6.4 Slope-Intercept Form of the Equation for a Linear Function

Slope-Intercept Form of the Equation of a Linear Function

The equation of a linear function can be written in the form $\underline{y = mx + b}$

where $m = \underline{\text{slope} \left(\frac{\text{rise}}{\text{run}}\right)}$ and $b = \underline{\text{y-intercept (where graph crosses the y-axis)}}$

Example 1: Graph the linear function with the equation: $y = \frac{1}{2}x + 3$

m b

Steps:

i) Determine the slope, **m**

$$m = \frac{1}{2} \rightarrow \text{rise} \\ \phantom{m = \frac{1}{2}} \rightarrow \text{run}$$

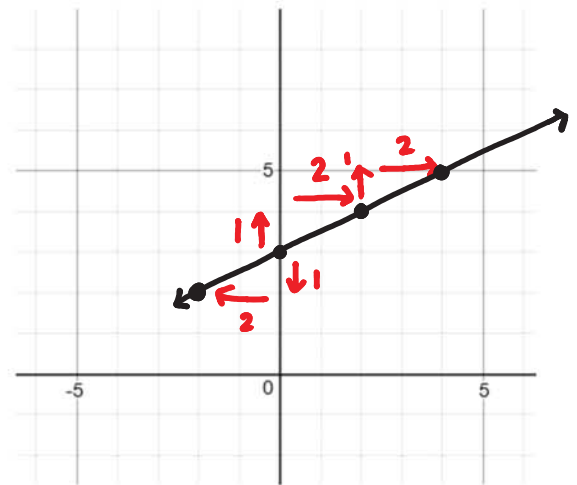ii) Determine the **y** - intercept, **b**

$$b = 3 \; ; \; \text{or} \; (0,3)$$

iii) Plot the **y** - intercept.

iv) **From the y -intercept**, use the slope to plot the other points on the line.

$$m = \frac{1}{2} \rightarrow \text{up} \\ \phantom{m = \frac{1}{2}} \rightarrow \text{right}$$

v) Draw a line through the points.

★ can do the reverse movements
$$\frac{-1}{-2} \rightarrow \text{down} \\ \phantom{\frac{-1}{}} \rightarrow \text{left}$$

Example 2: Write an equation to describe this function. ~~verify the equation~~
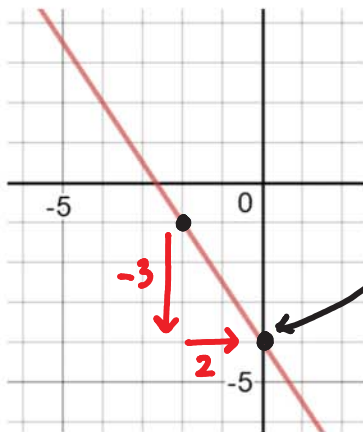
$$y = mx + b$$

Use the graph to find "m" and "b"

y-intercept ; $b = -4$

slope; $m = \frac{\text{rise}}{\text{run}} = -\frac{3}{2}$

$$y = -\frac{3}{2}x + (-4) \Rightarrow \boxed{y = -\frac{3}{2}x - 4}$$

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Example 3: Graph the lines represented by each equation. State the slope and the y – intercept of each function.

make the numerator negative

a) $y = \frac{1}{3}x - 4$

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

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

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

the coeff. is 1

c) $y = x + 4$

$m = \underline{\quad \frac{1}{1} \quad}$ $b = \underline{\quad 4 \quad}$

d) $y = 2$ } *y must always be 2 but x can be anything*

$m = \underline{\text{no slope}}$ $b = \underline{\quad 2 \quad}$
         (0)
                    horizontal line

e) $x = -3$ } *x must always be -3 by y can be anything*

$m = \underline{\text{undifined}}$ $b = \underline{\text{none}}$
    vertical line