Point-Point Form of a Line
Preliminaries

- The Slope of a Line
- Point-Slope Form of a Line

Objectives

- Find the equation of a line, given two points on the line
Example 1

Point-Point Form of a Line

\[ m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3}{5} \]

\[ \Rightarrow y - y_1 = m(x - x_1) \]

\[ y - 4 = \frac{-3}{5}(x + 2) \]

\[ y = \frac{-3}{5}x - \frac{6}{5} + 4 \]

\[ y = \frac{-3}{5}x + \frac{14}{5} \]
Example 1

The point-point form of a line can be found using the formula:

\[ m = \frac{y_2 - y_1}{x_2 - x_1} \]

Given the points \((-2, 4)\) and \((3, 1)\), we can calculate the slope as follows:

\[ m = \frac{1 - 4}{3 - (-2)} = \frac{-3}{5} \]
Example 1

\( m = \frac{1 - 4}{3 - (-2)} = -\frac{3}{5} \)

\( y - 4 = -\frac{3}{5}(x + 2) \)
Example 1

\[
m = \frac{1 - 4}{3 - (-2)} = -\frac{3}{5}
\]

\[
y - 1 = -\frac{3}{5}(x - 3)
\]
To find the equation of a line, given two points,

- Find the slope using the slope formula
- Find the equation using the point-slope equation of a line
Intercept-Intercept Form

Point-Point Form of a Line

\[ m = \frac{0 - b}{a - 0} = -\frac{b}{a} \]

\[ y - b = -\frac{b}{a}(x - 0) \]
Intercept-Intercept Form

\[ m = \frac{0 - b}{a - 0} = -\frac{b}{a} \]

\[ y - b = -\frac{b}{a}(x - 0) \]

\[ y = -\frac{b}{a}x + b \]
Intercept-Intercept Form

\[ m = \frac{0 - b}{a - 0} = -\frac{b}{a} \]

\[ y - b = -\frac{b}{a}(x - 0) \]

\[ y = -\frac{b}{a}x + b \]

\[ y - 0 = -\frac{b}{a}(x - a) \]
Example 1

\[ y - 4 = -\frac{3}{5}(x + 2) \]  
\[ y - 1 = -\frac{3}{5}(x - 3) \]
Example 1

\[ y - 4 = -\frac{3}{5}(x + 2) \]
\[ y - 4 = -\frac{3}{5}x - \frac{6}{5} \]
\[ y = -\frac{3}{5}x - \frac{6}{5} + 4 \]
\[ y = -\frac{3}{5}x - \frac{6}{5} + \frac{20}{5} \]
\[ y = -\frac{3}{5}x + \frac{14}{5} \]

\[ y - 1 = -\frac{3}{5}(x - 3) \]
\[ y - 1 = -\frac{3}{5}x + \frac{9}{5} \]
\[ y = -\frac{3}{5}x + \frac{9}{5} + 1 \]
\[ y = -\frac{3}{5}x + \frac{9}{5} + \frac{5}{5} \]
\[ y = -\frac{3}{5}x + \frac{14}{5} \]