

Algebra 2

Name \_\_\_\_\_

5.1E Solving with Substitution (paper only)

Date \_\_\_\_\_ Period \_\_\_\_\_

Solve each system by substitution. You must show work, and you must use the substitution method.

1)  $\begin{cases} y = 5x \\ y = 7x - 16 \end{cases}$

$$5x = 7x - 16$$

$$\begin{matrix} -7x & -7x \\ \hline -2x & = -16 \\ -2 & -2 \end{matrix}$$

$$x = 8$$

$y = 5x$   
 $y = 5(8)$   
 $y = 40$

$(x, y)$   
 $(8, 40)$

2)  $\begin{cases} x = -2y \\ 2x + 3y = 5 \end{cases}$

$$2(-2y) + 3y = 5$$

$$-4y + 3y = 5$$

$$\frac{-y}{-1} = \frac{5}{-1}$$

$$y = -5$$

$x = -2y$   
 $x = -2(-5)$   
 $x = 10$

$(10, -5)$

3)  $\begin{cases} -8x - y = 11 \\ y = -8x - 11 \end{cases}$

$$-8x - (-8x - 11) = 11$$

$$-8x + 8x + 11 = 11$$

$$0 + 11 = 11$$

$$11 = 11$$

true

**infinitely many solutions**

4)  $\begin{cases} -6x + 2y = -3 \\ -3x + y = 7 \end{cases}$

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

$$-6x + 6x + 14 = -3$$

$$0 + 14 = -3$$

$$14 = -3$$

false

**no solution**

5)  $\begin{cases} 6x - 2y = 26 \\ -y + 3 = x \end{cases}$

6)  $\begin{cases} 2x - y = -14 \\ y = 3x + 21 \end{cases}$

7)  $\begin{cases} y = -7x + 17 \\ y = x - 7 \end{cases}$

8)  $\begin{cases} -2x + 4y = 4 \\ x - 8y = -8 \end{cases}$

$$-2(8y - 8) + 4y = 4$$

$$-16y + 16 + 4y = 4$$

$$-12y + 16 = 4$$

$$\frac{-12y}{-12} = \frac{-12}{-12}$$

$$y = 1$$

$x = 8y - 8$   
 $x = 8(1) - 8$   
 $x = 0$

$(0, 1)$