

Slope (Rate of Change) Notes

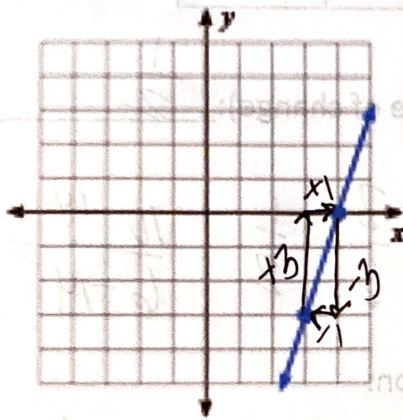
The *slope* or *rate of change* of a line or linear scenario tells us the change in the dependent variable each time the independent variable increases by one.

On a graph or in a table, we think of the slope (m) as the $\frac{\text{rise}}{\text{run}}$, which is the $\frac{\text{change in } y}{\text{change in } x}$. We calculate change by subtracting, so the formula you will see for slope at times is $\frac{y_2 - y_1}{x_2 - x_1}$ or $\frac{y_1 - y_2}{x_1 - x_2}$.

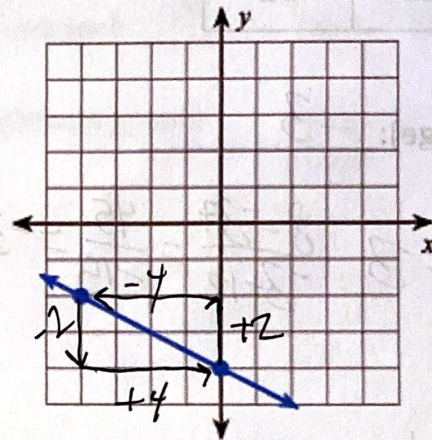
Let's see this in action.

Calculate the slope of the lines in the graphs. Show the work in more than one way.

A)



B)



Slope (rate of change): 3

(see start of work on graph)

Work:

$$\frac{3}{1} = 3 \quad \frac{-3}{-1} = 3$$

Explanation:

y (DV) increases by 3
when x (IV) increases
by 1.

Slope (rate of change): $-\frac{1}{2}$

(see start of work on graph)

Work:

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

Explanation:

y (DV) decreases by 1
when x (IV) increases
by 2.

Calculate the slopes of the lines represented by the point in the tables. Show the work in more than one way.

C)

x	y
4	-13
-3	8
12	-37
-11	32

Slope (rate of change): -3

Work:

$$\frac{-13-32}{4-11} = \frac{-45}{-15} = 3 \quad \frac{8-37}{-3-12} = \frac{-29}{-15} = -3$$

Explanation:

y decreases by 3 when x increases by 1.

D)

x	y
2	8
6	10
-4	5
14	14

Slope (rate of change): $\frac{1}{2}$

Work:

$$\frac{8-5}{2-4} = \frac{3}{-2} = -\frac{3}{2} \quad \frac{10-14}{6-14} = \frac{-4}{-8} = \frac{1}{2}$$

Explanation:

y increases by 1 when x increases by 2.
 (or y increases by $\frac{1}{2}$ when x increases by 1.)

For E and F, identify the slope (rate of change) in the word problem. Note: you won't actually be modeling the situation here, but the context gives you a better idea of whether your slope should be positive or negative.

E) Jaysen spends \$45 on supplies to make cookies, and plans to sell the cookies for \$1.50 each. Write an equation to model Jaysen's profit.

IQ and units: # of cookies sold

DQ and units: profit (\$)

Slope (rate of change): \$1.50/cookie

F) Augwenda is 700 miles from home and is driving home at an average rate of 50 miles per hour. Write an equation to model Augwenda's distance from home.

IQ and units: # of hours

DQ and units: distance from home (miles)

Slope (rate of change): -50 miles/hour