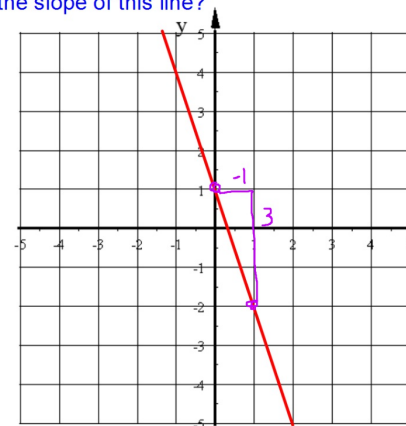


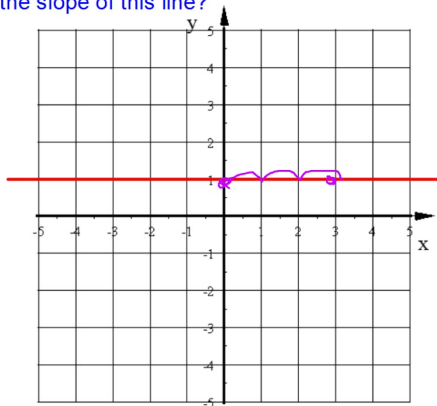
## Sec 6-1: Slope and Rate of Change

What is the slope of this line?



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

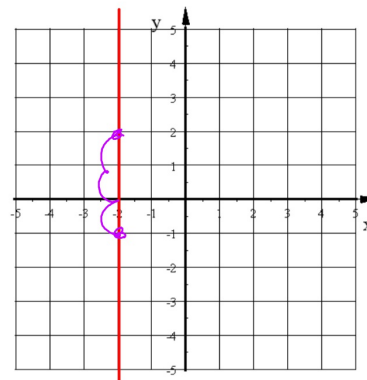
What is the slope of this line?



$$m = \frac{0}{3} = 0$$

HORIZONTAL  
LINE

What is the slope of this line?

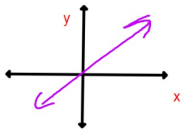


$$m = \frac{2}{0} = \text{undefined}$$

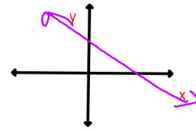
Vertical Line

What are the four different kinds of slope?

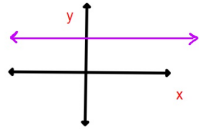
Positive



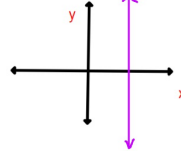
Negative



Zero



Undefined



Find the slope of the line that passes through this pair of points:

$(4, -3)$  and  $(-2, -4)$

$$m = \frac{-3 - (-4)}{4 - (-2)} = \frac{1}{6}$$

Find the slope of the line that passes through this pair of points:

$(-6, 5)$  and  $(6, -3)$

$$m = \frac{5 - (-3)}{-6 - 6} = \frac{8}{-12} = -\frac{2}{3}$$

Find the slope of the line that passes through this pair of points:

$(1, 7)$  and  $(1, -2)$

$$x - x = 0$$

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

undefined

Find the slope of the line that passes through this pair of points:

(2,-5) and (11,-5)

$$y - y = 0$$
$$m = \frac{0}{\quad}$$
$$m = 0$$

The larger the slope, the steeper the line

larger pos  
or larger neg.

The further the slope is from  
zero, the steeper the line.

The closer the slope is to zero the flatter the line is.

Which line would be steeper?

Line 1: Slope = 11

Line 2: Slope = -12

12 is bigger than 11 or -12 is further than 11 is from zero

Which line would be flatter?

Line 1: Slope = -0.932

Line 2: Slope = 0.947

-0.932 is closer to zero than 0.947

or 0.932 is smaller than 0.947

Put the slopes in order from steepest to flatest.

$-2, 0.8, \frac{7}{3}, -9, 6.4, -\frac{1}{7}, -2.5$

Steepest  $\longrightarrow$  Flatest

$-9$  ,  $6.4$  ,  $-2.5$  ,  $\frac{7}{3}$  ,  $-2$  ,  $0.8$  ,  $-\frac{1}{7}$

A line has a slope of  $\frac{2}{3}$ . If the line passes through the two points below what is the value of x?

(x, 1) and (-2, 7)

apply the slope formula

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

now solve for x

$$\frac{2}{3} = \frac{7-1}{-2-x}$$

simplify 7-1

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

cross multiply

$$2(-2-x) = 18$$

distribute

$$-4 - 2x = 18$$

finish solving for x

$$-2x = 22$$

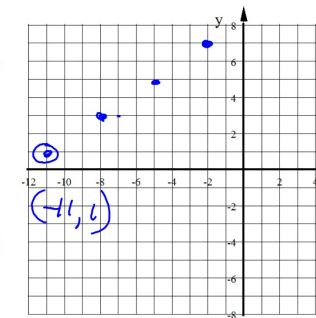
$$x = -11$$

$$x = -11$$

A line has a slope of  $-\frac{2}{3}$ . If the line passes through the two points below what is the value of x?

(x, 1) and (-2, 7)

How could you use a graph to answer this question?



The slope of a line is  $\frac{4}{3}$

This pair of points is on the line:

(-1, 7) & (14, y)

Find the value of y.

$$\frac{4}{3} = \frac{y-7}{14-(-1)}$$

$$\frac{4}{3} = \frac{y-7}{15}$$

$$y-7 = 20$$

$$y = 27$$

$$\frac{4}{3}, \frac{8}{6}, \frac{12}{9}, \frac{16}{12}, \frac{20}{15}$$

Given a line passes through each pair of Is each line horizontal, vertical, or neither?

1. (-7, 8) and (8, 1) Neither

4. ( ) and ( )

Horizontal

2. (3, 6) and (3, -6) Vertical

Same x-coordinates means:  $m = \frac{0}{0}$

to be horizontal the two points must have the same y-coordinates

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

3. (-11, 23) and (-11, 7) Vertical

Same x-coordinates means:  $m = \frac{0}{0}$

$$\text{Rate of Change} = \frac{\text{Change in the Dependent Variable}}{\text{Change in the Independent Variable}} = \frac{\Delta Y}{\Delta X}$$

$$\text{Rate of Change} = \frac{\Delta Y}{\Delta X} \quad \text{Slope with units}$$

Since the phrase Rate of Change applies when using "REAL" data you'll be expected to give units with your answer. Instead of fractions, give answers as decimals.