

# Equations of Lines

$y = mx + b$  is slope-intercept form

$m = \text{slope}$

$b = \text{y-int}$

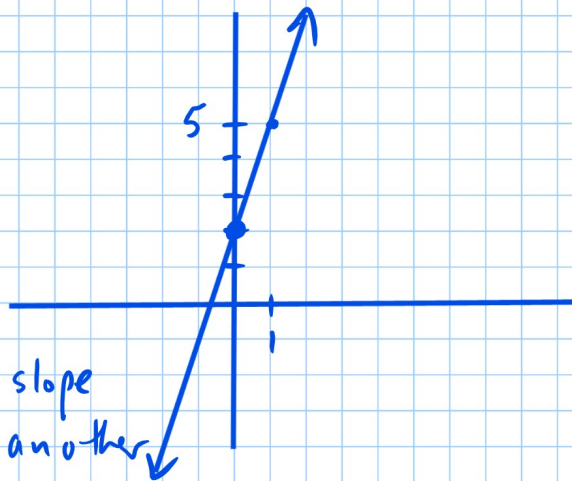
$$y = 3x + 2$$

$$m = \frac{3}{1} \quad \text{y-int} = 2$$

Plot y-int

From y-int, use slope to locate another point.

Connect dots



How do we find the equation of a line if we're given 2 points.

ex:  $(3, -1)$  and  $(1, -11)$

$$y = \frac{m}{\frac{m}{x}} x + \frac{b}{\frac{b}{y}}$$

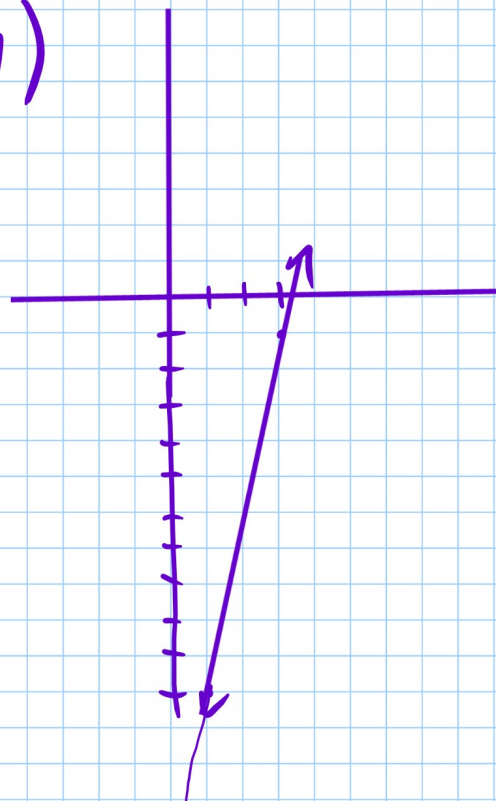
$$m = \frac{\text{change in } y}{\text{change in } x} = \frac{-11 - (-1)}{1 - 3} = \frac{-11 + 1}{-2}$$

$$-1 = 5 \cdot (3) + b$$

$$-1 = 15 + b$$

$$\begin{array}{r} -1 \\ -15 \\ \hline -16 \end{array}$$

$$m = \frac{-10}{-2} = 5$$



$$-16 = b$$

$$y = 5x - 16$$

1) (6,1) and (8,-4)

STEP 1: Find  $m$

$$m = \frac{-4 - 1}{8 - 6} = -\frac{5}{2}$$

STEP 2: Plug one of the points in with the slope to find  $b$ .

$$1 = -\frac{5}{2} \cdot 6 + b$$

$$\begin{array}{r} 1 = -15 + b \\ +15 \quad +15 \\ \hline 16 = b \end{array}$$

STEP 3: Write in  $y = mx + b$  form

$$y = -\frac{5}{2}x + 16$$

5) (7,1) and (7,8)

$$m = \frac{8 - 1}{7 - 7} = \frac{7}{0} \text{ undefined}$$

