Math 10

Section 7.0.1 (6.5)

Slope

bunny run

black ◇

Focus:

1. To be able to determine the slope of a line.
2. To be able to use slope to draw lines.
3. To be able to understand slope as a rate of change.
4. To be able to solve problems involving slope.

Curricular Competencies
B2 I can visualize to explore math
D2 I can connect math concepts to each other and to everyday life

Slope:

Slope measures the steepness of an incline or a decline. This is also referred to as a rate of change (those Science guys borrowing from math again ☺!)

$$\text{Rate of change} = \frac{\text{change vertically}}{\text{change horizontally}} = \frac{\Delta y}{\Delta x}$$

Slope is another way of measuring such a rate of change. Therefore, we can modify the definition slightly:

$$\text{Slope} = \text{rate of change} = \frac{\text{vertical}}{\text{horizontal}} = \boxed{\frac{\text{rise}}{\text{run}}}$$

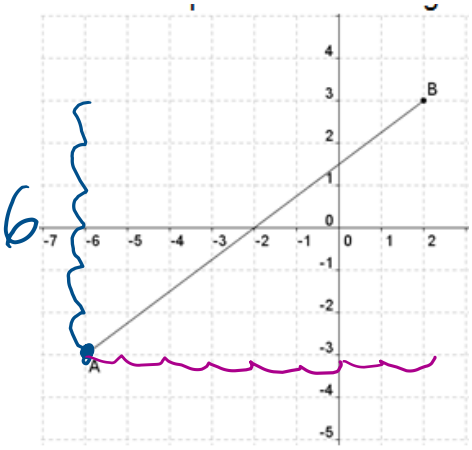
We commonly remember slope calculation as the following:

$$\text{slope} = m = \frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}} = \boxed{\frac{y_2 - y_1}{x_2 - x_1}}$$

Finding Slope of a Line

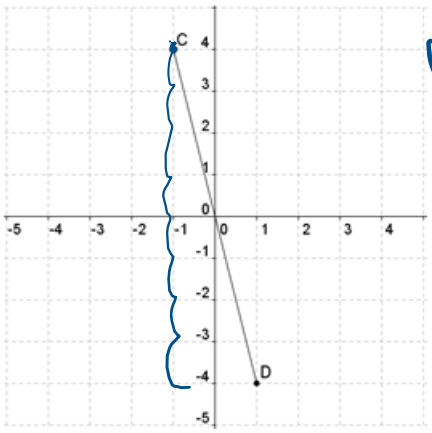
*read left to right

Determine the slope of the following line segments.



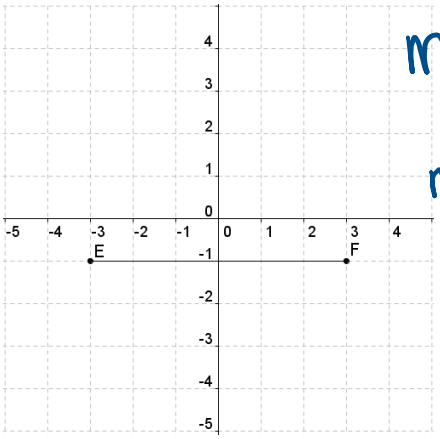
$\frac{\text{rise}}{\text{run}} = \frac{6}{8}$

$m = \frac{3}{4}$



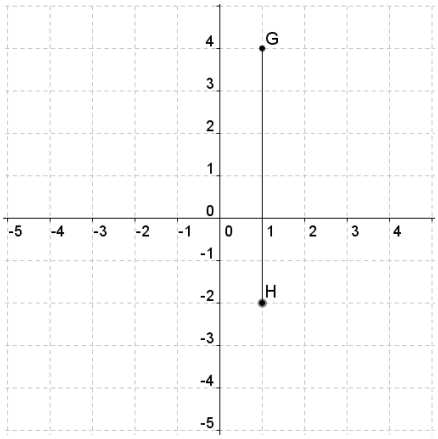
$m = \frac{-8}{2}$

$= -4$



$m = \frac{0}{6}$

$m = 0$



$m = \frac{6}{0}$

error

m = undefined

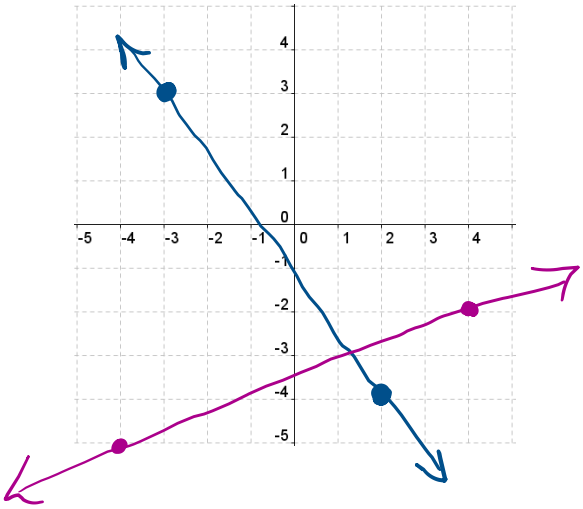
Draw a line segment with the given slope:

① pick a point

② follow $\frac{\text{rise}}{\text{run}}$

a. $-\frac{7}{5}$

b. $\frac{3}{8}$



Determine the slope of line segments with the following points:

a. M(-5,-1) and N(-1,-7)

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

$= \frac{-7 - -1}{-1 - -5}$

$= \frac{-6}{4} = \frac{-3}{2}$

b. J(7,5) and K(-3,-2)

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

$= \frac{5 - -2}{7 - -3}$

$= \frac{7}{10}$

c. A(6,-4) and B(9,5)

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

$= \frac{-4 - 5}{6 - 9}$

$= \frac{-9}{-3} = 3$

Find the value of y given that points C(-1,-3) and D(3,y) line on a single line segment with slope of $\frac{7}{4}$.

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

$\frac{7}{4} = \frac{-3 - y}{-1 - 3}$

$4 = -1 - 3$

$4 = -4$

neg

$7 = -3 - y$

$(10 = -y)(-1)$

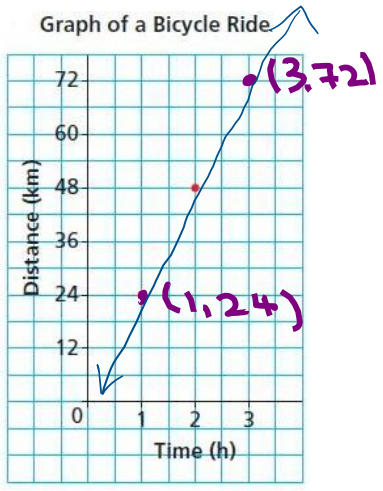
$-10 = y$

neg so that the neg cancel

$7 = -3 - -10$

$7 = 7$

Yvonne recorded the distances she had travelled at certain times since she began her cycling trip along the Trans Canada Trail in Manitoba, from North Winnipeg to Grand Beach. She plotted these data on a grid.



a. What is the slope of the line through these points?

$\frac{72 - 24}{3 - 1} = \frac{48}{2}$ $m = 24$

b. What does the slope mean?

her speed of 24 km/h

c. How far can Yvonne travel in 6 hours if she maintains her pace?

$24 \times 6 = 144$ km

d. How long did Yvonne take to travel 55km?

$24h = 55$

$h = 2.29$ hrs

Summary

Slope measures the steepness of an incline or decline. It can be calculated using:

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

If the slope is positive, the graph moves up from left to right. 

If the slope is negative, the graph moves down from left to right. 

If the change in y is zero, then the slope is zero and corresponds to a horizontal line.

If the change in x is zero, then the slope is undefined can corresponds to a vertical line.

Assign: P 325 1-6, 8-10, 12, 16, 17

#4 needs graph paper