

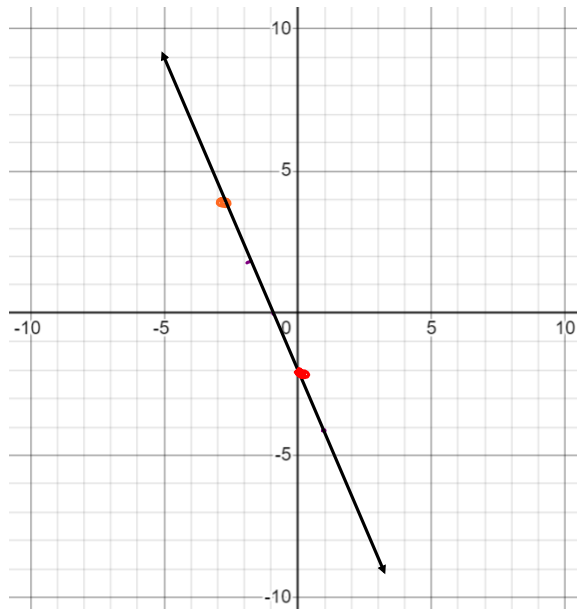
## MTH1W Grade 9 Mathematics

**4.4 Equations of Lines Using Slope and a Point**

- Goal(s)**
- To sketch the graph of a line given its slope and a point on the line.
  - Write the equation of a line in  $y = mx + b$  form using a graph constructed from the line's slope and a point on the line.

A line has a slope of  $-2$  and passes through the point  $(-3, 4)$ .

- Use the given point and slope to sketch a graph of the line.
- Use the graph to identify the  $y$ -intercept.
- Using the slope and  $y$ -intercept, write the equation of the line in  $y = mx + b$  form.



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

A line with a slope of  $2$  passes through the point  $(5, 12)$ .

Write the equation of the line in  $y = mx + b$  form with the given slope substituted for  $m$ .

$$y = 2x + b$$

Re-write the above equation with the coordinates of the given point substituted for  $x$  and  $y$ .

$$12 = 2(5) + b$$

Solve the equation to determine the line's  $y$ -intercept.

$$12 = 2(5) + b$$

$$12 = 10 + b$$

$$2 = b$$

Write the equation of the line.

$$\Rightarrow y = 2x + 2$$

Find the equation of a line with a slope of  $-\frac{3}{5}$  that passes through the point  $(-10, 0)$ .

$$m = -\frac{3}{5} \quad (x, y) = (-10, 0)$$

Sub into  $y = mx + b$

$$0 = -\frac{3}{5}(-10) + b$$

$$0 = 6 + b$$

$$0 - 6 = 6 + b - 6$$

$$-6 = b$$

Equation is  $y = -\frac{3}{5}x - 6$

Jimmy rented a bike for **10 hours** that **cost** him **\$35**. The rental company charges **\$2 per hour** and a **fixed amount** that Jimmy can't remember.

Determine the **fixed amount** charged and write an equation to model the situation.

$$R \text{ of } C = 2 \quad (x, y) = (10, 35)$$

$$y = mx + b$$

$$35 = 2(10) + b$$

$$35 = 20 + b$$

$$35 - 20 = 20 + b - 20$$

$$15 = b \Rightarrow \text{Fixed amount} = \$15$$

What would it have **cost** Jimmy if he had rented the bike for **38 hours**?

The equation is  $y = 2x + 15$

$$y = 2(38) + 15$$

$$y = 76 + 15$$

$$y = 91 \Rightarrow \text{Costs } \$91$$