangle.

6. 2, 3, $\sqrt{13}$

   ____

7. 3, 6, $3\sqrt{5}$

   ____

Name ______________________ Date ____________ Class ____________

LESSON 13-1

Volume of Cylinders

Reteach

You can use your knowledge of how to find the area of a circle to find the volume of a cylinder.

1. What is the shape of the base of the cylinder?

   circle

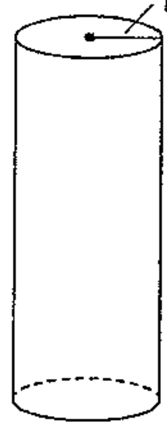
2. The area of the base is $B = \pi r^2$.

   $B = 3.14 \cdot \underline{1}^2 = \underline{3.14}$ cm^2

3. The height of the cylinder is $\underline{5}$ cm.

4. The volume of the cylinder is

   $V = B \cdot h = \underline{3.14} \cdot \underline{5} = \underline{15.7}$ cm^3



The volume of the cylinder is 15.7 cm^3.

1. a. What is the area of the base?

   $B = 3.14 \cdot$ _____^{2} = _____ cm^2

   b. What is the height of the cylinder? _____ cm

   c. What is the volume of the cylinder?

   $V = B \cdot h =$ _____ $\cdot$ _____ = _____ cm^3

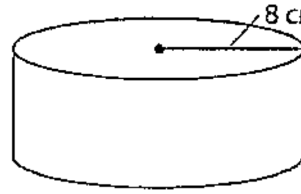
2. a. What is the area of the base?

   $B = 3.14 \cdot$ _____^{2} = _____ cm^2

   b. What is the height of the cylinder? _____ cm

   c. What is the volume of the cylinder?

   $V = B \cdot h =$ _____ $\cdot$ _____ = _____ cm^3



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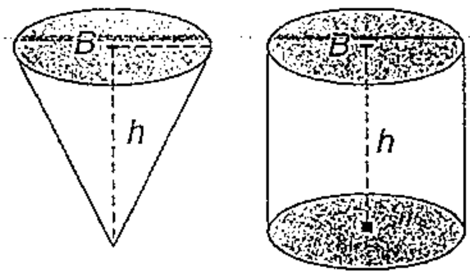
LESSON 13-2

Volume of Cones

Reteach

You can use your knowledge of how to find the volume of a cylinder to help find the volume of a cone.

This cone and cylinder have congruent bases and congruent heights.



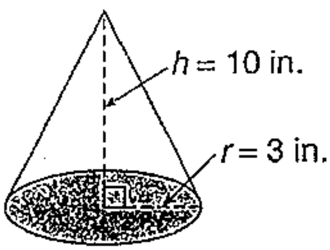
Volume of Cone = $\frac{1}{3}$ Volume of Cylinder

Use this formula to find the volume of a cone.

$$V = \frac{1}{3}Bh$$

Complete to find the volume of each cone.

1.



radius r of base = ____ in.

$V = \frac{1}{3}Bh$

$V = \frac{1}{3}(\pi r^2)h$

$V = \frac{1}{3}(\pi \times$ ____ $) \times$ ____

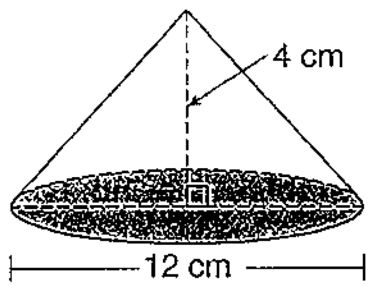
$V = \frac{1}{3}($____$) \times$ ____

$V =$ ____ $\times$ ____

$V =$ ________

$V \approx$ ____ in^3

2.



radius $r = \frac{1}{2}$ diameter = ____ cm

$V = \frac{1}{3}Bh$

$V = \frac{1}{3}(\pi r^2)h$

$V = \frac{1}{3}(\pi \times$ ____ $) \times$ ____

$V = \frac{1}{3}($____$) \times$ ____

$V =$ ____ $\times$ ____

$V =$ ________

$V \approx$ ____ cm^3

Name ______________________ Date ______________ Class ______________

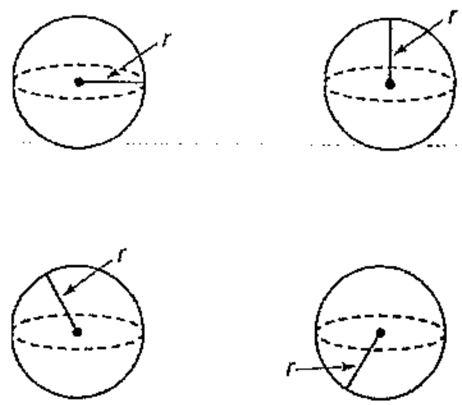
LESSON 13-3

Volume of Spheres

Reteach

- All points on a sphere are the same distance from its center.
- Any line drawn from the center of a sphere to its surface is a radius of the sphere.
- The radius is half the measure of the diameter.
- Use this formula to find the volume of a sphere.

$$V = \frac{4}{3}\pi r^3$$

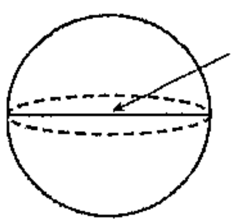


Complete to find the volume of each sphere to the nearest tenth. Use 3.14 for π. The first one is done for you.

1. A regular tennis ball has a diameter of 2.5 inches.

   diameter = **2.5 inches**

   radius = **1.25 inches**



$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3} \cdot$ **3.14** $\cdot$ **1.25^3**

$V = \frac{4}{3} \cdot$ **3.14** $\cdot$ **1.95**

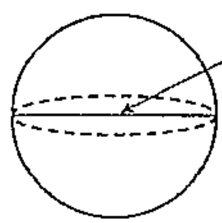
$V =$ **8.164**

$V \approx$ **8.2 in^3**

2. A large grapefruit has a diameter of 12 centimeters.

   diameter = ______________

   radius = ______________



$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3} \cdot$ ________ $\cdot$ ________

$V = \frac{4}{3} \cdot$ ________ $\cdot$ ________

$V =$ ________

$V \approx$ ________