EQUATION REVIEW:
- Slope \( m = \frac{y_2 - y_1}{x_2 - x_1} \)
- Equation of a Line \( y = mx + b \)

EXAMPLE 1: IDENTIFY THE SLOPE AND Y-INTERCEPT:
a)
\[
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 5}{6 - 0} = -5
\]
Equation: \( y = \frac{2}{3}x - 5 \)
b)
\[
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 3}{3 - 0} = \frac{2}{3}
\]
Equation: \( y = \frac{5}{3}x + 3 \)

c)
\[
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 4}{2 - 0} = 0
\]
Equation: \( y = 4 \)
d)

Look at the graph. What do you notice about the x-intercept? (x-intercept is where y=0)
\[
m = \frac{1 - 0}{0 - 0}
\]
Equation: \( x = 2 \)

m = undefined
GRAPH A LINE GIVEN m AND b:

a) \( m = \frac{3}{4}, b = -2 \)
- substitute the slope and y-intercept into the equation \( y = mx + b \)
  \[ y = \frac{3}{4}x + b \]

b) \( m = -3, b = 0 \)
- substitute the slope and y-intercept into the equation \( y = mx + b \)
  \[ y = -3x + 0 \]

INTERPRET A LINEAR RELATIONSHIP:

- Identify the slope and y-intercept from the graph and explain what they mean. Write an equation to describe the relationship.

  \[ \text{Slope} \quad m = \frac{y_2 - y_1}{x_2 - x_1} \]
  \[ \text{y-intercept} \quad b = 5m \]

- Tracy began walking 5m from the sensor. Her speed was \(-\frac{1}{2}\) m/s towards the sensor.

\[ m = \frac{-5}{10} = -\frac{1}{2} \]

- Equation: \( y = -0.5x + 5 \)

- Identify the slope and y-intercept from the graph and explain what they mean. Write an equation to describe the relationship.

  \[ \text{Slope} \quad m = \frac{y_2 - y_1}{x_2 - x_1} \]
  \[ \text{y-intercept} \quad b = 6 \]

- the tomato plant was 6cm tall when it was planted. The tomato plant grew 4cm/week.

\[ m = \frac{14 - 6}{2 - 0} = \frac{8}{2} = 4 \]

- Equation: \( y = 4x + 6 \)
Practice Questions

1. Identify the slope and the $y$-intercept of each line.
   a) $y = 3x - 2$
   b) $y = -2x + 4$
   c) $y = \frac{3}{4}x - 5$
   d) $y = -\frac{2}{5}x$
   e) $y = 2x - \frac{1}{3}$
   f) $y = 5$

2. Find the slope and $y$-intercept of each line.
   a) 
   b) 

3. Write the equation of each line in question 2.

4. Find the slope and $y$-intercept of each line.
   a) 

5. Write the equation of each line in question 4.

6. Identify the slope and $y$-intercept of each line, if they exist.
   a) $y = 2$
   b) $x = 3$
   c) $y = -4$
   d) $x = -1$
1. a) slope = 3, y-intercept = -2
   b) slope = -2, y-intercept = 4
e) slope = \frac{3}{4}, y-intercept = -5
d) slope = \frac{-2}{5}, y-intercept = 0
f) slope = 0, y-intercept = 5

2. a) slope = 2, y-intercept = 1
c) slope = 0, y-intercept = 0, x-intercept = all real numbers

3. a) \( y = 2x + 1 \)
   b) \( y = -3x - 2 \)

4. a) slope = \frac{2}{3}, y-intercept = -2
   c) x-intercept = 0

5. a) \( y = \frac{2}{3}x - 2 \)
   b) \( y = -\frac{3}{4}x + 3 \)

6. a) slope = 0, y-intercept = 2
   b) slope = undefined, y-intercept = none, x-intercept = 3
c) slope = 0, y-intercept = -4
d) slope = undefined, y-intercept = none, x-intercept = -1

7. a) slope = 0, y-intercept = 1
   b) slope = undefined, y-intercept = none, x-intercept = -2

e) slope = 2, y-intercept = -\frac{1}{3}

8. a) \( y = 1 \)
   b) \( x = -2 \)
c) \( y = 0 \)
   d) \( x = 0 \)

9. \( \frac{x}{a} + \frac{y}{b} = 1 \)

10. a) \( y = \frac{2}{5}x - 1 \)
    b) \( y = -\frac{2}{3}x + 2 \)
   c) \( y = -2 \)
    d) \( x = 3 \)

11. [Tasks related to finding the equation of a line with given information]

Write the equation of each line in the form \( y = \frac{a}{b}x + c \).

Find the x-intercept and the y-intercept of each line.

Any x-intercept is 0.
The value of the x-coordinate for a graph crossing the x-axis.
The x-intercept is the point where a graph crosses the x-axis.
The x-intercept is the x-coordinate of the point.

Any y-intercept is 0.
The value of the x-coordinate for a graph crossing the y-axis.
The y-intercept is the point where a graph crosses the y-axis.
The y-intercept is the y-coordinate of the point.

\( \frac{x}{a} = 0, y-intercept = none, x-intercept = \frac{a}{b} \)

Write the equation of each line.

10. The slope and the y-intercept are given.