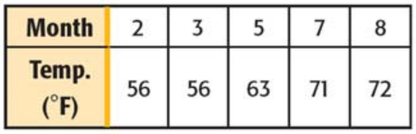
Warm-up 10-30

1.) **The table shows the average temperature (°F) for five months in a certain city. Find the rate of change for each time period. During which time period did the temperature increase at the fastest rate?**



Month	2	3	5	7	8
Temp. (°F)	56	56	63	71	72

2.) Find the x and y-intercept for $2x + 3y = 12$ and $3x + 4y = 24$.

Write the intercepts as ordered pairs (points).

Warm-up 10-30

1.) **The table shows the average temperature (°F) for five months in a certain city. Find the rate of change for each time period. During which time period did the temperature increase at the fastest rate?**

1 2 2 1

Month	2	3	5	7	8
Temp. (°F)	56	56	63	71	72

0 7 8 1

$\frac{0}{1}, \frac{7}{2}, \frac{8}{2}, \frac{1}{1}$

$0, 3.5, \boxed{4}, 1$

5-7 months

2.) Find the x and y-intercept for 2x + 3y = 12 and 3x + 4y = 24.

Write the intercepts as ordered pairs (points).

$2(0)+3y=12$

$\frac{3y}{3}=\frac{12}{3}$

$y=4$

(0,4) (6,0)

$2x+3(0)=12$

$\frac{2x}{2}=\frac{12}{2}$

$x=6$

$3(0)+4y=24$

$\frac{4y}{4}=\frac{24}{4}$

$y=6$

(0,6) (8,0)

$3x+4(0)=24$

$\frac{3x}{3}=\frac{24}{3}$

$x=8$

Any homework or other questions before the quiz?

https://goo.gl/forms/W47iP0YdY9oFJsG93

Section 4.3

Today's Goals

I can

- relate a constant rate of change to the slope of a line.
- write linear equations (point-slope and slope-intercept forms)

Once upon a

Talk it Out

Talk with a partner. Was there a time when you experienced a very steep hill? Maybe your experience involved a bicycle, skis, a car, etc.. Talk about your experience with your partner. Why does steepness matter? How might this connect with linear equations? Be prepared to share your story with the class.

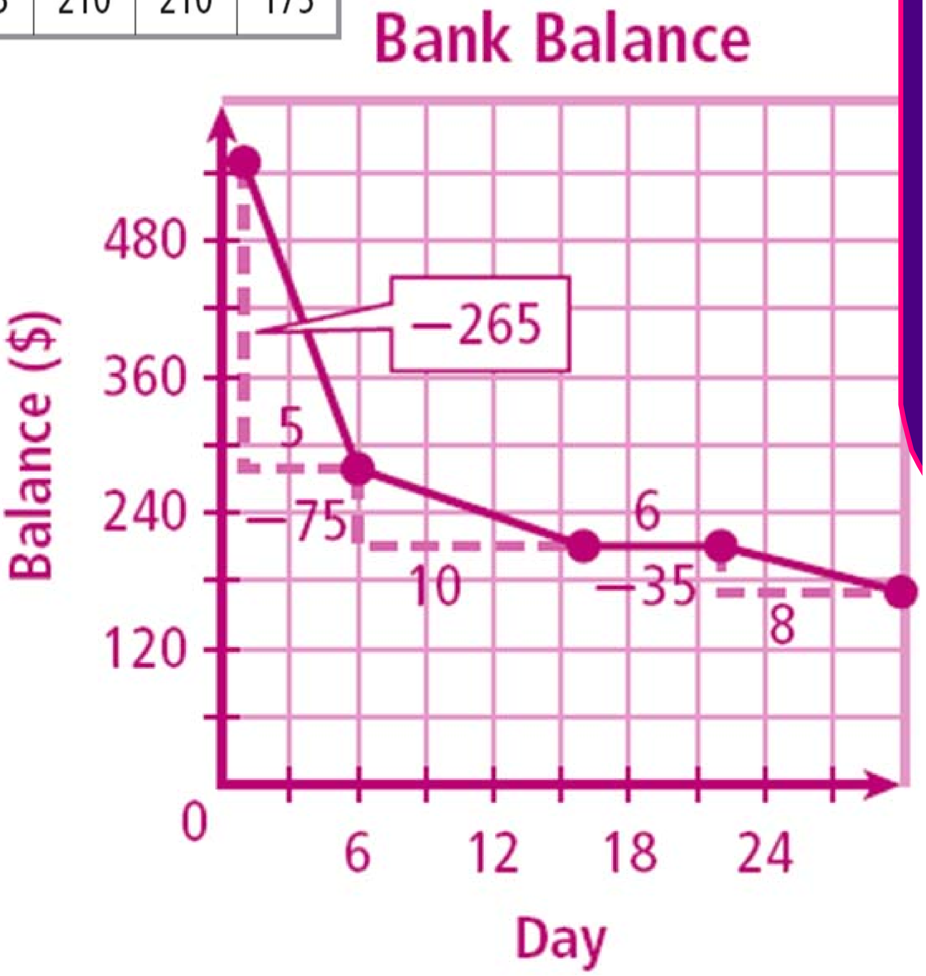
Section 4.3: Rate of Change

A **rate of change** is a ratio that compares the amount of change in a dependent variable to the amount of change in an independent variable.

Rate of change = $\frac{\text{rise}}{\text{run}} = \frac{\text{dependent}}{\text{independent}}$

Graph the data and show the rates of change.

Day	1	6	16	22	30
Balance ($)	550	285	210	210	175



If all of the connected segments have the same rate of change, then they all have the same steepness and together form a straight line. The constant rate of change of a line is called the ***slope*** of the line.

Slope of a Line

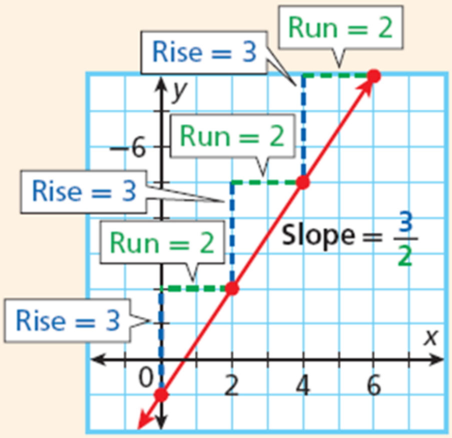
The **rise** is the difference in the *y*-**values** of two points on a line.

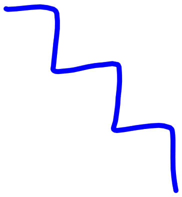
The **run** is the difference in the *x*-**values** of two points on a line.

The **slope** of a line is the ratio of rise to run for any two points on the line.

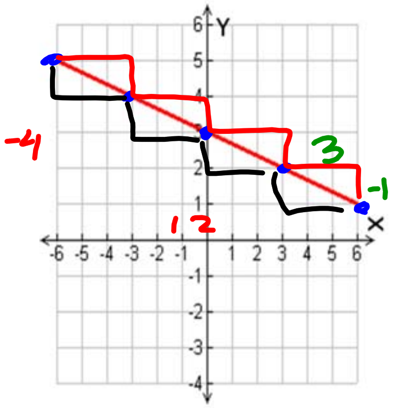
$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{\Delta y}{\Delta x}$$

(Remember that *y* is the **dependent variable** and *x* is the **independent variable**.)





Finding Slope of a Line



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

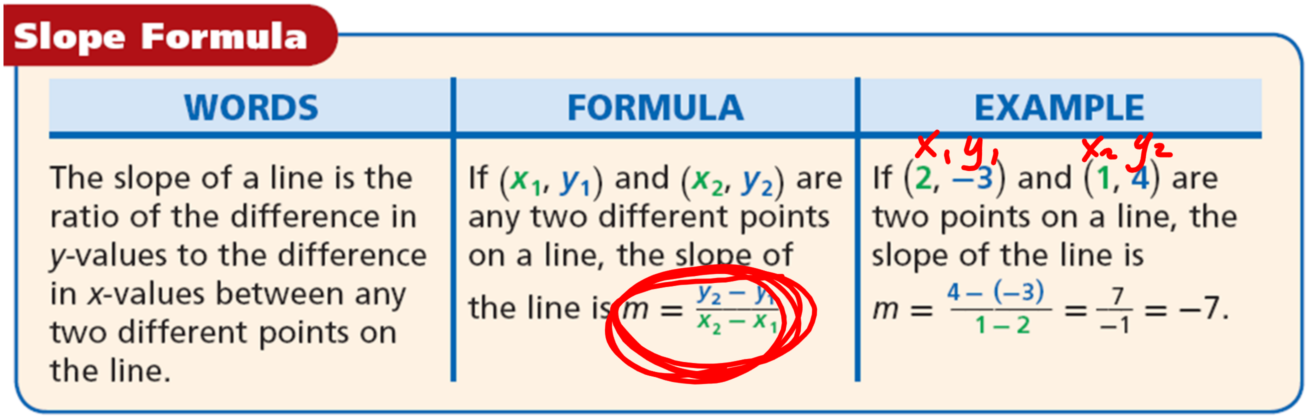
$-\frac{4}{12} = -\frac{1}{3}$

Begin at one point and count vertically to find the rise.

Then count horizontally to the second point to find the run.

Section 4.4: The Slope Formula

There is also a formula you can use to find the slope of a line, which is usually represented by the letter *m*. To use this formula, you need the coordinates of **two different points** on the line.



Slope Formula

WORDS	FORMULA	EXAMPLE
The slope of a line is the ratio of the difference in *y*-values to the difference in *x*-values between any two different points on the line.	If (x_1, y_1) and (x_2, y_2) are any two different points on a line, the slope of the line is $m = \frac{y_2 - y_1}{x_2 - x_1}$	x_1, y_1 x_2 y_2 If $(2, -3)$ and $(1, 4)$ are two points on a line, the slope of the line is $m = \frac{4 - (-3)}{1 - 2} = \frac{7}{-1} = -7$.

Find the slope of the line that contains (0, 3) and (-5, –5).

x_1 y_1 x_2 y_2

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

$$m = \frac{-5-(3)}{-5-(0)} = \frac{-8}{-5} = \boxed{\frac{8}{5}}$$

X Y

2 $(-5, -5)$

1 $(-0, -3)$

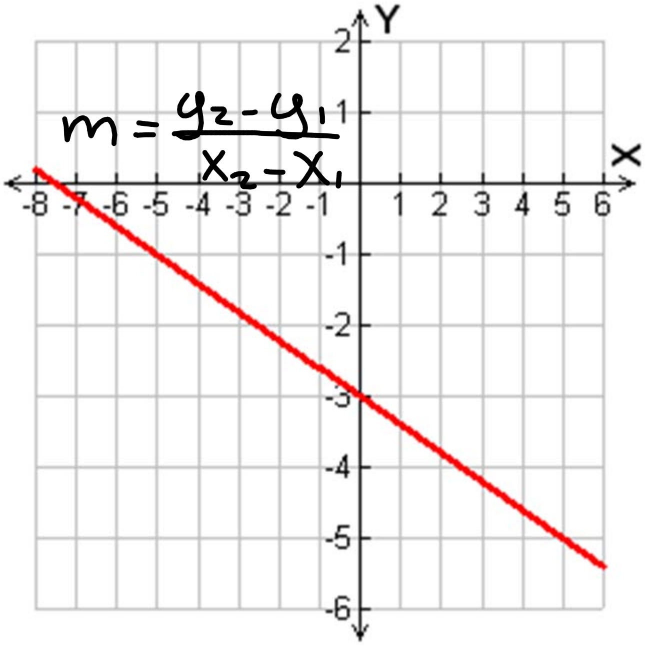
Δx Δy

-5 -8

$$\frac{-8}{-5} = \frac{8}{5}$$

Try This!

Find the slope of the line that contains (0, −3) and (5, −5).



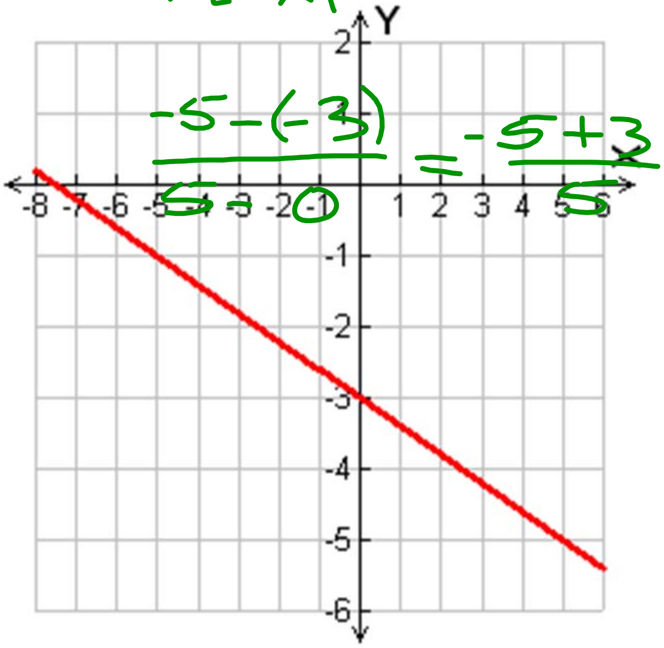
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Try This!

x_1 y_1 x_2 y_2

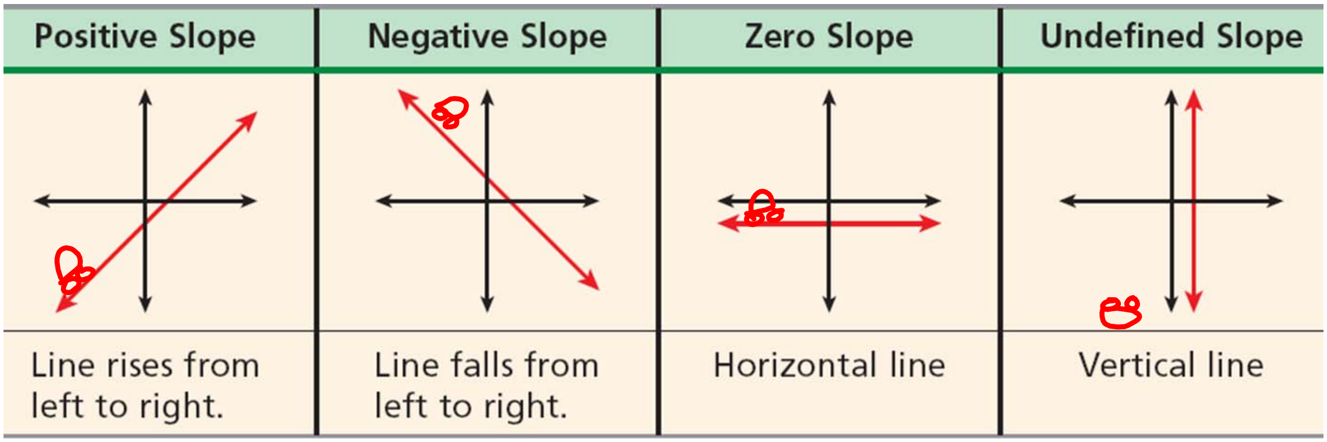
Find the slope of the line that contains (0, −3) and (5, −5).

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



$$\frac{-5-(-3)}{5-0} = \frac{-5+3}{5} = \boxed{\frac{-2}{5}}$$

Classifying Slope

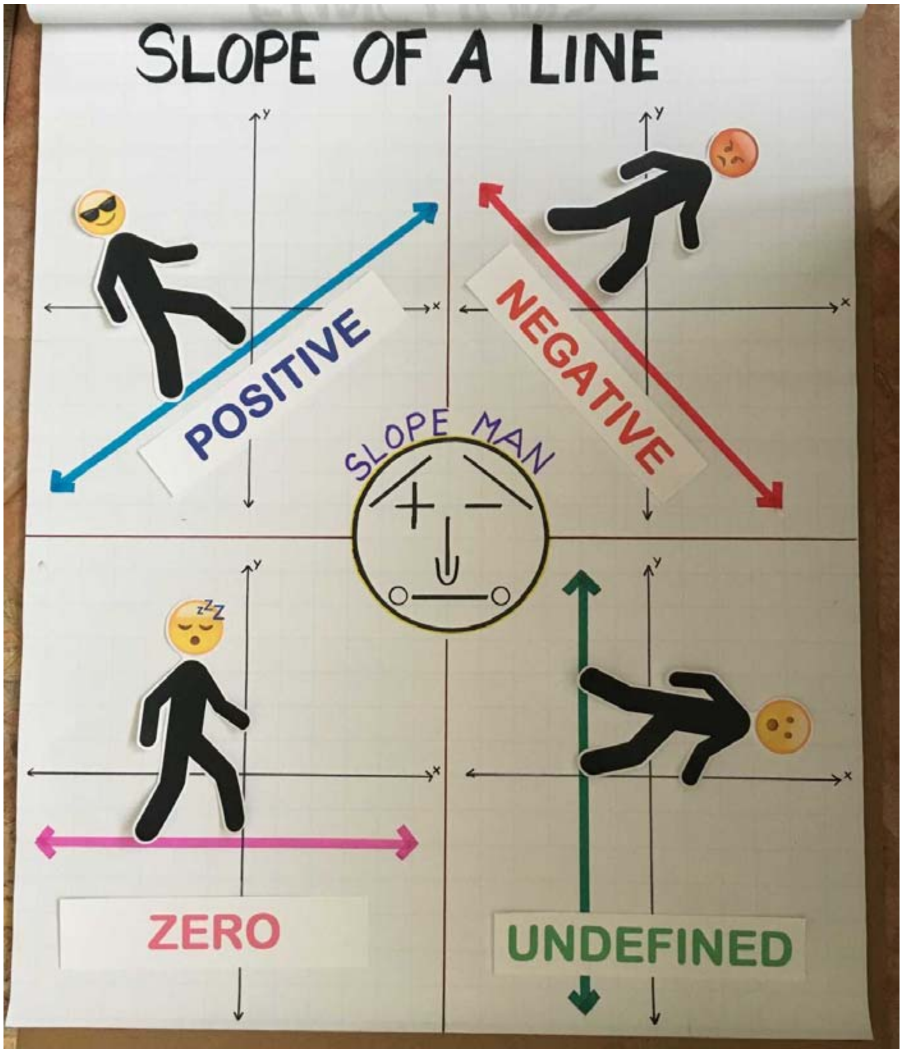


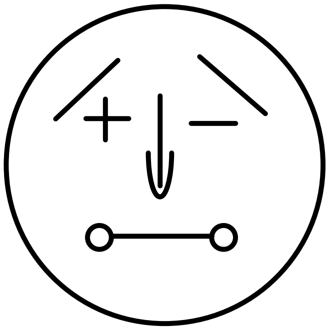
Positive Slope	Negative Slope	Zero Slope	Undefined Slope
Line rises from left to right.	Line falls from left to right.	Horizontal line	Vertical line

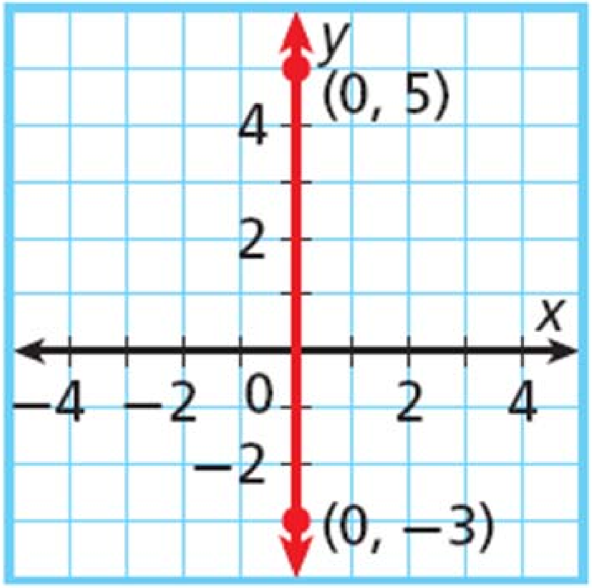
Negative Slope

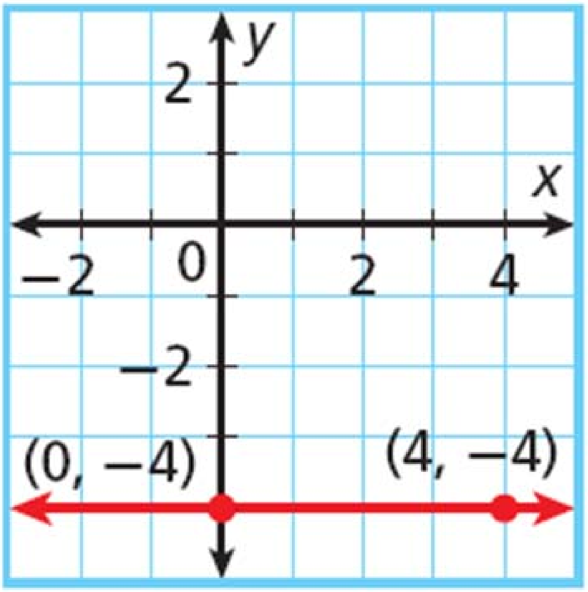
Zero Slope

No Slope


SLOPE OF A LINE
POSITIVE
NEGATIVE
SLOPE MAN
ZERO
UNDEFINED
x
y

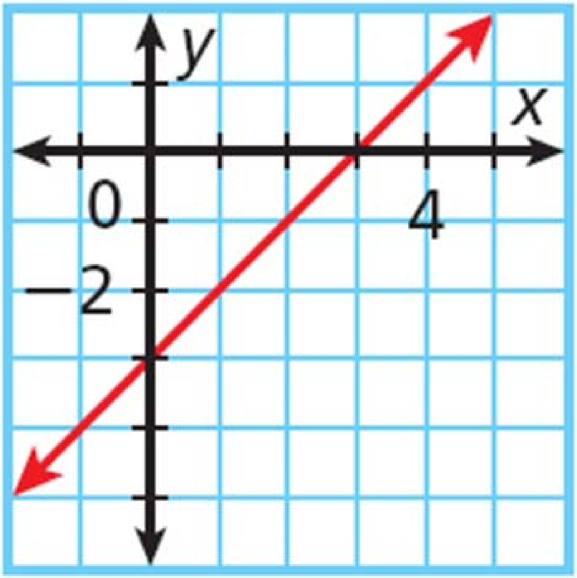

+
−

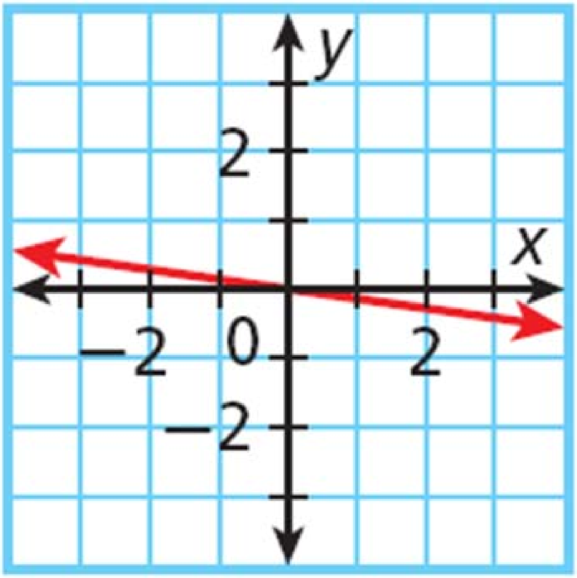

y
(0, 5)
4
2
x
−4
−2
0
2
4
−2
(0, −3)


y
2
x
−2
0
2
4
−2
(0, −4)
(4, −4)

Describing Slope

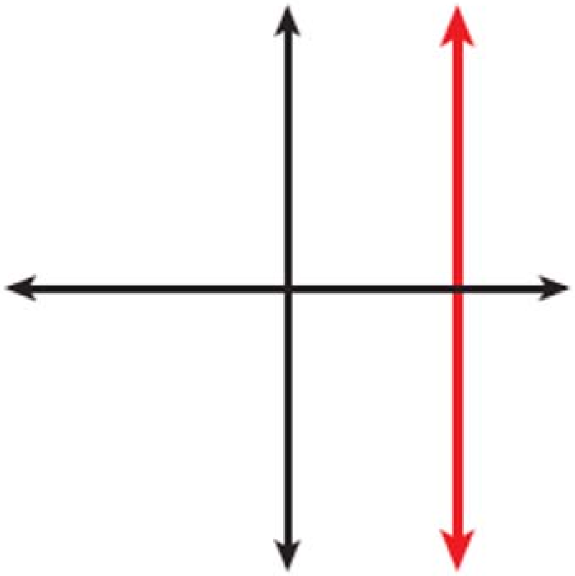
Tell whether the slope of each line is positive, negative, zero or undefined.

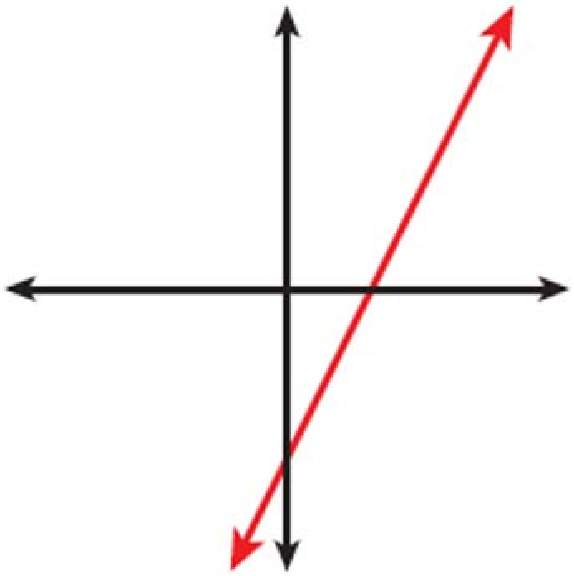




Try This!

Tell whether the slope of each line is positive, negative, zero or undefined.





Homework

pg. 248 # 1-13 (odd),