

Name: <u>Key</u>	Class:
Topic:	Date:

Main Ideas/Questions	Notes
WHAT IS IT?	<u>Elimination</u> - process of cancelling out one variable to solve for the other.
STEPS TO SOLVE	<p><b>Step 1:</b> Make sure equations are lined up!</p> <p><b>Step 2:</b> <u>Add</u> or <u>Subtract</u> equations to eliminate the variable with common <u>coefficients</u>.</p> <p><b>Step 3:</b> <u>Solve</u> the equation for the remaining variable.</p> <p><b>Step 4:</b> <u>Substitute</u> your answer into either original equation and <u>solve</u> for the other variable.</p>
<b>EXAMPLES</b> SOLVE THE FOLLOWING SYSTEMS USING ELIMINATION  <b>ANSWERS:</b> 1. <u><math>(-3, -5)</math></u> 2. <u><math>(5, 2)</math></u> 3. <u><math>(8, 1)</math></u> 4. <u><math>(-2, 7)</math></u>	<p>1. <math>y = 3x + 4</math>  <math>-y = x - 2</math>  <math>\hline 0 = 2x + 6</math>  <math>\frac{-6}{2} = \frac{2x}{2}</math>  <math>x = -3</math></p> <p><math>y = -3 - 2</math>  <math>y = -5</math>  <math>(-3, -5)</math></p> <p>2. <math>x + 4y = 13</math>  <math>-x - y = 3</math>  <math>\hline 5y = 16</math>  <math>\frac{5y}{5} = \frac{16}{5}</math>  <math>y = 2</math></p> <p><math>x + 4(2) = 13</math>  <math>x + 8 = 13</math>  <math>x = 5</math>  <math>(5, 2)</math></p> <p>3. <math>3x - 10y = 14</math>  <math>-3x - 9y = 15</math>  <math>\hline -y = -1</math>  <math>y = 1</math></p> <p><math>3x - 10(1) = 14</math>  <math>3x - 10 = 14</math>  <math>\frac{3x}{3} = \frac{24}{3}</math>  <math>x = 8</math>  <math>(8, 1)</math></p> <p>4. <math>4x + 2y = 6</math>  <math>-2x + 2y = 18</math>  <math>\hline 6x = -12</math>  <math>\frac{6x}{6} = \frac{-12}{6}</math>  <math>x = -2</math></p> <p><math>4(-2) + 2y = 6</math>  <math>-8 + 2y = 6</math>  <math>+8 \quad +8</math>  <math>\hline 2y = 14</math>  <math>\frac{2y}{2} = \frac{14}{2}</math>  <math>y = 7</math>  <math>(-2, 7)</math></p>

**ANSWERS:**

5.  $(-1, 1)$

6.  $(3, 4)$

7.  $(5, -2)$

8.  $(7, -3)$

9.  $(6, -2)$

10.  $(4, 0)$

11.  $\emptyset$

12.  $\infty$

$$\begin{array}{r} 5. \quad 4x + 9y = 5 \\ + \quad -4x + 7y = 11 \\ \hline \quad \quad 16y = 16 \\ \quad \quad \frac{16}{16} \\ \quad \quad y = 1 \end{array}$$

$$\begin{array}{r} 4x + 9(1) = 5 \\ 4x + 9 = 5 \\ \rightarrow -9 \\ \hline 4x = -4 \\ \frac{4}{4} \quad \frac{-4}{4} \\ x = -1 \end{array}$$

$(-1, 1)$

$$\begin{array}{r} 6. \quad 10x - 3y = 18 \\ + \quad -2x + 3y = 6 \\ \hline \quad \quad 8x = 24 \\ \quad \quad \frac{8}{8} \\ \quad \quad x = 3 \end{array}$$

$$\begin{array}{r} 10(3) - 3y = 18 \\ 30 - 3y = 18 \\ -30 \quad -30 \\ \hline -3y = -12 \\ \frac{-3}{-3} \quad \frac{-12}{-3} \\ y = 4 \end{array}$$

$(3, 4)$

$$\begin{array}{r} 7. \quad x = 3y + 11 \rightarrow x - 3y = 11 \\ 2x - 3y = 16 \\ - \quad x - 3y = 11 \\ \hline \quad \quad x = 5 \end{array}$$

$$\begin{array}{r} 5 = 3y + 11 \\ -11 \quad -11 \\ \hline -6 = 3y \\ \frac{-6}{3} \quad \frac{3y}{3} \quad y = -2 \end{array}$$

$(5, -2)$

$$\begin{array}{r} 8. \quad x - y = 10 \\ + \quad 3x + y = 18 \\ \hline \quad \quad 4x = 28 \\ \quad \quad \frac{4}{4} \\ \quad \quad x = 7 \end{array}$$

$$\begin{array}{r} 3(7) + y = 18 \\ 21 + y = 18 \\ -21 \quad -21 \\ \hline y = -3 \end{array}$$

$(7, -3)$

$$\begin{array}{r} 9. \quad 7x + 7y = 28 \\ - \quad 7x + 10y = 22 \\ \hline \quad \quad -3y = 6 \\ \quad \quad \frac{-3}{-3} \quad \frac{6}{-3} \\ \quad \quad y = -2 \end{array}$$

$$\begin{array}{r} 7x + 7(-2) = 28 \\ 7x + (-14) = 28 \\ \quad \quad +14 \quad +14 \\ \hline 7x = 42 \\ \frac{7}{7} \quad \frac{42}{7} \\ x = 6 \end{array}$$

$(6, -2)$

$$\begin{array}{r} 10. \quad 4y = 2x - 8 \rightarrow -2x + 4y = -8 \\ 5x - 4y = 20 \\ + \quad -2x + 4y = -8 \\ \hline \quad \quad 3x = 12 \\ \quad \quad \frac{3}{3} \quad \frac{12}{3} \\ \quad \quad x = 4 \end{array}$$

$$\begin{array}{r} 4y = 2(4) - 8 \\ 4y = 8 - 8 \\ 4y = 0 \\ y = 0 \end{array}$$

$(4, 0)$

$$\begin{array}{r} 11. \quad 3x - 4y = -10 \\ - \quad 3x - 4y = -13 \\ \hline \quad \quad 0 = 3 \end{array}$$

No Solutions

$$\begin{array}{r} 12. \quad 2x + y = -10 \\ + \quad -2x - y = 10 \\ \hline \quad \quad 0 = 0 \end{array}$$

$\infty$