

4-2 Write equations in slope-intercept form

$$y = \underset{\substack{| \\ \text{slope}}}{m}x + \underset{\substack{| \\ \text{y intercept}}}{b}$$

Standard Form:  $Ax + By = C$

Direct Variation =  $y = \underset{\substack{| \\ \text{slope}}}{k}x$

Write an equation of a line that passes through  $(2, 1)$  with a slope of 3

$(2, 1)$  Coordinate Points  $(x, y)$   
 $(x, y)$

Substitute slope  $(m) = 3$  and the points from the given coordinates  $(2, 1)$   
 $(x, y)$

$$1 = 3(2) + b \quad \text{We are solving for the y intercept}$$

$$1 = 6 + b$$

$$\begin{array}{r} 1 \\ -6 \\ \hline -5 \end{array}$$

$$\underline{-5 = b} \quad \text{y intercept}$$

Slope  $(m)$  was: 3  
 y intercept: -5

$$y = 3x - 5$$

$$1A.) \begin{matrix} (x,y) \\ (-2,5) \end{matrix} m=3$$

$$\begin{array}{r} 5 = 3(-2) + b \\ 5 = -6 + b \\ +6 \quad +6 \\ \hline 11 = b \end{array}$$

$$y = 3x + 11$$

$$1B.) \quad (4, -7) \quad m = -1$$

$$\begin{array}{r} -7 = 4(-1) + b \\ -7 = -4 + b \\ +4 \quad +4 \\ \hline -3 = b \end{array}$$

$$\begin{array}{l} m = -1 \\ b = -3 \\ \hline y = -1x - 3 \end{array}$$

Write an equation of a line given two points

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{First find the slope}$$

a.)  $(\overset{x}{3}, \overset{y}{1})$  and  $(2, 4)$

$$\frac{4 - 1}{2 - 3} = \frac{3}{-1} \quad m = -3$$

Now use this slope and EITHER one of the points to find the equation.

$$1 = 3(-3) + b$$

$$1 = -9 + b$$

+9

$$10 = b$$

$$y = -3x + 10$$

b.)  $(\underset{x}{-4}, \underset{y}{-2})$  and  $(-5, -6)$

$$m = \frac{-6 - (-2)}{-5 - (-4)} = \frac{-6 + 2}{-5 + 4} = \frac{-4}{-1} \quad m=4$$

$$-2 = -4(4) + b$$

$$-2 = -16 + b$$

$$\begin{array}{r} -2 = -16 + b \\ +16 \quad +16 \\ \hline 14 = b \end{array}$$

$$m=4$$

$$b=14$$

$$y = 4x + 14$$

$$2A.) \quad \begin{matrix} x & y \\ (-1, 12) & (4, 8) \end{matrix}$$

$$m = \frac{-8 - 12}{4 - (-1)} = \frac{-20}{5} = \textcircled{m = -4}$$

$$\textcircled{b = 8}$$

$$12 = -4(-1) + b$$

$$\begin{array}{r} 12 = 4 + b \\ -4 \quad -4 \\ \hline \end{array}$$

$$\textcircled{8 = b}$$

$$\textcircled{y = -4x + 8}$$

2B.)  $(5, -8)$   $(-7, 0)$

$$m = \frac{0 - (-8)}{-7 - 5} = \frac{8}{-12} = \frac{2}{3}$$

Always Reduce

$$-8 = 5\left(-\frac{2}{3}\right) + b$$

$$b = -\frac{14}{3}$$

$$-8 = -\frac{10}{3} + b$$

$$+\frac{10}{3} \quad +\frac{10}{3}$$

$$y = -\frac{2}{3}x - \frac{14}{3}$$

$$-\frac{14}{3} = b$$

Improper fraction  
Answer!

constraint — constricts or limits

linear extrapolation — line expand upon (extend)

- draw the line and based on the trend (slope) continue it to make a prediction.