

Example 1 Classify the Slope of a Line

The North Shore in Vancouver is popular for hiking and biking. Bridges and stunt structures on trails are complex and often extremely challenging. They have a huge variety of slopes. Classify each slope marked on the photographs as either positive or negative.



Positive Negative Negative

Example 2 Determine the Value of a Slope

When discussing a roof truss, carpenters refer to the *span* instead of the *width*. They talk about the *pitch* rather than the *slope*. Determine the pitch of the roof supported by the truss shown. Explain the meaning of your answer.



pitch = $\frac{\text{rise}}{\text{run}} = \frac{10 \text{ ft}}{24 \text{ ft}} = \frac{5}{12}$ Every 5 ft of vertical change you move 12 ft in horizontal distance.

Example 3 Determine the Slope of a Line Segment

What is the slope, m , of each line segment with the given end points?

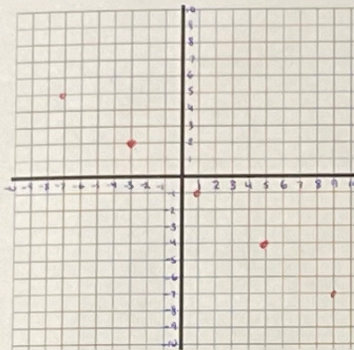
- $S(-3, 6)$ and $T(5, 2)$
- $H(4, 3)$ and $K(4, 8)$
- $M(-9, -7)$ and $N(-1, -7)$

Example 4 Use Slope to Graph a Line

The point $(-3, 2)$ is on a line that has a slope of $-\frac{3}{4}$. List three other points on the line. Graph the line.

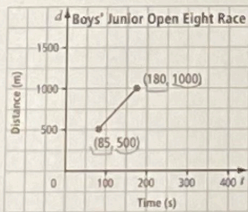
$$\frac{-\Delta y}{\Delta x} \rightarrow \frac{-3}{4}$$

- $(-7, 5)$
- $(1, -1)$
- $(5, -4)$
- $(9, -7)$



Example 5 Slope as a Rate of Change

The Brentwood Regatta in Mill Bay, BC, is the largest junior rowing regatta hosted by a single school in North America. The races are all 1500 m in length. The graph shows the approximate times at the 500-m mark and the 1000-m mark for one of the boys' races. Determine the average rate of change for this portion of the race.



$$\frac{\Delta y}{\Delta x} = \frac{1000 - 500}{180 - 85} \rightarrow \frac{500}{95 \text{ s}}$$



= Rate of change is 5.26 m/s

6.5 Slope

Types of Slopes:

Positive ↗ Negative ↘ Zero → Undefined ↑

How to Calculate Slope

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

$$= \frac{\Delta y}{\Delta x}$$

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

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

Ex 3. a) slope = $\frac{\Delta y}{\Delta x} = \frac{-4}{8}$ b) slope = $\frac{\Delta y}{\Delta x}$

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

$$= \frac{2 - 6}{5 - (-3)} = \text{negative} \quad = \frac{8 - 3}{4 - 4}$$

$$= \frac{8 - 3}{4 - 4}$$

c) Slope = $\frac{\Delta y}{\Delta x} = \frac{5}{0} \rightarrow$ undefined

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

$$= \frac{-7 - (-7)}{-1 - (-9)}$$

$$= \frac{-7 - (-7)}{-1 - (-9)}$$

$$= \frac{0}{8} \rightarrow \emptyset \text{ slope}$$

$$= \frac{0}{8} \rightarrow \emptyset \text{ slope}$$

$$= \frac{0}{8}$$

