Name: Key Block _____ Date _____

Essential Question:

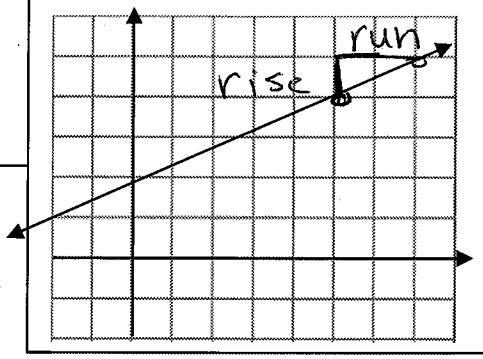
WHAT IS SLOPE?

WORDS:

The "steepness" of a line

aka "rate of change"

GRAPH:



FORMULA:

$\frac{\text{rise}}{\text{run}}$ or $\frac{y_2-y_1}{x_2-x_1}$ or $\frac{\Delta y}{\Delta x}$

* Do the same order for "x" as you do for "y"!

ex. (7,3) (2,4)

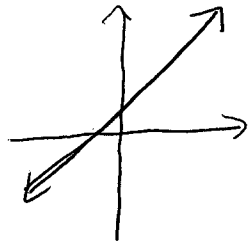
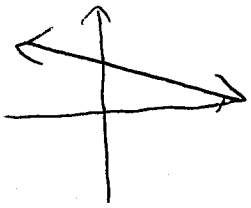
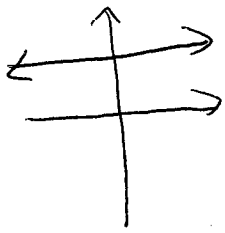
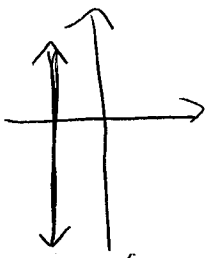
$x_1\ y_1\ x_2\ y_2$

$\frac{4-3}{2-7} = \frac{1}{-5}$

Find the slope between the following points.

* Watch signs!

1. (5,2) and (4,-1) $\frac{-1-2}{4-5} = \frac{-3}{-1} = \boxed{3}$	2. (-2,3) and (4,6) $\frac{6-3}{4-(-2)} = \frac{3}{6} = \boxed{\frac{1}{2}}$
3. (4.5, 5) and (.5,-3) $\frac{-3-5}{.5-4.5} = \frac{-8}{-4} = \boxed{2}$	4. (1,3) and (3,-2) $\frac{-2-3}{3-1} = \boxed{\frac{-5}{2}}$

Types of Slopes			
			
positive (rises)	negative (falls)	horizontal (0)	Vertical (undefined)

* Why do ~~the~~ vertical lines have undefined slopes?

Find the slope of the line that passes through the following points. Tell if it rises, falls, is 0, or undefined.

* Why do horizontal lines have a slope 0?

5) (5,2) and (5,-2)	6) (0,4) and (-3,4)	7) (0,6) and (0,-4)
$\frac{-2-2}{5-5}=\frac{-4}{0}$ undefined	$\frac{4-4}{-3-0}=\frac{0}{-3}=0$	$\frac{-4-6}{0-0}=\frac{-10}{0}=$ undefined
Vertical line	horizontal line	Vertical line

Finding slope from a graph:

Find the slope of the line in the following graphs:

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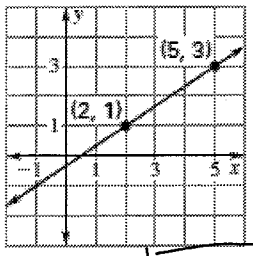

$\frac{3-1}{5-2}=\frac{2}{3}$ rises

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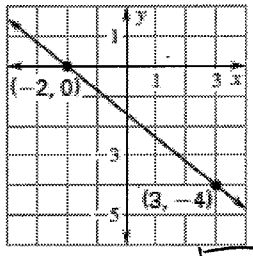
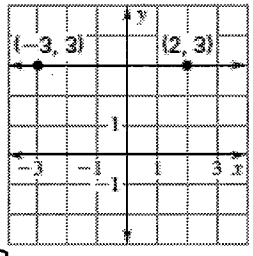


$\frac{-4-0}{3-(-2)}=\frac{-4}{5}$ falls

10



0; horizontal

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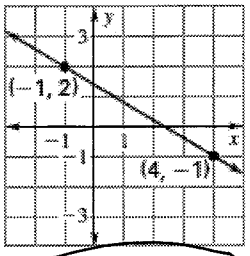
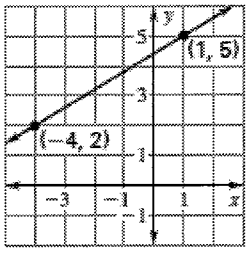


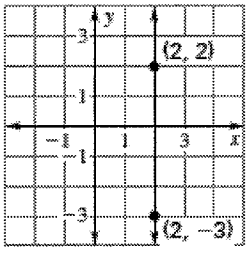
$\frac{2-(-1)}{-1-4}=\frac{3}{-5}$; falls

12



$\frac{5-2}{1-(-4)}=\frac{3}{5}$; rises

13



Undefined; Vertical

Rate of Change

Slope can be used to represent an average rate of change.

Example 1: A skateboard ramp has a rise of 15 inches and a run of 54 inches. What is its slope?

$\frac{15}{54} = \frac{5}{18}$

Example 2: One afternoon your family goes out to pick strawberries. At 1:00 p.m., your family has picked 3 quarts. Your family finishes picking at 3:00 p.m. and has 28 quarts of strawberries. At what rate is your family picking strawberries?

(1, 3) (3, 28) $\frac{\text{qts}}{\text{hr}}$ $\frac{28-3}{3-1} = \frac{25}{2}$ 25 qts/2 hrs → 12.5 qts/hr

Example 3: Kevin's savings account balance changed from $1,140 in January to $1,450 in April. Find the average rate of change per month. Round your answers to the nearest dollar. (Let x = 1 represent January).

(1, 1140) (4, 1450) $\frac{\text{Change}}{\text{month}} = \frac{1450-1140}{4-1} = \frac{310}{3} \approx$ $103/month

Example 4: John would like to know how much he saved per month last year. In January, his savings account balance was $300. A year later, in December, his savings account balance was $1,500. What is the rate of change of John's account per month? (Let x = 1 represent January)

(1, 300) (12, 1500) $\frac{\text{Change}}{\text{month}} = \frac{1500-300}{12-1} = \frac{1200}{11} \approx$ $109 per month