TH-A1 Algebra 1 Week 29 4/25

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

change "delta"

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

(x_1, y_1) (x_2, y_2)

$(-2, -4)$ $(3, 6)$

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \left[\frac{y_2 - y_1}{x_2 - x_1}\right] = \frac{6 - (-4)}{3 - (-2)} = \frac{6+4}{3+2} = \frac{10}{5}$$

$$= \boxed{2}$$

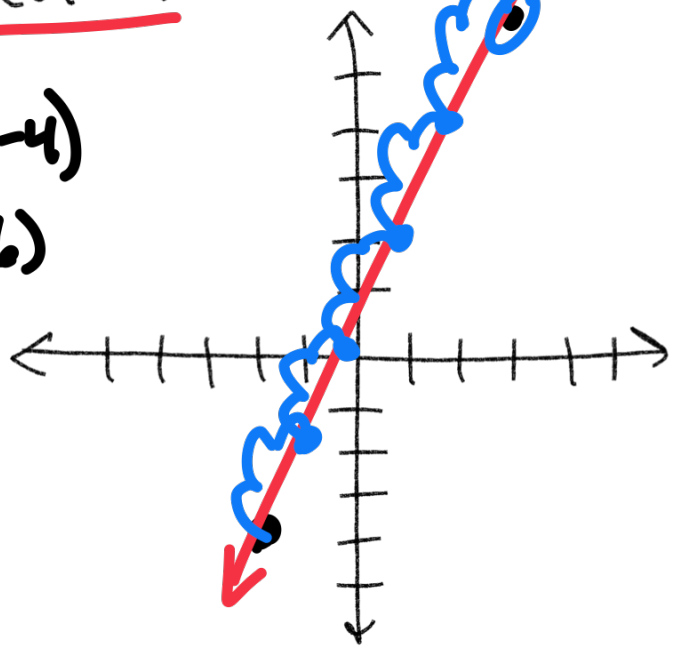
Order does not matter —

But... y's on top and ordered pairs in column.

$$\frac{-4 - 6}{-2 - 3} = \frac{-10}{-5} = \boxed{2}$$

(-2,-4)

(3,6)



$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{2}{1}$$

up 2

1 right

Find the slope: $(-1,-3)$ and $(5,7)$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7-(-3)}{5-(-1)} = \frac{7+3}{5+1} = \frac{10}{6} \overset{\div 2}{=} \boxed{\frac{5}{3}}$$

Find the slope: $(6,9)$ and $(-2,-7)$

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

Linear Equations

Slope – Intercept Form

$y = mx + b$ (m: slope, b: y-intercept)

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

y-int $= 4 = b$

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

$y = mx + b$

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

y-int $= -11 = b$

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

{(-4, 2) and (0, 8)} Find the equation with these two points.

x y x y

1.) Find the slope (m)

$y = mx + b$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2-8}{-4-0} = \frac{-6 \div -2}{-4 \div -2} = \frac{3}{2} = m$$

2.) Find the y-int (b)

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

$y = mx + b$

$8 = \frac{3}{2}(0) + b$

$8 = b$

choose a point

(0, 8)

x y

3.) Plug in

$y = mx + b$

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

Find the linear equation with the points:

$\{(1, 7)$ and $(-2, 1)\}$

1.) Find the slope.

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

2.) Find the y-int. by choosing a point.

$y = mx + b$

$x = 1$
$y = 7$

$(1, 7)$
$x \quad y$
$y = mx + b$
$7 = (2)(1) + b$
$7 = 2 + b$
$-2 \quad -2$
$\boxed{5 = b}$

$(-2, 1)$
$x = -2$
$y = 1$
$y = mx + b$
$1 = (2)(-2) + b$
$1 = -4 + b$
$+4 \quad +4$
$\boxed{5 = b}$

3.) Plug int $y = mx + b$

$m = 2$
$b = 5$

$$\boxed{y = 2x + 5}$$

Slope-Intercept $y = mx + b$

or... use point-slope form

$$(x_2 - x_1)m = \frac{y_2 - y_1}{x_2 - x_1}(x_2 - x_1)$$

$$y_2 - y_1 = m(x_2 - x_1)$$

$$\boxed{y - y_1 = m(x - x_1)}$$

point-slope form

From previous problem

$(1, 7)$ and $(-2, 1)$

slope $= 2$

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

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

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

$y - 1 = 2x + 4$

$+1 \qquad +1$

$\boxed{y = 2x + 5}$

Find the equation (2, 6) (4, -8)

1.) Find slope

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-8-6}{4-2} = \frac{-14}{2} = \boxed{-7}$$

2.) slope-intercept or point-slope

$y = mx + b$

$6 = (-7)(2) + b$

$6 = -14 + b$

$+14 \quad +14$

$20 = b$ $\quad m = -7$

$y = mx + b$

$\boxed{y = -7x + 20}$

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

$y - 6 = -7(x - 2)$

$y - 6 = -7x + 14$

$+6 \qquad +6$

$\boxed{y = -7x + 20}$