

24.  
p 329

$$3x + y = 21 \quad y = -3x + 21$$

$$10x + 5y = 65$$

$$(8, -3)$$

$$10x + 5(-3x + 21) = 65$$

$$10x + -15x + 105 = 65$$

$$-5x + 105 = 65$$

$$-5x = -40$$

$$x = +8$$

$$y = -3x + 21$$

$$y = -3(8) + 21$$

$$y = -24 + 21$$

$$y = -3$$

$$(8, -3)$$

## 7.3 Solving Systems of Equations

1. Graphing
2. Substitution
3. Elimination
  - Addition
  - Subtraction

$$\begin{array}{r} 2x - 3y = 8 \\ + \quad 5x + 3y = 20 \\ \hline \end{array}$$

$$\begin{array}{r} 7x = 28 \\ \text{Solve } \overline{7} \quad \overline{7} \\ x = 4 \end{array}$$

Addition  
Coefficients of  
one variable  
are opposites

Substitute into  
one equations to find y

$$\begin{array}{r} 2x - 3y = 8 \\ 2(4) - 3y = 8 \\ 8 - 3y = 8 \\ -3y = 0 \\ \underline{-3} \quad \underline{-3} \\ y = 0 \end{array}$$

$$(4, 0)$$

$$\begin{array}{r} 2m - 3n = 5 \\ - 5m - 3n = 11 \\ \hline \end{array}$$

Solve

$$\frac{-3m}{-3} = \frac{-6}{-3}$$

$$m = 2$$

Substitute  
to find  
n

$$2m - 3n = 5$$

$$2(2) - 3n = 5$$

$$4 - 3n = 5$$

$$\frac{-3n}{-3} = \frac{1}{-3}$$

$$n = -\frac{1}{3}$$

$$(2, -\frac{1}{3})$$

Subtract  
Coefficients  
of n's  
are the  
same

$$2p + 3q = 18$$

$$3 \cdot 5p - q = 11$$

Multiply equation by 3 to create opposites  $3 \cdot -3$

Add  
Coefficients  
of 1 variable  
opposites

$$\begin{array}{r} 2p + 3q = 18 \\ + 15p - 3q = 33 \\ \hline 17p = 51 \\ \underline{17} \quad \quad \underline{17} \end{array}$$

$$p = 3$$

Substitute  
to find q

$$2p + 3q = 18$$

$$2(3) + 3q = 18$$

$$6 + 3q = 18$$

$$3q = 12$$

$$q = 4$$

$$(3, 4)$$

(p, q)  
Alphabetical  
Order

Multiply by

$$2x - 5y = -14$$

Multiply  
by 2

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

Add  
Create  
opposites  
x's

$$\begin{array}{r}
 14x - 35y = 98 \\
 + \quad -14x + 8y = -10 \\
 \hline
 \end{array}$$

Multiply  
of 2: -1  
14

Solve for y

$$\begin{array}{r}
 -27y = -108 \\
 \underline{-27} \quad \underline{-27}
 \end{array}$$

$$y = 4$$

Substitute  
to find x

$$2x - 5y = -14$$

$$2x - 5(4) = -14$$

$$2x - 20 = -14 + 20$$

$$\frac{2x}{2} = \frac{6}{2}$$

$$x = 3$$

$$(3, 4)$$

$$\begin{aligned} 3x &= 2y + 2 \\ 4x - 7y &= 33 \end{aligned}$$

$$\begin{array}{l} \text{Multiply} \\ \text{by } 4 \\ \text{Multiply} \\ \text{by } -3 \end{array} \begin{aligned} 3x - 2y &= 2 \\ 4x - 7y &= 33 \end{aligned}$$

$$\begin{array}{r} 12x - 8y = 8 \\ + \quad -12x + 21y = -99 \\ \hline \end{array}$$

$$13y = -91$$

$$\frac{13}{13} \quad \frac{-91}{13}$$

$$y = -7$$

Substitute  
to find x

$$3x - 2y = 2$$

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

$$3x + 14 = 2 \quad -14$$

$$3x = -12$$

$$\frac{3}{3} \quad \frac{-12}{3}$$

$$x = -4$$

$$(-4, -7)$$

Least  
Common  
Multiple  
Add  
Coefficients  
opposites  
x's

p 335

12, 14, 16, 32, 34