

## Warm-Up: Solve by Substitution (type I and II)

$$4x - 5y = -7$$

$$y = 5x$$

$$\begin{array}{l}
 4x - 5(5x) = -7 \\
 4x - 25x = -7 \\
 \frac{-21x}{-21} = \frac{-7}{-21} \\
 x = \frac{1}{3} \\
 0.\bar{3}
 \end{array}$$

$$\begin{array}{l}
 y = 5\left(\frac{1}{3}\right) \\
 y = \frac{5}{3} \\
 y = 1.\bar{6} \\
 \text{SOLUTION} \\
 (0.\bar{3}, 1.\bar{6})
 \end{array}$$

$$y = 2x - 2$$

$$y = x + 2$$



$$\begin{array}{l}
 2x - 2 = x + 2 \\
 -x \quad -x \\
 x - 2 = 2 \\
 +2 \quad +2 \\
 x = 4
 \end{array}$$

$$\begin{array}{l}
 y = 4 + 2 \\
 y = 6 \\
 \text{SOLUTION} \\
 (4, 6)
 \end{array}$$

$$3x + y = 12$$

$$y = -x - 2$$

$$\begin{array}{l}
 3x + -x - 2 = 12 \\
 2x - 2 = 12 \\
 +2 \quad +2 \\
 2x = 14 \\
 \frac{2x}{2} = \frac{14}{2} \\
 x = 7
 \end{array}$$

$$\begin{array}{l}
 y = -(7) - 2 \\
 y = -7 - 2 \\
 y = -9 \\
 \text{SOLUTION} \\
 (7, -9)
 \end{array}$$

System by Substitution (Type III)

Recall

Type I  $x = 2y + 7$        $2y + 7 = y + 4$   
 $x = y + 4$

Type II  $3x + y = 12$        $3x + (-x - 2) = 12$   
 $y = -x - 2$

Now Type III  $\textcircled{1} 1x + 14y = 84$   
 $\textcircled{2} 2x - 7y = -7$

Coefficient

$\textcircled{3}x + 2$

We want to solve eq. 1  
 for X

# before variable (x)

$$\begin{array}{r} x + 14y = 84 \\ -14y \quad -14y \\ \hline x = 84 - 14y \end{array}$$

$$\begin{array}{r} 2x - 7y = -7 \\ 2(84 - 14y) - 7y = -7 \\ 168 - 28y - 7y = -7 \\ 168 - 35y = -7 \\ -168 \quad -168 \\ \hline -35y = -175 \\ -35 \quad -35 \\ \hline y = 5 \end{array}$$

$$\begin{array}{l} x = 84 - 14(5) \\ x = 84 - 70 \\ x = 14 \end{array}$$

SOLUTION  
 (14, 5)

Ex 2

$$\cancel{3} \cdot \left( \frac{1}{3}x - y = 3 \right) \rightarrow 1x - 3y = 9$$

$$2x + 1y = 25$$

Solve for y

$$\begin{array}{r} 2x + y = 25 \\ -2x \phantom{+ y} = \phantom{25} \\ \hline y = 25 - 2x \end{array}$$

$$y = 25 - 2x$$

$$y = 25 - 2(12)$$

$$y = 1$$

$$1x - 3(25 - 2x) = 9$$

$$1x - 75 + 6x = 9$$

$$7x - 75 = 9$$

$$+75 \quad +75$$

$$7x = 84$$

$$\frac{7x}{7} = \frac{84}{7}$$

$$x = 12$$

SOLUTION  
(12, 1)

Ex 3

$$x + 3y = -4$$

$$2x + 6y = 5$$

Solve for x

$$x + 3y = -4$$

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

$$2(-4 - 3y) + 6y = 5$$

$$-8 - 6y + 6y = 5$$

$$-8 = 5 \quad \text{False} \quad \text{No Sd.}$$

Practice 6.2

# 9, 11, 12, 13, 15, 16, 18, 19, 20