

Linear Function: (slope-intercept form)
 $y = mx + b$

m (slope): $\frac{\text{rise}}{\text{run}}$

b: y-intercept

Formula: $\frac{y_2 - y_1}{x_2 - x_1}$ (rise)
 (run)

(where the line intersects y-axis)

* If lines have the Same slope, then they are parallel.

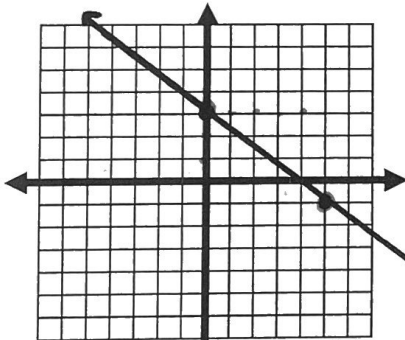
* Lines are perpendicular if their slopes are opposite reciprocals
 * form right angles

Ex: $\frac{1}{2} \rightarrow \frac{-2}{1}$; $\frac{-4}{3} \rightarrow \frac{3}{4}$
 $5 \rightarrow \frac{-1}{5}$

Examples:

Identify the slope given a graph or two coordinates:

1.



$m = \frac{4}{-5}$

$m = -\frac{4}{5}$

2. $(10, 2)$ and $(8, 1)$

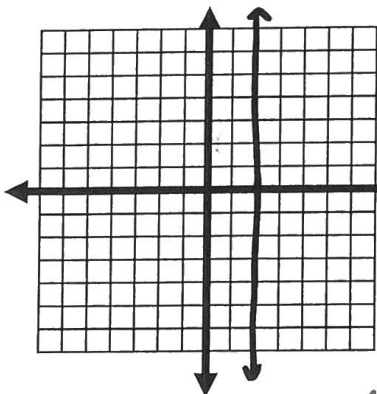
* Use slope Formula $\frac{y_2 - y_1}{x_2 - x_1}$

$\frac{1 - 2}{8 - 10} = \frac{-1}{-2} = \frac{1}{2}$

* Pick 2 points & count rise over run.

Identify the slope for a vertical & horizontal line:

3.

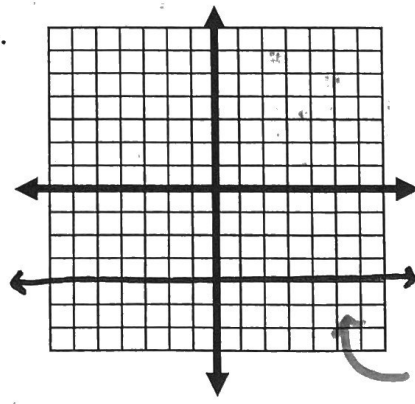


$x = \#$

$x = 2$

$m = \text{undefined}$

4.



$y = mx + b$
 $y = 0(x) + b$
 $y = b$
 or
 $y = \#$

$y = -4$

$m = \text{zero}$

5. Identify the slope that would create a line that is parallel to the given line:

$$y = \frac{1}{2}x + 3$$

* Same
Slope

$$m = \frac{1}{2}$$

6. Identify the slope that would create a line that is perpendicular to the given line:

$$y = -2x + 5$$

* Opposite
reciprocals

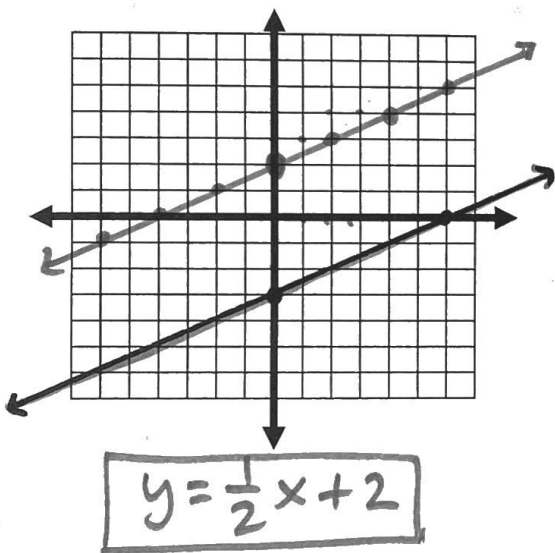
Current

line slope: $\underline{\underline{-2}}$

New

line slope: $\underline{\underline{\frac{1}{2}}}$

7. Identify a line that is parallel and passes through $(0, 2)$. *



We need same slope bc we want them to be \parallel .

$$m = \frac{3}{6} = \boxed{\frac{1}{2}}$$

Equation of new line:

$$y = mx + b$$

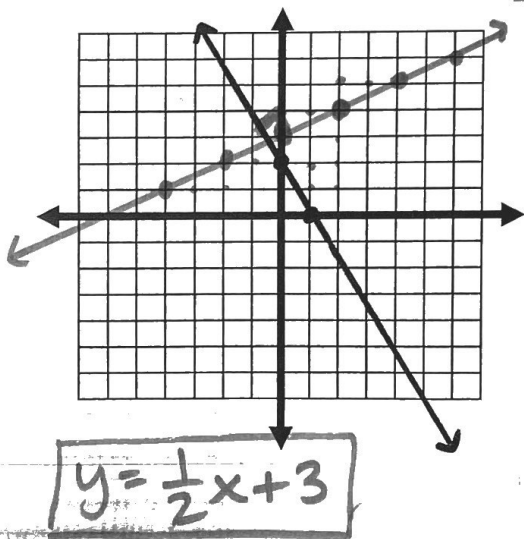
$$2 = \frac{1}{2}(0) + b$$

$$\underline{\underline{2 = b}}$$

$$m = \frac{1}{2} \quad (0, 2)$$

x y

8. Identify a line that is perpendicular and passes through $(2, 4)$. *



- we need slopes to be opposite reciprocals of each other.

- slope of old line: $m = -2$

- slope of new line: $m = \frac{1}{2}$

$$y = mx + b$$

$$4 = \frac{1}{2}(2) + b$$

$$4 = 1 + b$$

$$\underline{\underline{-1 = -1}}$$

$$m = \frac{1}{2} \quad (2, 4)$$

x y

$$\underline{\underline{3 = b}}$$