

Name \_\_\_\_\_

### Section 5.3

#### Algebra II: Systems of Equations—Solve by Elimination

##### Essential Questions:

How do I solve systems of equations by adding or subtracting? (Subtracting is the same as adding the opposite.) See: <http://youtu.be/o3kFQ9TATHs>

Elimination Example 1—solve by adding

- Solve:  $2x + y = 7$  and  $3x - y = 8$

- Add. This makes the Y term drop out.

$$\begin{array}{r} 2x + y = 7 \\ + \quad 3x - y = 8 \\ \hline 5x + 0 = 15 \\ \underline{\quad 5} \quad \quad \underline{\quad 5} \end{array}$$

- Solve the new equation.

$$\boxed{x = 3}$$

$$2x + y = 7$$

$$2(3) + y = 7$$

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

$$\boxed{y = 1}$$

$$(3, 1)$$

- Substitute the answer for x in one equation. Find the value of y.

Check

$$2x + y = 7$$

$$2(3) + (1) = 7$$

$$6 + 1 = 7$$

$$7 = 7$$

yes. It worked

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Elimination Example 1—solve by adding.

- Solve:  $5x + 6y = 3$  and  $-5x - 2y = -11$

- Subtract. This makes the x term drop out.

$$\begin{array}{r} 5x + 6y = 3 \\ + \quad -5x - 2y = -11 \\ \hline 0 + 4y = -8 \\ \quad \frac{4}{4} \quad \frac{-8}{4} \\ \quad \quad \quad y = -2 \end{array}$$

- Solve the new equation.

$$\begin{array}{r} 5x + 6y = 3 \\ 5x + 6(-2) = 3 \\ 5x - 12 = 3 \\ \quad \quad +12 \quad +12 \\ \hline \frac{5x}{5} = \frac{15}{5} \\ \quad \quad \quad x = 3 \end{array}$$

$$\boxed{(3, -2)}$$

- Substitute the answer for y in one equation. Find the value of x.

Try this one on your own - we will check after.

$$\begin{array}{r} 2x + y = 10 \\ \underline{3x - y = 5} \end{array}$$

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Solving systems of equations by elimination.

Solve by adding.

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

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

3.  $x + 2y = 7$   
 $3x - 2y = 5$

4.  $x + 3y = 0$   
 $2x - 3y = 9$

5.  $2x - y = 3$   
 $4x + y = 9$

6.  $2x + y = 10$   
 $3x - y = 5$

7.  $3x - 2y = 8$   
 $x + 2y = 8$

8.  $4x - 7y = 13$   
 $4x + 7y = -29$

9.  $2x + 3y = 7$   
 $-2x - y = -5$

10.  $3x - 2y = 13$   
 $4x + 2y = 8$

11.  $3x + y = 0$   
 $6x - y = 18$

12.  $-4x + y = 7$   
 $4x + 3y = 5$