

**Worksheet: Solving word problems using systems of equations (part 2). Identify your variables, set up a system of equations, and solve for your variables.**

1. The cost of 5 squash and 2 zucchini is \$1.32. Three squash and 1 zucchini cost \$0.75. Find the cost of each vegetable.
2. Judy worked 8 hours and Ben worked 10 hours. Their combined pay was \$80. When Judy worked 9 hours and Ben worked 5 hours, their combined pay was \$65. Find the hourly rate of pay for each person.
3. Rob has 40 coins, all dimes and quarters, worth \$7.60. How many dimes and how many quarters does he have?
4. Kelly has 24 dimes and quarters worth \$3.60. How many quarters does she have?
5. The talent show committee sold a total of 530 tickets in advance. Student tickets cost \$3 each and the adult tickets cost \$4 each. If the total receipts were \$1740, how many of each type of ticket were sold?

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Hour: 4<sup>th</sup>

## Guided Notes: Solving Systems of Equations by Elimination

So far, we have solved systems of equations by graphing and by substitution. It's best to use the elimination method when...

one of the variables can be manipulated so it's cancelled out.

### Elimination Method:

Step 1: Line up like-terms for all equations.

Step 2: Look for coefficients (like  $3x$  and  $-3x$ ) that will eliminate one variable. If you can't find one, make one through multiplication

Step 3: Eliminate one variable and solve for the other variable.

Step 4: Use the new values from step 3 to find the other variable.

Step 5: Write your answer as an ordered pair.  $(x, y)$

Example:  $3y + x = 4$  +  $3y + x = 4$   
 $-3(y - 2x = 6) \rightarrow -3y + 6x = -18$

$$7x = -14$$

$$x = -2$$

$$\begin{aligned} 3y + -2 &= 4 \\ 3y &= 6 \\ y &= 2 \end{aligned}$$

$$\boxed{(-2, 2)}$$

$$\begin{array}{r} 8x + 14y = 4 \\ 2(-6x - 7y = -10) \rightarrow \\ \hline -12x - 14y = -20 \\ \hline -4x = -16 \\ x = 4 \end{array}$$

$$\begin{array}{r} -4x - 15y = -17 \\ 3(-x + 5y = -13) \rightarrow \\ \hline -3x + 15y = -39 \\ \hline -7x = -56 \\ x = 8 \end{array}$$

$$\begin{array}{l} \cancel{-6(4) - 7y = -10} \\ 8(4) + 14y = 4 \\ 32 + 14y = 4 \end{array}$$

$$\begin{array}{l} 14y = -28 \\ y = -2 \\ \boxed{(4, -2)} \end{array}$$

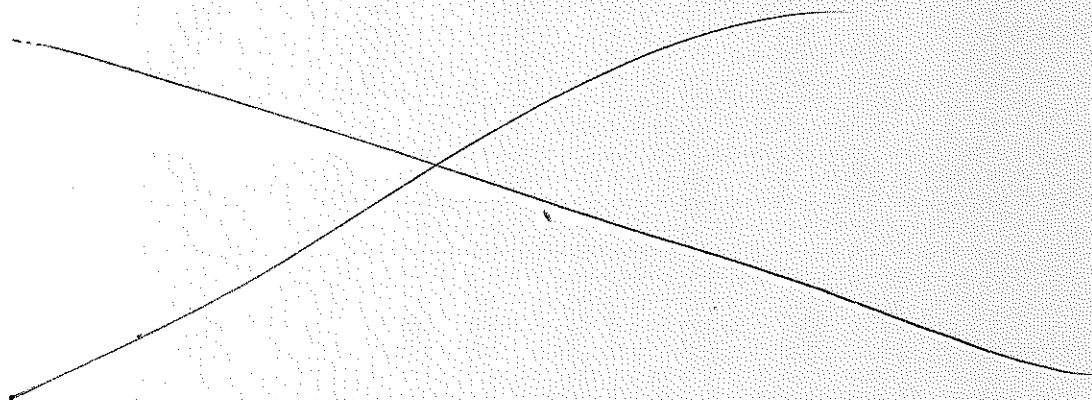
$$-4(8) - 15y = -17$$

$$-32 - 15y = -17$$

$$\begin{array}{l} -15y = 15 \\ \boxed{(8, -1)} \\ y = -1 \end{array}$$

$$\begin{array}{l} -7x - 8y = 9 \\ -4x + 9y = -22 \end{array}$$

$$\begin{array}{l} 5x + 4y = -30 \\ 3x - 9y = -18 \end{array}$$



$$\begin{array}{r} 2(-2x - 3y = 9) \rightarrow \\ 4x + 6y = -18 \\ \hline -4x - 6y = 18 \\ \hline 4x + 6y = -18 \\ \hline 0 = 0 \end{array}$$

Infinite Solutions

$$\begin{array}{r} -5x + 3y = -1 \\ + 5x - 3y = -4 \\ \hline 0 + 0 = -5 \\ 0 \neq -5 \end{array}$$

No Solutions

## Systems of Equations - Elimination with Multiplication Date \_\_\_\_\_ Period \_\_\_\_\_

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**Solve each system by elimination.**

1) 
$$\begin{aligned} 4x - 2y &= 20 \\ -8x - 3y &= 16 \end{aligned}$$

2) 
$$\begin{aligned} 2x - 3y &= -6 \\ -5x - 9y &= 15 \end{aligned}$$

3) 
$$\begin{aligned} 5x - 3y &= -28 \\ 4x + 6y &= -14 \end{aligned}$$

4) 
$$\begin{aligned} -20x + 6y &= -6 \\ -10x - 4y &= 4 \end{aligned}$$

5) 
$$\begin{aligned} 3x + 6y &= 6 \\ 9x - 12y &= 18 \end{aligned}$$

6) 
$$\begin{aligned} -2x + 4y &= -6 \\ -6x - 2y &= -4 \end{aligned}$$

7) 
$$\begin{aligned} 4x - 9y &= -11 \\ 3x - y &= 9 \end{aligned}$$

8) 
$$\begin{aligned} 6x + 8y &= 26 \\ -7x + 2y &= -19 \end{aligned}$$

9) 
$$\begin{aligned} -3x - 9y &= -6 \\ -8x - 4y &= 24 \end{aligned}$$

10) 
$$\begin{aligned} -6x - 8y &= -28 \\ 9x + 5y &= -14 \end{aligned}$$

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Hour: \_\_\_\_\_

**Error Analysis: Solving Systems of Equations by Elimination and Substitution**

Given the following problems, determine how they were solved (either by elimination or by substitution). Then, determine if they were solved correctly. If they weren't solved correctly, correct them.

Problem	How they solved it/Is it correct?	How you solved it
$\begin{aligned} -x - 7y &= 14 \\ -4x - 14y &= 28 \end{aligned}$	$\begin{aligned} -2(-x - 7y &= 14) \\ +2x + 14y &= -28 \\ -4x - 14y &= 28 \\ -2x &= 0 \\ x &= 0 \end{aligned}$ $\begin{aligned} 0 - 7y &= 14 \\ y &= -2 \end{aligned}$ <span style="border: 1px solid black; padding: 2px;"><math>(0, -2)</math></span>	
$\begin{aligned} -5x + y &= -2 \\ -3x + 6y &= -12 \end{aligned}$	$\begin{aligned} -5x + y &= -2 \\ y &= -5x - 2 \end{aligned}$ $\begin{aligned} 3x + 6(-5x - 2) &= -12 \\ 3x + -30x - 12 &= -12 \\ -27x &= 0 \\ x &= 0 \end{aligned}$ $\begin{aligned} -5(0) + y &= -2 \\ y &= -2 \end{aligned}$ <span style="border: 1px solid black; padding: 2px;"><math>(0, -2)</math></span>	
$\begin{aligned} y &= 5x + 7 \\ 5x - 2y &= 11 \end{aligned}$	$\begin{aligned} 5x - 2(5x + 7) &= 11 \\ 5x - 10x + 14 &= 11 \\ -5x &= -3 \\ x &= 5 \end{aligned}$ $\begin{aligned} y &= 5(5) + 7 \\ y &= 25 + 7 \\ y &= 32 \end{aligned}$ <span style="border: 1px solid black; padding: 2px;"><math>(5, 32)</math></span>	
$\begin{aligned} 8x + 14y &= 4 \\ -6x - 7y &= -10 \end{aligned}$	$\begin{aligned} 2(6x - 7y &= -10) \\ 12x - 14y &= -10 \\ 8x + 14y &= 4 \\ 20x &= -6 \\ x &= -3/10 \end{aligned}$ $\begin{aligned} 8(-3/10) + 14y &= 4 \\ y &= 0.45 \end{aligned}$ <span style="border: 1px solid black; padding: 2px;"><math>(-3/10, 0.45)</math></span>	

## Solving Systems of Equations by Elimination

Solve each system by elimination.

1) 
$$\begin{aligned} -4x - 2y &= -12 \\ 4x + 8y &= -24 \end{aligned}$$

2) 
$$\begin{aligned} 4x + 8y &= 20 \\ -4x + 2y &= -30 \end{aligned}$$

3) 
$$\begin{aligned} x - y &= 11 \\ 2x + y &= 19 \end{aligned}$$

4) 
$$\begin{aligned} -6x + 5y &= 1 \\ 6x + 4y &= -10 \end{aligned}$$

5) 
$$\begin{aligned} -2x - 9y &= -25 \\ -4x - 9y &= -23 \end{aligned}$$

6) 
$$\begin{aligned} 8x + y &= -16 \\ -3x + y &= -5 \end{aligned}$$

7) 
$$\begin{aligned} -6x + 6y &= 6 \\ -6x + 3y &= -12 \end{aligned}$$

8) 
$$\begin{aligned} 7x + 2y &= 24 \\ 8x + 2y &= 30 \end{aligned}$$

9) 
$$\begin{aligned} 5x + y &= 9 \\ 10x - 7y &= -18 \end{aligned}$$

10) 
$$\begin{aligned} -4x + 9y &= 9 \\ x - 3y &= -6 \end{aligned}$$

11) 
$$\begin{aligned} -3x + 7y &= -16 \\ -9x + 5y &= 16 \end{aligned}$$

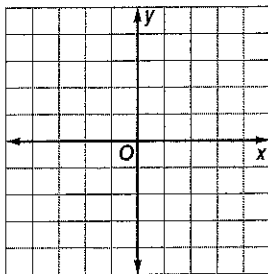
12) 
$$\begin{aligned} -7x + y &= -19 \\ -2x + 3y &= -19 \end{aligned}$$

# 3-2 Skills Practice

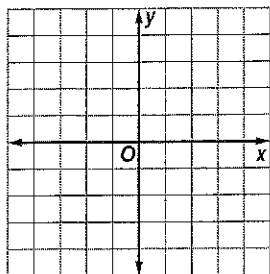
## Solving Systems of Inequalities by Graphing

Solve each system of inequalities by graphing.

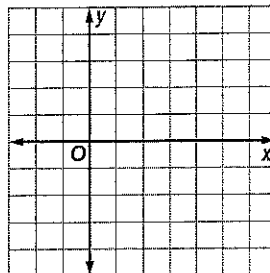
1.  $x < 1$   
 $y \geq -1$



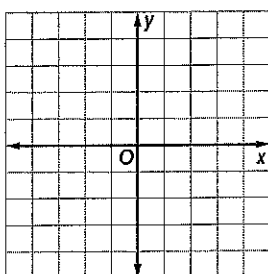
2.  $x \geq -3$   
 $y \geq -3$



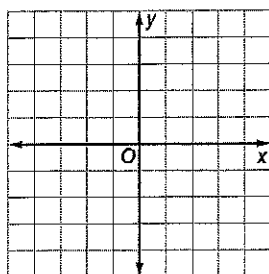
3.  $x \leq 2$   
 $x > 4$



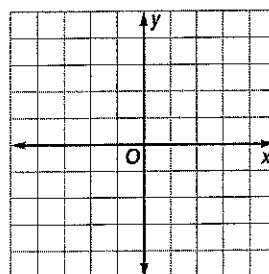
4.  $y \geq x$   
 $y \geq -x$



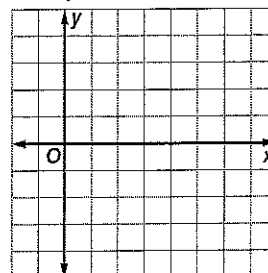
5.  $y < -4x$   
 $y \geq 3x - 2$



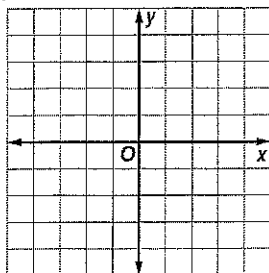
6.  $x - y \geq -1$   
 $3x - y \leq 4$



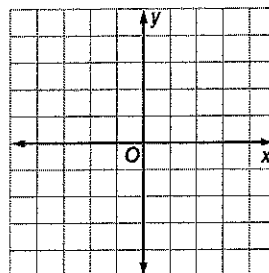
7.  $y < 3$   
 $x + 2y < 12$



8.  $y < -2x + 3$   
 $y \leq x - 2$



9.  $x - y \leq 4$   
 $2x + y < 4$

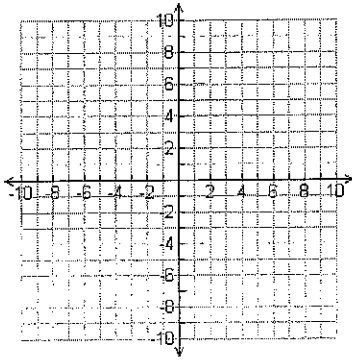


Find the coordinates of the vertices of the triangle formed by each system of inequalities.

10.  $y \leq 0$

$x \leq 0$

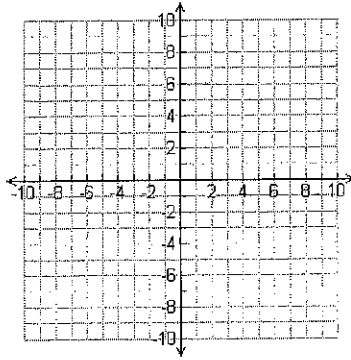
$y \geq -x - 1$



11.  $y \leq 3 - x$

$y \geq 3$

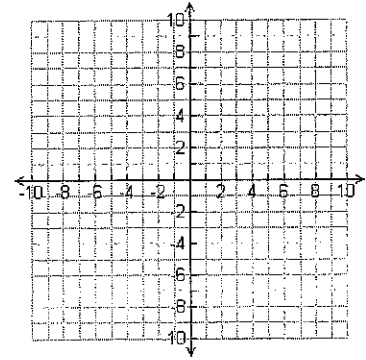
$x \geq -5$



12.  $x \geq -2$

$y \geq x - 2$

$x + y \leq 2$

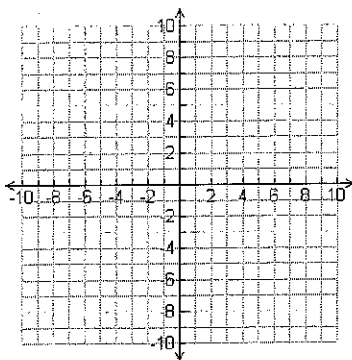


Find the coordinates of the vertices of the triangle formed by each system of inequalities.

13.  $y \geq 1 - x$

$y \leq x - 1$

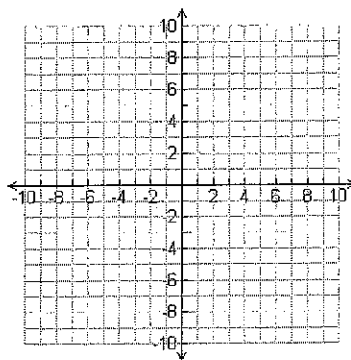
$x \leq 3$



14.  $x - y \leq 2$

$x + y \leq 2$

$x \geq -2$



15.  $y \geq 2x - 2$

$2x + 3y \geq 6$

$y < 4$

