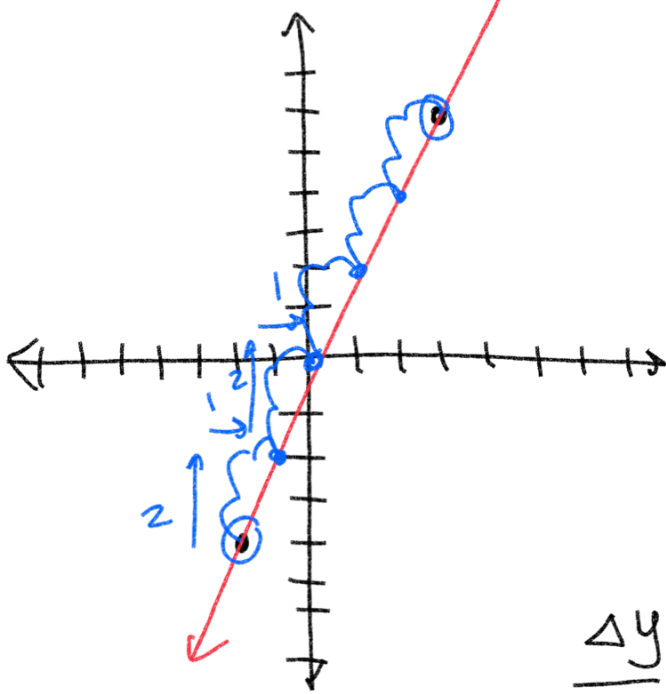


TH-A1 Algebra 1 Week 29 4/27

slope =  $\frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{\Delta y}{\Delta x}$  delta → change

slope =  $\frac{y_2 - y_1}{x_2 - x_1}$

$(x_1, y_1)$        $(x_2, y_2)$   
 $(-2, -4)$        $(3, 6)$



slope →  $\frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - (-4)}{3 - (-2)} = \frac{6 + 4}{3 + 2} =$

$\frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}} = \frac{2 \text{ up}}{1 \text{ over}} \quad \frac{10}{5} = \frac{2}{1}$

slope → ⊕ → up  
 ⊖ → down

slope =  $\frac{y_2 - y_1}{x_2 - x_1}$

$(-1, -3)$  and  $(5, 7)$

$\frac{7 - (-3)}{5 - (-1)} = \frac{7 + 3}{5 + 1} = \frac{10}{6} \stackrel{\div 2}{=} \frac{5}{3}$

$\frac{-3 - 7}{-1 - 5} = \frac{-10}{-6} \stackrel{\div -2}{=} \frac{5}{3}$

$(6, 9)$  and  $(-2, -7)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-7 - 9}{-2 - 6} = \frac{-16}{-8} = \frac{2}{1} = \boxed{2}$$

## Linear Equations

Slope-Intercept Form

$$y = m x + b$$

↑ slope                      ↑ y-intercept

slope =  $\frac{2}{3}$        $m = \frac{2}{3}$

y-int:  $4$        $y = 4$

$$\boxed{y = \frac{2}{3}x + 4}$$

$$y = mx + b$$

slope =  $-\frac{4}{3}$

y-int:  $-11$

$$\boxed{y = -\frac{4}{3}x - 11}$$

$$\begin{matrix} x & y \\ (-4, 2) \end{matrix} \text{ and } \begin{matrix} x & y \\ (0, 8) \end{matrix}$$

$$y = mx + b$$

1.) Find slope

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 2}{0 - (-4)} = \frac{6}{4} = \frac{3}{2}$$

$$m = \frac{3}{2}$$

2.) Use  $y = mx + b$

Solve for  $b$

$$(-4, 2)$$

$$x = -4$$
$$y = 2$$

$$y = \frac{3}{2}x + b$$
$$2 = \frac{3}{2}(-4) + b$$
$$2 = \frac{-12}{2} + b$$

$$2 = -6 + b$$
$$+b \quad +6$$

$$8 = b$$

$$m = \frac{3}{2}$$

$$y = mx + b$$

$$y = \frac{3}{2}x + 8$$

Find the linear equation

$$y = mx + b$$

$(1, 7)$  and  $(-2, 1)$   
 $x_1, y_1$        $x_2, y_2$   
1.) Find the slope

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 7}{-2 - 1} = \frac{-6}{-3} = 2$$

$$m = 2$$

2.) Find  $y = mx + b$  by solving for  $b$

$$(1, 7) \quad x = 1 \\ y = 7$$

$$y = mx + b \\ \downarrow \quad \downarrow \\ y = 2x + 5$$

$$y = 2x + b \\ \downarrow \quad \downarrow \\ 7 = 2(1) + b \\ 7 = 2 + b \\ -2 \quad -2$$

$$5 = b$$

Or.... Use point-slope form

$$(x_2 - x_1) m = \frac{y_2 - y_1}{\cancel{x_2 - x_1}} (\cancel{x_2 - x_1}) \quad y_2 - y_1 = m(x_2 - x_1) \\ y - y_1 = m(x - x_1)$$

$(1, 7)$

$(-2, 1)$

$$m = 2$$

$$y - y_1 = m(x - x_1)$$

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

$$y - 1 = 2(x + 2)$$

$$y - 1 = 2x + 4$$

$$+1 \qquad +1$$

$$y = 2x + 5$$