

Name: Key

Unit 2: Linear Functions



Date: \_\_\_\_\_ Bell: \_\_\_\_\_

Homework 5: Solving Systems of Equations by Elimination & Applications

**\*\* This is a 2-page document! \*\***

**Directions:** Solve each system of equations by elimination. Clearly identify your solution.

1.  $3x + y = 11$   
 $5x - y = 21$

$$\begin{array}{r} 8x = 32 \\ x = 4 \end{array}$$

$$\begin{array}{r} 3(4) + y = 11 \\ 12 + y = 11 \\ y = -1 \end{array}$$

**(4, -1)**

2.  $2x - 9y = -51$   
 $7x - 3y = -9$

$$\begin{array}{r} -6y = -42 \\ y = 7 \end{array}$$

$$\begin{array}{r} 2x - 9(7) = -51 \\ 2x - 63 = -51 \\ 2x = 12 \\ x = 6 \end{array}$$

**(6, 7)**

3.  $5x + 12y = -34$   
 $3(2x + 4y = -12)$

$$\begin{array}{r} 5x + 12y = -34 \\ 6x + 12y = -36 \\ \hline -x = 2 \\ x = -2 \end{array}$$

$$\begin{array}{r} 5(-2) + 12y = -34 \\ -10 + 12y = -34 \\ 12y = -24 \\ y = -2 \end{array}$$

**(-2, -2)**

4.  $-3x + 8y = 73$   
 $-3(x - 7y = -46)$

$$\begin{array}{r} -3x + 8y = 73 \\ -3x + 21y = 138 \\ \hline -13y = -65 \\ y = 5 \end{array}$$

$$\begin{array}{r} -3x + 8(5) = 73 \\ -3x + 40 = 73 \\ -3x = 33 \\ x = -11 \end{array}$$

**(-11, 5)**

5.  $9x + 4y = -72$   
 $9(2x - 3y = -16)$

$$\begin{array}{r} 18x + 8y = -144 \\ 18x - 27y = -144 \\ \hline 35y = 0 \\ y = 0 \end{array}$$

$$\begin{array}{r} 9x + 4(0) = -72 \\ 9x = -72 \\ x = -8 \end{array}$$

**(-8, 0)**

6.  $4x - 11y = 68$   
 $4(6x + 5y = -27)$

$$\begin{array}{r} 24x - 66y = 408 \\ 24x + 20y = -108 \\ \hline -86y = 516 \\ y = -6 \end{array}$$

$$\begin{array}{r} 4x - 11(-6) = 68 \\ 4x + 66 = 68 \\ 4x = 2 \\ x = \frac{1}{2} \end{array}$$

**(1/2, -6)**

7.  $5x = 15 - 5y$   
 $8y + 26 = 2x$

$$\begin{array}{r} 5x + 5y = 15 \\ 5(2x + 8y = -26) \\ \hline -10x - 10y = -30 \\ -10x + 40y = -130 \\ \hline -50y = 100 \\ y = -2 \end{array}$$

$$\begin{array}{r} 5x + 5(-2) = 15 \\ 5x - 10 = 15 \\ 5x = 25 \\ x = 5 \end{array}$$

**(5, -2)**

8.  $14x + 7y = -7$   
 $y = -2x - 1$

$$\begin{array}{r} 14x + 7y = -7 \\ 7(2x + y = -1) \\ \hline 14x + 7y = -7 \\ 14x + 7y = -7 \\ \hline 0 = 0 \end{array}$$

**Infinite Solutions**

**Directions:** Define your variables and set up a system of equations, then solve.

9. A storeowner mixed 8 pounds of peanuts and 5 pounds of M&M's. This 13 pound mixture sold for \$55.27. A second mixture included 6 pounds of peanuts and 4 pounds of M&M's. This 10 pound mixture sold for \$42.70. Find the cost per pound of the peanuts and M&M's.

$$\begin{aligned} x &= \text{peanuts} \$ & 4(8x + 5y) &= 55.27 & 8(3.79) + 5y &= 55.27 \\ y &= \text{M\&M's} \$ & 5(6x + 4y) &= 42.70 & 30.32 + 5y &= 55.27 \end{aligned}$$

$$32x + 20y = 221.08$$

$$30x + 20y = 213.50$$

$$\underline{2x = 7.58}$$

$$x = 3.79$$

$$5y = 24.95$$

$$y = 4.99$$

Peanuts - \$3.79

M&M's - \$4.99

10. Katy's favorite rides at the amusement park are the rollercoaster and water slide. The wait time for the rollercoaster is 25 minutes and the wait time for the water slide is 10 minutes. If she went on 12 rides total and waited three hours in line, how many times did she go on each ride?

$$\begin{aligned} x &= \text{rollercoaster} & x + y &= 12 \rightarrow y = -x + 12 \\ y &= \text{water slide} & 25x + 10y &= 180 \end{aligned}$$

$$4 + y = 12$$

$$y = 8$$

$$25x + 10(-x + 12) = 180$$

$$25x - 10x + 120 = 180$$

$$15x = 60$$

$$x = 4$$

rollercoaster - 4

water slide - 8

11. A collection of nickels and dimes is worth \$9.45. If the number of dimes is doubled, the value is \$16.65. Find the number of each coin.

$$\begin{aligned} x &= \text{nickels} & .05x + .10y &= 9.45 \\ y &= \text{dimes} & .05x + 2(.10y) &= 16.65 \end{aligned}$$

$$.05x + .10(72) = 9.45$$

$$.05x + 7.2 = 9.45$$

$$.05x = 2.25$$

$$x = 45$$

$$\underline{-10y = -7.20}$$

$$y = 72$$

45 nickels

72 dimes

12. Zack has two savings accounts with a total of \$9,000. He withdrew 10% from one and 60% from the other to buy his girlfriend an engagement ring. If the ring cost \$2,175, find the remaining balance in each account.

$$\begin{aligned} x &= \text{Acct A} & x + y &= 9000 \rightarrow y = -x + 9000 \\ y &= \text{Acct B} & .10x + .60y &= 2175 \end{aligned}$$

$$6450 + y = 9000$$

$$y = 2550$$

$$.10x + .60(-x + 9000) = 2175$$

$$.10x - .60x + 5400 = 2175$$

$$-.5x = -3225$$

$$x = 6450$$

$$6450(.9) = 5805$$

$$2550(.7) = 1020$$

He has \$5805  
in Acct A and  
\$1020 in Acct B