

4.1 notes

Friday, September 25, 2020 1:18 PM

Foundations and Precalculus 10

4.1 Slope of a Line

The SLOPE of a line describes how steep the line.

<p>No steepness</p>	<p>Increasing from <u>left to right</u></p>	<p>So steep you're vertical!</p>	<p>Decreasing from <u>left to right</u></p>
Slope = zero = 0	Slope = positive	Slope = undefined	Slope = negative

The slope can also be defined as the $\frac{\text{rise}}{\text{run}}$ to go from one point to another on the line.

slope

$$m = \frac{\text{rise}}{\text{run}}$$

Ex.1: Use the points given to determine the slope of each line.

$m = \frac{\text{rise}}{\text{run}}$ $m = \frac{+1}{+6}$	<p>a)</p>	<p>c)</p>	$m = \frac{\text{rise}}{\text{run}}$ $m = \frac{-7}{6}$ $m = -\frac{7}{6}$
$m = \frac{\text{rise}}{\text{run}}$ $m = \frac{+5}{+5}$ $m = \frac{1}{1}$	<p>b)</p>	<p>d)</p>	$m = \frac{\text{rise}}{\text{run}}$ $m = \frac{0}{3}$ $m = 0$ <p>(horizontal line)</p>

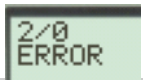
e) What is the slope of a vertical line?

rise = 2
run = 0

* m = undefined

$m = \frac{2}{0} = \text{undefined}$

check in your calculator:



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Sometimes you are only given the coordinates of points on a line and asked to determine the slope.

Graph. *Coord. rates*

variable 'm' is used to represent slope.

Slope formulas:

$$m = \frac{\text{rise}}{\text{run}}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Ex.2: Find the slope of the lines that pass through the following points.

a) $(-5, 4)$ and $(3, -1)$
 ① ②

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

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

$$m = \frac{-5}{8}$$

$$m = -\frac{5}{8}$$

b) $(4, 5)$ and $(4, -4)$
 ② ①

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{(5) - (-4)}{(4) - (4)}$$

$$m = \frac{9}{0}$$

$$m = \text{undefined}$$

Ex.3: The slope of a line segment is $\frac{1}{2}$ and passes through the points $(k, 6)$ and $(-1, 2)$. Find the value of k.

$$\frac{1}{2} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\left(\frac{1}{2}\right) = \frac{(2) - (6)}{(-1) - k}$$

$$\frac{1}{2} = \frac{-4}{-1 - k}$$

$$-8 = -1 - k$$

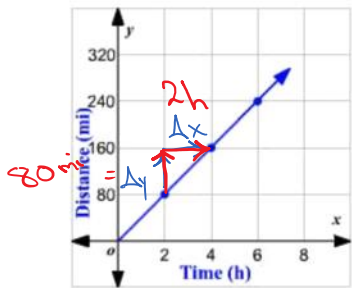
$$-7 = -k$$

$$7 = k$$

$$k = 7$$

- Steps:
- ① label coordinates
 - ② sub into $m = \frac{y_2 - y_1}{x_2 - x_1}$
 - ③ simplify
 - ④ cross-multiply
 - ⑤ solve for missing coordinate.

Practical applications of slope:



$$\text{rate of change} = \frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}} = \frac{80 \text{ mi}}{2 \text{ h}}$$

$$= 40 \text{ mi/h}$$

$$= 40 \text{ mph}$$

HW p339 #5-7,9,13a,22