

Period _____

Substitution

Name _____

Date _____

1) $y = 4x$

$x + y = 5$

$y = 4(1)$

$x + 4x = 5$

$y = 4$

$\frac{5x}{5} = \frac{5}{5}$

$(1, 4)$

$x = 1$

2)

$y = 2x$

$x + 3y = -14$

$y = 2(-2)$

$x + 3(2x) = -14$

$y = -4$

$x + 6x = -14$

$(-2, -4)$

$\frac{7x}{7} = \frac{-14}{7}$

$x = -2$

3) $y = 3x$

$2x + y = 15$

$y = 3(3)$

$2x + 3x = 15$

$y = 9$

$\frac{5x}{5} = \frac{15}{5}$

$(3, 9)$

$x = 3$

$$4) \quad y = x - 1 \quad x + y = 3$$

$$y = 2 - 1 \quad x + x - 1 = 3$$

$$\begin{array}{r} y = 1 \\ \times y \\ (2, 1) \end{array}$$

$$\begin{array}{r} 2x - 1 = 3 \\ +1 \quad +1 \\ \hline 2x = 4 \end{array}$$

$$\frac{2x}{2} = \frac{4}{2}$$

$$x = 2$$

$$5) \quad y = 4x - 1 \quad y = 2x - 5$$

$$\begin{array}{r} 4x - 1 = 2x - 5 \\ -2x \quad -2x \\ \hline 2x - 1 = -5 \end{array}$$

$$\begin{array}{r} 2x - 1 = -5 \\ +1 \quad +1 \\ \hline 2x = -4 \end{array}$$

$$\frac{2x}{2} = \frac{-4}{2}$$

$$x = -2$$

$$y = 4x - 1$$

$$y = 4(-2) - 1$$

$$y = -8 - 1$$

$$y = -9$$

$$(-2, -9)$$

$$y = 2x - 5$$

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

$$y = -4 - 5$$

$$y = -9$$

$$y = -9$$

$$\begin{array}{r}
 4) \quad x + 2y = 13 \\
 \quad \quad -2y \quad \quad -2y \\
 \hline
 x = -2y + 13
 \end{array}$$

$$x = -2y + 13$$

$$x = -2(3) + 13$$

$$x = -6 + 13$$

$$x = 7$$

$$(7, 3)$$

$$3x - 5y = 6$$

$$3(-2y + 13) - 5y = 6$$

$$-6y + 39 - 5y = 6$$

$$-11y + 39 = 6$$

$$\frac{-11y}{-11} = \frac{-33}{-11}$$

$$y = 3$$

$$\begin{array}{r}
 7) \quad 3x - 4y = 4 \\
 \quad \quad -3x \quad \quad -3x \\
 \hline
 -4y = -3x + 4
 \end{array}$$

$$\frac{-4y}{-1} = \frac{-3x + 4}{-1}$$

$$y = 3x - 4$$

$$y = 3(3) - 4$$

$$y = 9 - 4$$

$$y = 5$$

$$2x - 3y = -9$$

$$2x - 3(3x - 4) = -9$$

$$2x - 9x + 12 = -9$$

$$-7x + 12 = -9$$

$$\frac{-7x}{-7} = \frac{-21}{-7}$$

$$x = 3$$

$$(x, y)$$

$$(3, 5)$$

$$8) \quad \begin{array}{r} x - 5y = 10 \\ +5y \quad +5y \\ \hline x = 5y + 10 \end{array}$$

$$2x - 10y = 20$$

$$\begin{array}{r} 2(5y + 10) - 10y = 20 \\ 10y + 20 - 10y = 20 \end{array}$$

$20 = 20 \checkmark$
infinitely many \checkmark
solutions.

$$\boxed{\begin{array}{l} 2(x - 5y = 10) \quad 2x - 10y = 20 \\ 2x - 10y = 20 \end{array}}$$

$$\begin{array}{r} x - 5y = 10 \\ -5y = -x + 10 \\ \hline -5 \quad -5 \quad -5 \\ y = \frac{1}{5}x - 2 \end{array}$$

$$\begin{array}{r} 2x - 10y = 20 \\ -2x \quad -2x \\ \hline -10y = -2x + 20 \\ \hline -10 \quad -10 \quad 10 \\ y = \frac{1}{5}x - 2 \end{array}$$

$$9) \quad \begin{array}{r} 2x + 5y = 38 \\ 2(3y - 3) + 5y = 38 \\ 6y - 6 + 5y = 38 \\ 11y - 6 = 38 \\ \hline 11y = 44 \\ \hline 11 \quad 11 \\ y = 4 \end{array}$$

$$\begin{array}{r} x - 3y = -3 \\ +3y \quad +3y \\ \hline x = 3y - 3 \\ x = 3(4) - 3 \\ x = 12 - 3 \\ x = 9 \\ (9, 4) \end{array}$$

$$7) \quad x + 2y = 13$$

$$\begin{array}{r} -2y \quad -2y \\ \hline \end{array}$$

$$x = -2y + 13$$

$$x = -2y + 13$$

$$x = -2(3) + 13$$

$$x = -6 + 13$$

$$x = 7$$

$$3x - 5y = 6$$

$$3(-2y + 13) - 5y = 6$$

$$3(-2y + 13) - 5y = 6$$

$$-6y + 39 - 5y = 6$$

$$-11y + 39 = 6$$

$$\frac{-11y}{-11} = \frac{-33}{-11}$$

$$y = 3$$

$$(7, 3)$$

$$8) \quad \begin{array}{r} 3x - y = 4 \\ -3x \quad -3x \\ \hline \end{array}$$

$$\frac{-y}{-1} = \frac{-3x + 4}{-1} = \frac{-1}{-1}$$

$$y = 3x - 4$$

$$y = 3(3) - 4$$

$$y = 9 - 4$$

$$y = 5$$

$$2x - 3y = -9$$

$$2x - 3y = -9$$

$$2x - 3(3x - 4) = -9$$

$$2x - 9x + 12 = -9$$

$$-7x + 12 = -9$$

$$\frac{-7x}{-7} = \frac{-21}{-7}$$

$$x = 3$$

$$(3, 5)$$

$$9.) \quad 2x + 5y = 38 \quad x - 3y = -3$$

$$2(3y - 3) + 5y = 38$$

$$\begin{array}{r} +3y \quad +34 \\ \hline x = 3y - 3 \end{array}$$

$$6y - 6 + 5y = 38$$

$$x = 3(4) - 3$$

$$11y - 6 = 38$$

$$11y = 44$$

$$y = 4$$

$$x = 12 - 3$$

$$\frac{11y}{11} = \frac{44}{11}$$

$$y = 4$$

$$x = 9$$

$$(9, 4)$$

$$10.) \quad y = 5x - 8$$

$$y = 5(3) - 8$$

$$y = 15 - 8$$

$$y = 7$$

$$(3, 7)$$

$$4x + 3y = 33$$

$$4x + 3(5x - 8) = 33$$

$$4x + 15x - 24 = 33$$

$$19x - 24 = 33$$

$$+24 \quad +24$$

$$\frac{19x}{19} = \frac{57}{19}$$

$$x = 3$$

$$11.) \quad x - 5y = 10$$

$$\begin{array}{r} +5y \quad +5y \\ \hline x = 5y + 10 \end{array}$$

$$2x - 10y = 20$$

$$2(5y + 10) - 10y = 20$$

$$(10y) + 20 - (10y) = 20$$

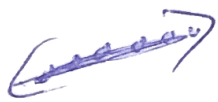
$$20 = 20$$

$$\begin{array}{r} x - 5y = 10 \\ -x \qquad \qquad -x \\ \hline -5y = \frac{-x + 10}{-5} \end{array}$$

$$y = \frac{1}{5}x - 2$$

$$\begin{array}{r} 2x - 10y = 20 \\ -2x \qquad \qquad -2x \\ \hline -10y = \frac{-2x + 20}{-10} \end{array}$$

$$y = \frac{1}{5}x - 2$$



Infinitely many solutions

$$12.) \quad x + 2y = 6$$

$$y = -\frac{1}{2}x + 3$$

$$x + 2\left(-\frac{1}{2}x + 3\right) = 6$$

$$(x + -x) + 12 = 6$$

$$12 = 6$$

No solution

$$\frac{2y}{2} = \frac{-x + 6}{2}$$