

Math 8H



Colonial School District

Summer Math Packet 2008-2009

The concepts included in this packet will help reinforce key skills your child has encountered in math this year. Please encourage them to complete as many activities as possible as it will lead to greater success next year. The answer key to this packet is available on the district website (www.colonialsd.org).

Equations

Two-step Equations

RULE	EXAMPLE
1. First, undo addition or subtraction. 2. Then, undo multiplication or division. 3. Check your answer by replacing the variable with the solution.	$3x - 2 = 13$ $\quad \quad \quad \underline{+2} \quad \underline{+2}$ $\frac{3x}{3} = \frac{15}{3}$ $x = 5$ $\checkmark 3 \times 5 - 2$ $15 - 2 = 13$

Solve.

1. $6d - 3 = 32$

2. $\frac{x}{5} + 2 = 6$

3. $2y + 7 = 15$

4. $\frac{b}{7} - 13 = 23$

5. $-5y + 9 = 24$

6. $\frac{f}{8} - 3 = -27$

Equations

Equations with Variables on Both Sides

RULE	EXAMPLE
<ol style="list-style-type: none">1. Eliminate the variable from one side of the equation using inverse operations.2. Undo addition or subtraction.3. Then, undo multiplication or division.4. Check your answer by replacing the variable with the solution.	$\begin{array}{r} 8x - 3 = 6x + 1 \\ -6x \quad -6x \\ \hline 2x - 3 = 1 \\ + 3 \quad + 3 \\ \hline 2x = 4 \\ \frac{2x}{2} = \frac{4}{2} \\ x = 2 \end{array}$ $\begin{array}{r} \checkmark 8 \times 2 - 3 = 6 \times 2 + 1 \\ 16 - 3 = 12 + 1 \\ 13 = 13 \end{array}$

Solve.

1. $3k + 10 = 2k - 21$

2. $x - 4 = 6x - 19$

3. $18 + 4p = 6p + 11$

4. $11h - 14 = 7 + 14h$

5. $-3p + 8 = 2p - 2$

6. $-t + 10 = t + 4$

Reteaching Worksheet 7-5**Solving Multi-Step Equations**

When an equation includes parentheses, you often must first simplify the equation before you can solve it. Compare these examples.

$$4(x - 6) = -44 + 3x$$

$$4x - 24 = -44 + 3x$$

$$4x = -20 + 3x$$

$$x = -20$$

$$3(2x - 5x) = x + 45$$

$$3(-3x) = x + 45$$

$$-9x = x + 45$$

$$-10x = 45$$

$$x = -4.5$$

1. Check the left example.

2. Check the right example.

3. Compare the first step in the two examples. What operations are used?

4. In the left example, what happens if you first divide both sides by 4?

Solve each equation. Check your solution.

5. $6(4x - x) = -36$

6. $6(4x - x) = 12x - 36$

7. $-2(-3x + 6x) = 30$

8. $-2(-3x + 6x) = 30 - x$

9. $-8(x - 20) = -96$

10. $-8(x - 20) = -96 - 4x$

11. $75 = 5(-4 + 2x)$

12. $75 - 9x = 5(-4 + 2x)$

13. $2.5 = -0.5(x - 1.5)$

14. $2x + 2.5 = -0.5(x - 1.5)$

Reteaching Worksheet 3-7

Solving Inequalities: Adding and Subtracting

An **inequality** is a mathematical sentence that contains one of these symbols: $<$, $>$, \leq , \geq , or \neq . The meaning of each of these symbols is given in the table at the right.

Symbol	Meaning
$<$	is less than
$>$	is greater than
\leq	is less than or equal to
\geq	is greater than or equal to
\neq	is not equal to

The same steps used to solve equations are used to solve inequalities.

Example: Solve the inequality $x + 6 > 11$.

$$\begin{aligned}
 x + 6 &> 11 \\
 x + 6 - 6 &> 11 - 6 && \text{Subtract 6 from each side.} \\
 x &> 5
 \end{aligned}$$

Check: To check the solution, replace x with any number greater than 5. For example, use 8.

$$\begin{aligned}
 x + 6 &> 11 \\
 8 + 6 &\overset{?}{>} 11 \\
 14 &> 11 \quad \checkmark
 \end{aligned}$$

The solution is any number greater than 5.

Solve each inequality. Check your solution.

1. $x + 41 < 6$

2. $x + (-4) < 20$

3. $x - 7 < -10$

4. $x - 75 > 27$

5. $x - (-5) > 21$

6. $x + 54 > -96$

7. $x + (-12) > 20$

8. $x - 104 < 75$

9. $x + 7 > 15$

10. $x - 32 < -12$

11. $x - 72 > -136$

12. $x - (-92) < 65$

Reteaching Worksheet 3-8

Solving Inequalities: Multiplying and Dividing

When you multiply or divide each side of an inequality by a positive number, you get a new inequality with the same solutions.

$$\begin{array}{l} 3h < -12 \\ 3h \div 3 < -12 \div 3 \\ h < -4 \end{array} \qquad \begin{array}{l} \frac{h}{5} > 10 \\ \frac{h}{5} \cdot 5 > 10 \cdot 5 \\ h > 50 \end{array}$$

When you multiply or divide each side by a negative number, you must reverse the inequality symbol. Otherwise, the new inequality will not have the same solutions.

$$\begin{array}{l} -3h < -12 \\ -3h \div (-3) > -12 \div (-3) \\ h > 4 \end{array} \qquad \begin{array}{l} \frac{h}{-5} > 10 \\ \frac{h}{-5} \cdot (-5) < 10 \cdot (-5) \\ h < -50 \end{array}$$

Do the two inequalities have the same solutions? Write yes or no.

1. $2x < 14$
 $x > 7$

2. $-x < 0$
 $x > 0$

3. $3x < 9$
 $x < 3$

4. $-5x > 0$
 $x > 0$

5. $-4x < 4$
 $x > -1$

6. $-3x > -3$
 $x > 1$

Solve each inequality. Check your solution.

7. $7x < 84$

8. $9x > 81$

9. $\frac{h}{3} < -10$

10. $6p < 12$

11. $\frac{h}{4} > -7$

12. $0 > -5c$

13. $-2d > 4$

14. $-2d > -4$

15. $-2d < -4$

16. $\frac{a}{-3} < 9$

17. $\frac{a}{-3} > -9$

18. $\frac{a}{3} < -9$

Review 67

Solving Systems Using Substitution

OBJECTIVE: Solving systems of linear equations by substitution

MATERIALS: None

Example

Solve using substitution.

$$-4x + y = -13$$

$$x - 1 = y$$

$$y = 4x - 13$$

$$y = x - 1$$

$$y = (4x - 13)$$

$$y = (x - 1)$$

$$4x - 13 = x - 1$$

$$3x = 12$$

$$x = 4$$

$$y = 4x - 13$$

$$y = 4(4) - 13$$

$$y = 3$$

← Rewrite each equation in the form $y = mx + b$.

← Circle the sides of the equations that do not contain y .

← Since both circled parts equal y , they are equal to each other.

← Solve for x .

← Substitute 4 for x in either equation. Solve for y .

The solution is $(4, 3)$.

Check to see whether $(4, 3)$ makes both equations true. If it doesn't, then the system has no solution.

$$-4(4) + 3 \stackrel{?}{=} -13$$

$$-16 + 3 \stackrel{?}{=} -13$$

$$-13 = -13 \checkmark$$

$$4 - 1 \stackrel{?}{=} 3$$

$$3 = 3 \checkmark$$

Exercises

Solve each system using substitution. Check your solution.

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

2. $y + 4 = x$
 $-2x + y = 8$

3. $y - 2 = x$
 $-x = y$

4. $6y + 4x = 12$
 $-6x + y = -8$

5. $3x + y = 5$
 $2x - 5y = 9$

6. $x + 4y = 5$
 $4x - 2y = 11$

7. $2y - 3x = 4$
 $x = -2$

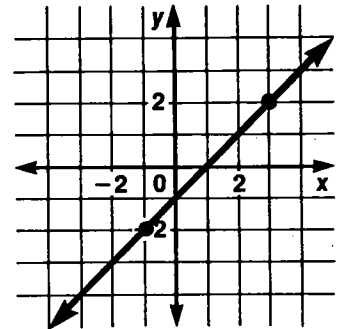
8. $3y + x = -1$
 $x = -3y$

9. $2x + y = -1$
 $6x = -3y - 3$

Reteaching Worksheet 8-6

Graphing Equations

An equation has many ordered pairs of values that are solutions. For example, four ordered pairs for the equation $y = x - 1$ are $(3, 2)$, $(0, -1)$, $(2, 1)$, and $(-1, -2)$. There are too many to name so a picture is drawn of them. This picture is called a graph of the equation. The graph of $y = x - 1$ is the line drawn on the coordinate system at the right.



Find three ordered pairs that satisfy each equation. Graph each ordered pair. Draw a line through the points.

1. $y = x$

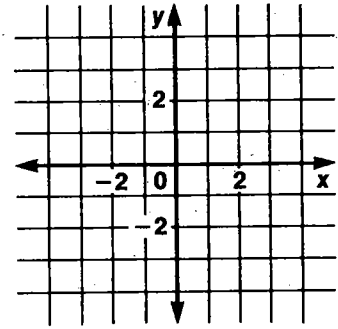
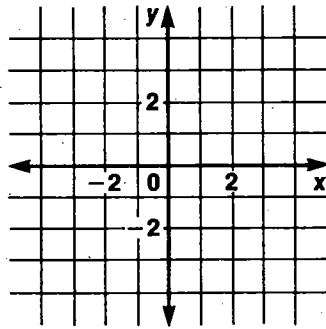
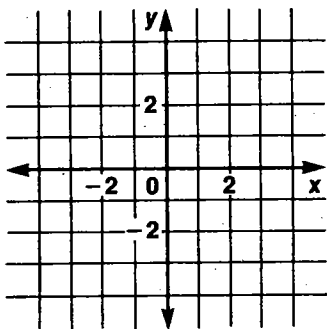
x	y
-2	-2
0	
3	

2. $y = x + 1$

x	y
-1	
0	
3	

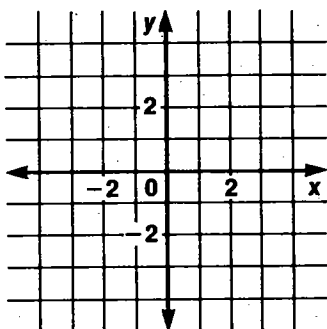
3. $y = x + 2$

x	y
0	
1	
2	

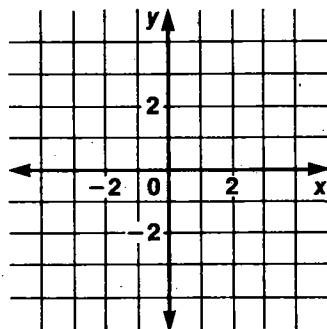


Graph each equation.

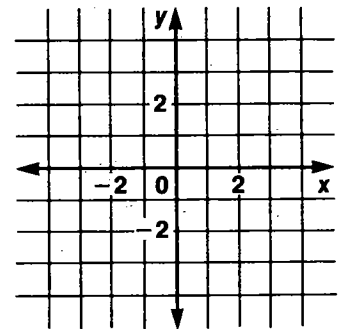
4. $y = x - 4$



5. $y = 3x + (-5)$



6. $y = \frac{1}{4}x$



THE PYTHAGOREAN THEOREM

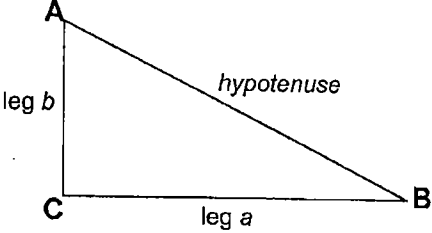
One of the most famous theorems in the history of mathematics is the **Pythagorean Theorem**. It has to do with the sides of right triangles:

The Pythagorean Theorem
In any right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs.

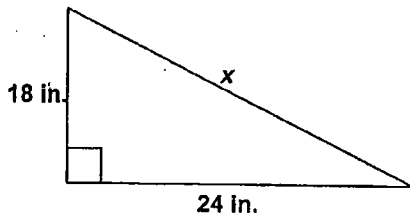
As a formula, the Pythagorean Theorem is:

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

You will often use this formula to solve problems.

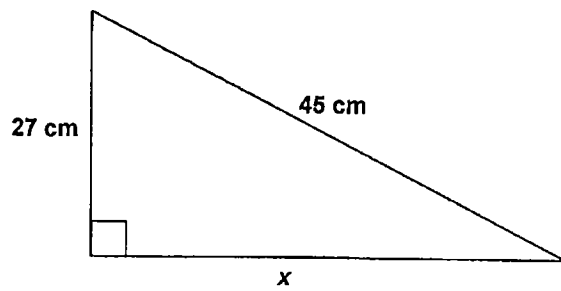


1. What is x ?



- a. 12 in.
- b. 30 in.
- c. 36 in.
- d. 40 in.

2. What is x ?



- a. 20 cm
- b. 25 cm
- c. 28 cm
- d. 36 cm

3. The length and width of a rectangle are 12 m and 5 m. What is the length of the diagonal? Show your work.

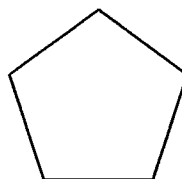
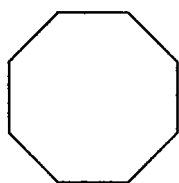
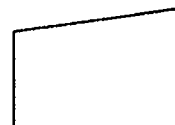
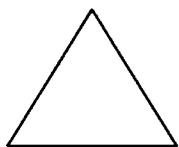
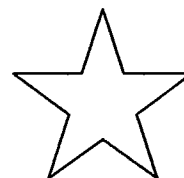
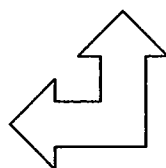
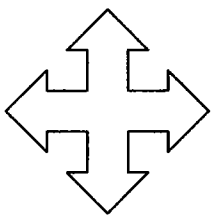
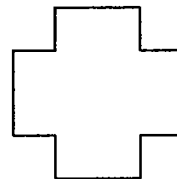
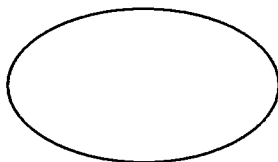
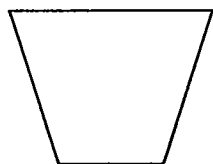
ROTATIONAL SYMMETRY

A shape has rotational symmetry if it fits onto itself two or more times in one turn.

The order of rotational symmetry is the number of times the shape fits onto itself in one turn.

A 2D shape has a line of symmetry if the line divides the shape into two halves – one being the mirror image of the other.

Write the order of rotational symmetry under each shape & letter. Also draw dotted lines to indicate lines of symmetry.



M A T H S