8.8 (Page 305) Slope

Lines in a coordinate plane have steepness. In mathematics, the steepness of a line is called its SLOPE.

The vertical change is called the "change in y", and the horizontal change is called the "change in x".

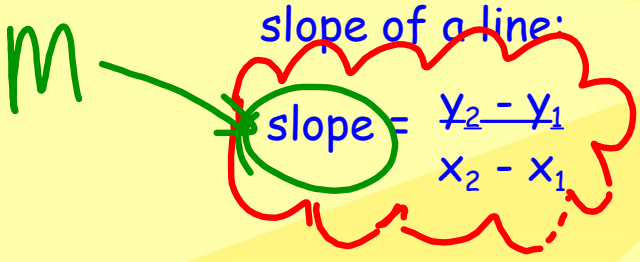
Thus, the slope can be expressed as a ratio (fraction):

$$\text{slope} = \frac{\text{change in y}}{\text{change in x}}$$

8.8 (Page 305) Slope

The slope of a line can be determined by using the coordinates of any two points on the line. The "change in y" can be found by subtracting the y-coordinates. Likewise, the "change in x" can be found by subtracting the corresponding x-coordinates.

This gives us the following formula for finding the slope of a line:



8.8 (Page 305) Slope

Special Slopes

In the last section, we discussed the graphs of vertical and horizontal lines and what their corresponding equations looked like.

The slope of a horizontal line (y = a number) is 0.

The slope of a vertical line (x = a number) is "no slope".

8.8 (Page 305) $m = \frac{y_2 - y_1}{x_2 - x_1}$ Slope

Example: Find the slope of the line that contains each pair of points.

a.) $(-4, -2)$ $(5, 3)$ — $x_1\ y_1$ $x_2\ y_2$

$$m = \frac{3 + +2}{5 + +4} = \boxed{\frac{5}{9}}$$

b.) $(1, 4)$ $(5, -2)$ — $x_1\ y_1$ $x_2\ y_2$

$$m = \frac{-2 - 4}{5 - 1} = \frac{-6}{4} = \boxed{\frac{-3}{2}}$$

8.8 (Page 305) $m = \frac{y_2 - y_1}{x_2 - x_1}$ Slope

Example: Find the slope of the line that contains each pair of points.

c.) $(0, 7)$ $(5, 1)$ $x_1\ y_1$ $x_2\ y_2$

$$m = \frac{1 - 7}{5 - 0} = \boxed{\frac{-6}{5}}$$

d.) $(-3, 4)$ $(-2, -2)$ $x_1\ y_1$ $x_2\ y_2$

$$m = \frac{-2 - 4}{-2 + 3} = \frac{-6}{1} = \boxed{-6}$$

8.8 (Page 305) $m = \frac{y_2 - y_1}{x_2 - x_1}$ Slope

Example: Find the slope of the line that contains each pair of points.

e.) $(-2, 3)$ $(-2, -1)$ $x_1\ y_1$ $x_2\ y_2$

$$m = \frac{-1 - 3}{-2 + 2} = \frac{-4}{0}$$

$$\boxed{\text{NO SLOPE}}$$

f.) $(3, 1)$ $(0, 1)$ $x_1\ y_1$ $x_2\ y_2$

$$m = \frac{1 - 1}{0 - 3} = \frac{0}{-3} = \boxed{0}$$

8.8 Using the Slope to Graph.notebook