Algebra 1 3.3 *8th grade standard

Use rate of change to solve problems

Find the slope of a line*

Is it ever OK to divide by zero? no!

rate of change

slope = m

$$\frac{\text{vert}}{\text{horiz}} \quad \frac{\text{rise}}{\text{run to the right}} \quad \pm$$

positive slope

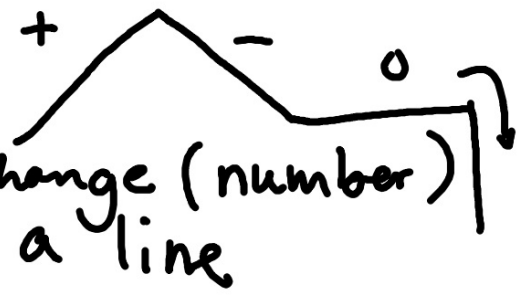
negative slope

zero slope horiz.

undefined slope vert.

constant does not change (number)

linear graph is a line



Quiz 3.1-3.2

slope song

1 Rate of Change

Rate of change is a ratio that describes, on average, how much one quantity changes with respect to a change in another quantity.

KeyConcept Rate of Change

If x is the independent variable and y is the dependent variable, then

$$\text{rate of change} = \frac{\text{change in } y}{\text{change in } x}.$$

Run to the right!

KeyConcept Slope

Words The slope of a nonvertical line is the ratio of the rise to the run.

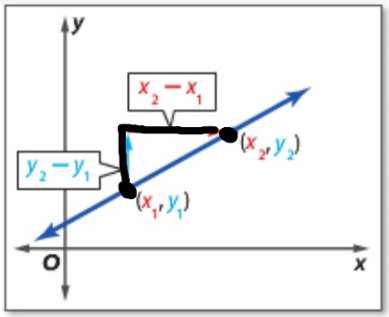
Symbols The slope m of a nonvertical line through any two points, (x_1, y_1) and (x_2, y_2), can be found as follows.

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

$y_2 - y_1$ ← change in y

$x_2 - x_1$ ← change in x

Graph



Slope song

Slope Song

(Turkey in the Straw)

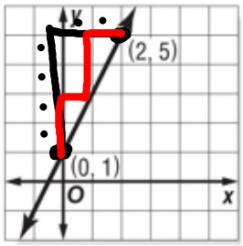
Slope is rise over run as we all know.
With the Y's on the top and the X's below.
Subtract the terms to get it right.
Simplify last for a wonderful sight.

(Chorus)
Rise over run, Y's over X.
Rise over run, Y's over X.
Subtract the terms to get it right.
Simplify last for a wonderful sight!

$$m = \frac{\text{rise}}{\text{run}} = \frac{y-y}{x-x}$$

Find the slope of the line that passes through each pair of points.

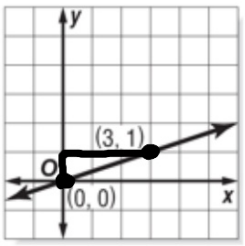
1.



$m = \frac{4}{2} = \frac{2}{1}$

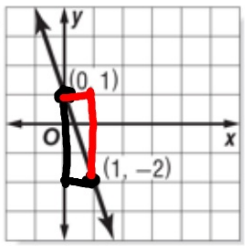
2

2.



$m = \frac{1}{3}$

3.



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

$= -3$

8. (2, 5), (–3, –5)

$\frac{5+5}{2+3} = \frac{10}{5}$

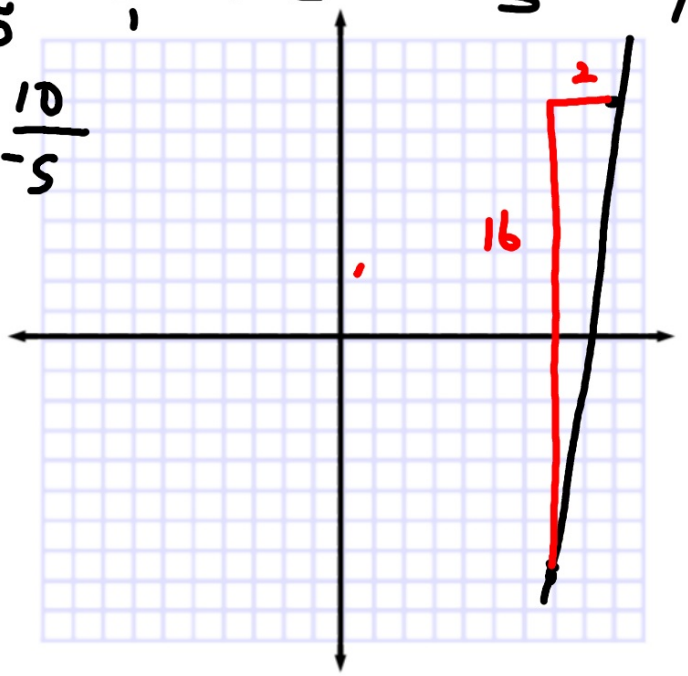
$m = \frac{10}{5} = \frac{2}{1}$

$\frac{-5+-5}{-3+2} = \frac{-10}{-5} = \frac{2}{1}$

$\frac{5+5}{-3+2}$ $\frac{10}{-5}$

9. (9, 8), (7, –8)

$m = \frac{-8+-8}{7+-9} = \frac{-16}{-2}$



$m = \frac{16}{2} = \frac{8}{1}$

10. (–5, –8), (–8, 1)

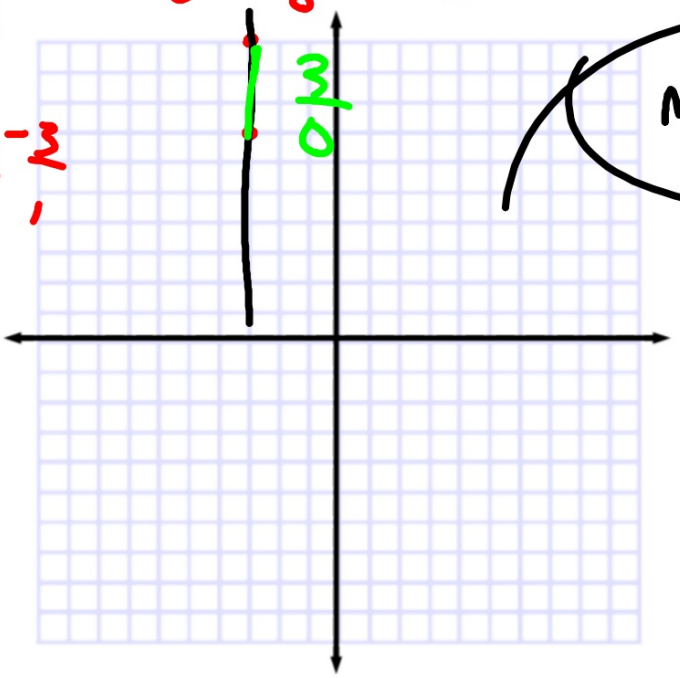
$\frac{1+8}{-8+5}$

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

11. (–3, 10), (–3, 7)

$\frac{-8+1}{-5+8} = \frac{-9}{3}$

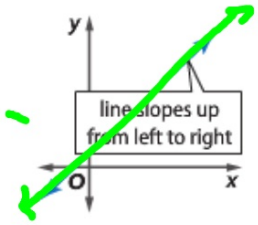
$\frac{-3}{0}$ $\frac{3}{0}$



M = undef

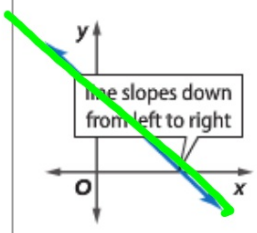
ConceptSummary Slope

positive slope



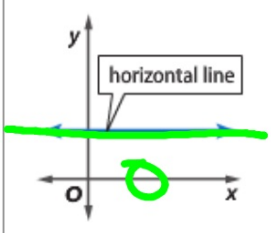
The function values are increasing over the entire domain.

negative slope



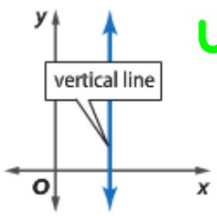
The function values are decreasing over the entire domain.

slope of 0



The function values are constant over the entire domain.

undefined slope



The relation is not a function.

zero slope undefined slope

E.T.

Find slope

a) (2,5) (3,-2)

b) (12,1) (6,3)

c) (5,2) (5,-6)

WB prac. 3.3

p 40 odds

$$\frac{y-y}{x-x}$$

Find the value of r so the line that passes through each pair of points has the given slope.

20. $(r, 3), (5, 9), m = 2$

21. $(5, 9), (r, -3), m = -4$

24. $(5, 3), (r, -5), m = 4$

25. $(7, r), (4, 6), m = 0$