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Module 8 Writing Linear Equations of Two Variables
Lesson 1 Finding Slope

guided notes

Lesson Objectives

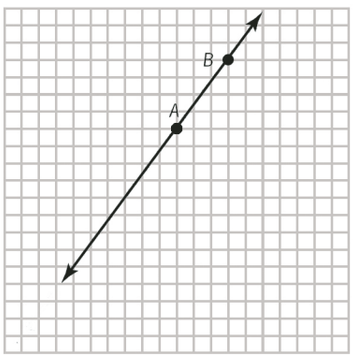
- Find the slope of a line given the graph of the line.
- Find the slope of a line given two points on the line.
- Find the slope of horizontal and vertical lines.

In mathematics, the measure of the steepness of a line is called its slope.

The slope is the ratio rise to run.

1 Use $\frac{\text{rise}}{\text{run}}$ to find the slope. $m = \frac{4}{3}$

The slope of a line through (x_1, y_1) and (x_2, y_2) is slope $m = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$.



Remember that "rise" is the vertical change between points or the difference in the y-values, and "run" is the horizontal change or difference in the x-values of two points. The formula for finding the slope of any line is the quantity $y_2 - y_1$ divided by the quantity $x_2 - x_1$. When we name a point (x_1, y_1) and another (x_2, y_2), we are using what is known as subscript notation.

2 Use the formula to find the slope of the line passing through the points (7, –7) and (–4, 4). $m = -1$

The slope of any horizontal line is zero because the difference in the y-coordinates is zero.

The slope of any vertical line is undefined because the difference in the x-coordinates is zero.

3 Find the slope of the line passing through the points (7, 5) and (7, 6).

undefined

Nonvertical parallel lines have **equal** slopes.

Vertical parallel lines have undefined slopes.

The slopes of nonvertical perpendicular lines are **negative** reciprocals.

4 Find the slope of a line parallel to the line passing through the points (3, 5) and (6, 1). $m = -\frac{4}{3}$

Today we have studied the following characteristics of slope:

- Slope $= \frac{\text{rise}}{\text{run}}$
- The slope can be found from any two points, (x_1, y_1) and (x_2, y_2), on a line.
- Slope $m = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$
- Slope of a horizontal line is equal to zero.
- Slope of a vertical line is undefined.
- Slopes of nonvertical parallel lines are equal.
- Slopes of nonvertical perpendicular lines are negative reciprocals.