

6.3 – Getting to Know the Slope of a Line

To many, the slope of a line is how much “slanted” a line can be. The following are some example of lines that have some sort of slope.



The SLOPE of a line is determined by two things: the RISE and the RUN.

The RISE of a line is how much UP or DOWN it is going. The RUN is how much LEFT or RIGHT a line is going.

To determine the RISE and RUN of line, you need to look at a line on a coordinate plane.

Step 1: Look at two points on a line

Step 2: Start at one point. Using the gridlines of the coordinate plane, move left or right. While doing this, draw an arrow. (Mentally count the spaces that you move.)

Step 3: Once you are below or above the second point, move up or down until you reach that point. (Mentally count the spaces that you move.)

Step 4: Use the following RULES to determine if the RISE and the RUN is POSITIVE or NEGATIVE.

RISE

Positive - If you move up

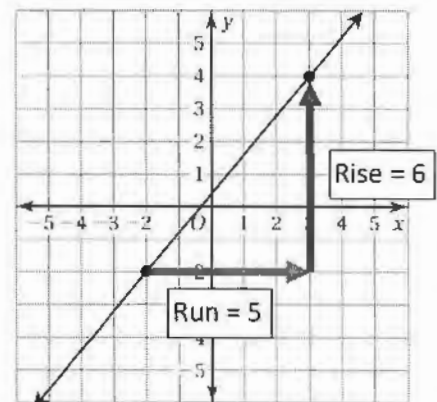
Negative - If you move down

RUN

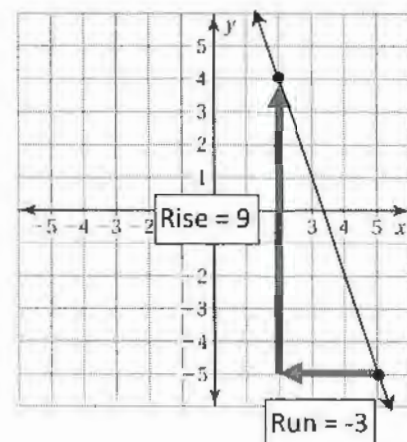
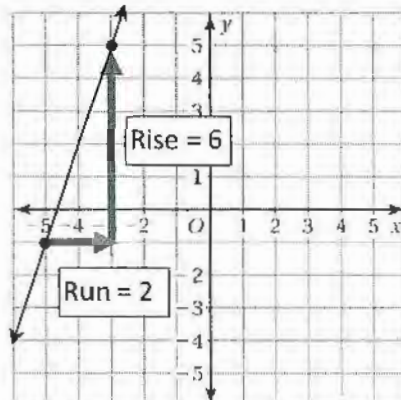
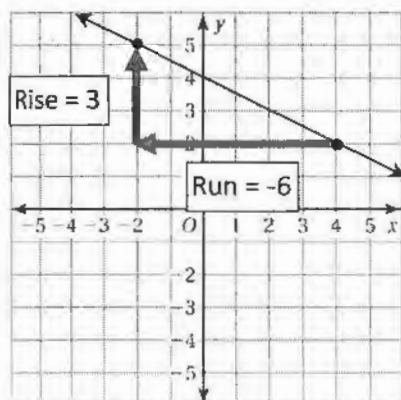
Positive - If you move right

Negative - If you move left

Example:



More Examples:



Concept Check:

- 1) According to what was mentioned earlier, what is the slope of a line?

It is how much "slanted" a line is.

- 2) In your own words, what determines the slope of a line?

Various answers...

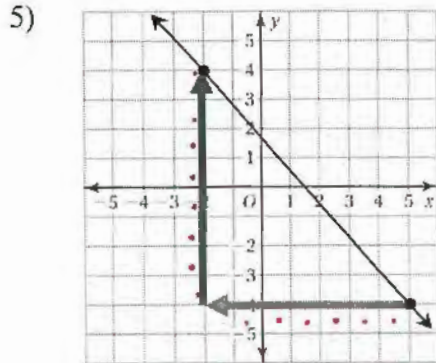
- 3) What is the "rise" of a line?

It is how much up or down a line is going.

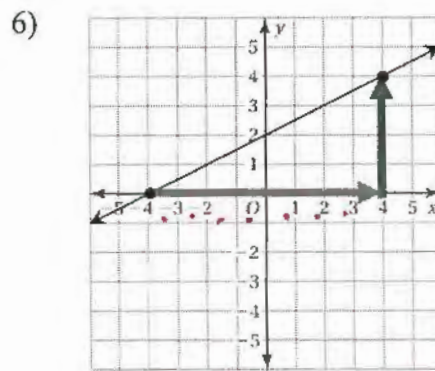
- 4) What is the "run" of a line?

It is how much left or right a line is going.

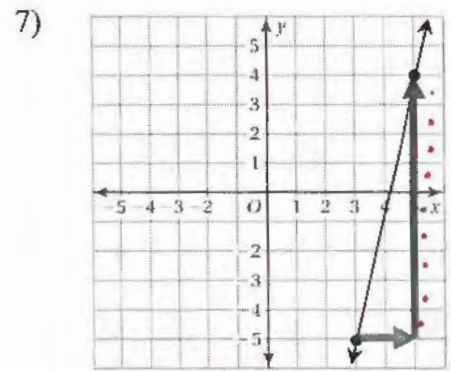
Determine the rise and run of the following lines.



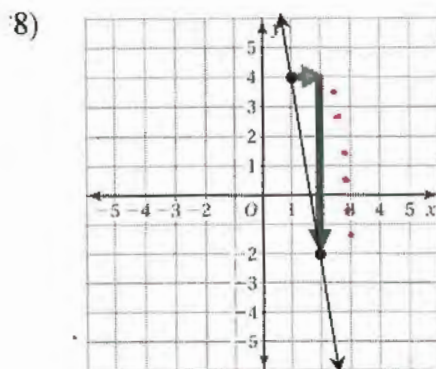
Rise = 8 Run = -7



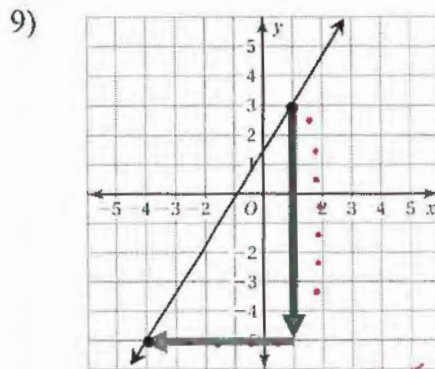
Rise = 4 Run = 8



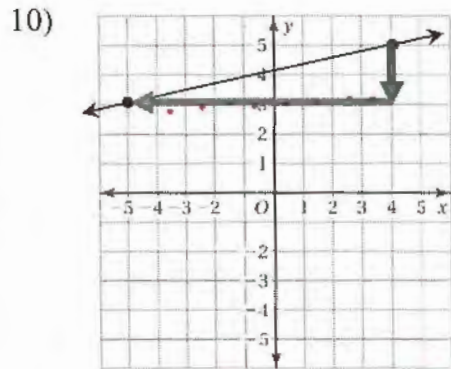
Rise = 9 Run = 2



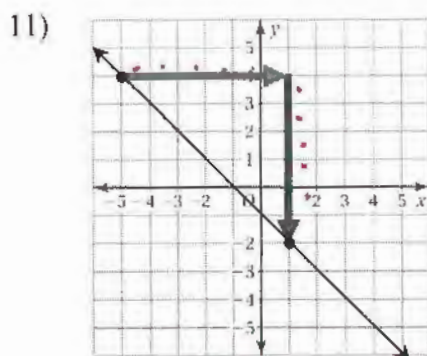
Rise = -6 Run = 1



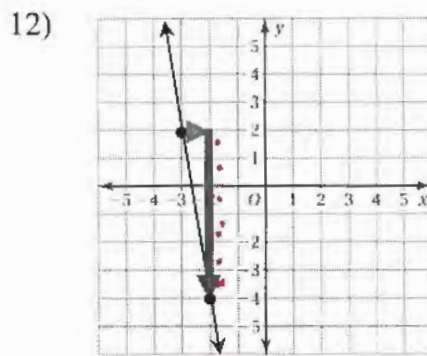
Rise = -8 Run = -5



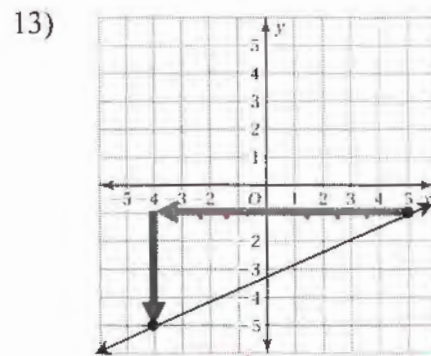
Rise = 2 Run = -9



Rise = -6 Run = 6



Rise = -6 Run = 1

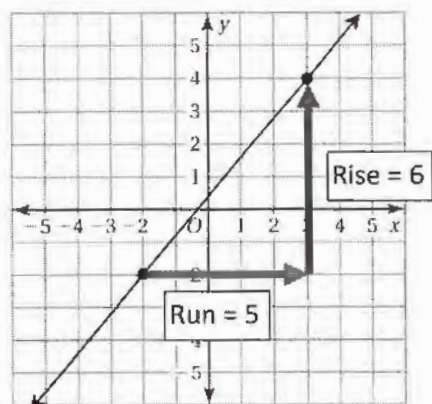


Rise = -4 Run = -9

From what has been mentioned, slope has to do with rise and run. However, to be more accurate, slope is the **RATIO OF THE RISE OVER RUN**.

Slope is most commonly written in the following ratio: $slope = \frac{rise}{run}$

Example:



From the example to the left, we find the slope of a line by "plugging in" the rise and run into the following:

$$slope = \frac{rise}{run}$$

$$= \frac{6}{5}$$

As you can see, the slope comes out as a ratio (or fraction) of the rise and run. If possible, we try to simplify the fraction.

For problems #14-22, find the slope from problem #5-13

14) Problem 5

slope = $\frac{8}{-7}$

15) Problem 6

slope = $\frac{1}{2}$

16) Problem 7

slope = $\frac{9}{2}$

17) Problem 8

slope = -6

18) Problem 9

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

19) Problem 10

slope = $\frac{2}{9}$

20) Problem 11

slope = -1

21) Problem 12

slope = -6

22) Problem 13

slope = $\frac{4}{7}$

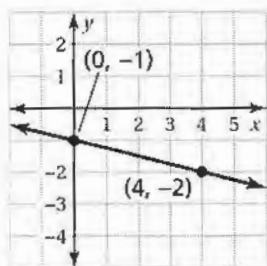
Concept Check:

23) The slope of a line can be written in what ratio?

rise
run

Besides the slope, another important part is the *Y-INTERCEPT*. The *y*-intercept is the point where the line crosses the *y*-axis.

Example:

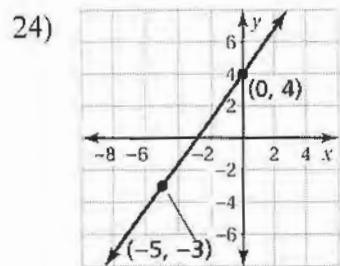


If you notice on the left, the line crosses the *y*-axis at point $(0, -1)$.

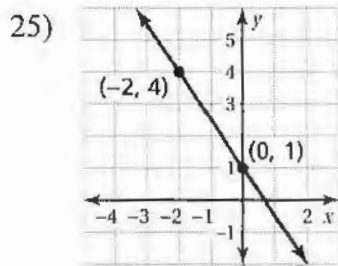
Thus, the

$$y\text{-intercept} = (0, -1)$$

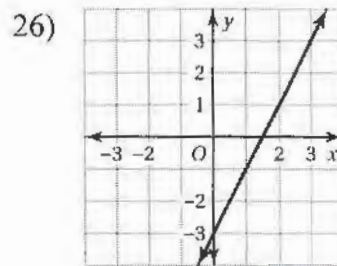
For the following, find the *y*-intercept of each graph.



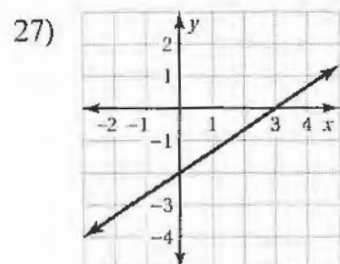
$$y\text{-intercept} = (0, 4)$$



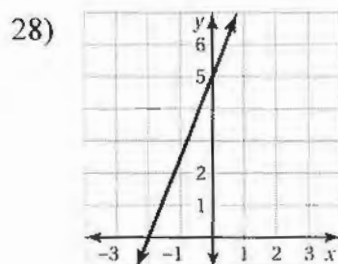
$$y\text{-intercept} = (0, 1)$$



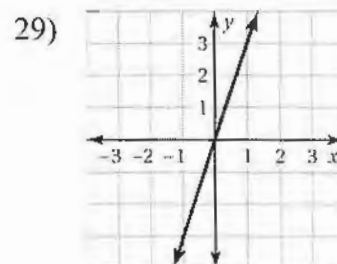
$$y\text{-intercept} = (0, -3)$$



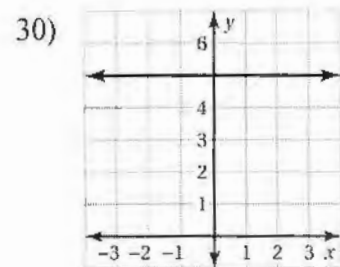
$$y\text{-intercept} = (0, -2)$$



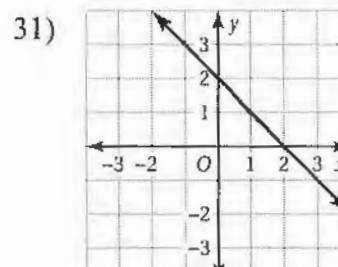
$$y\text{-intercept} = (0, 5)$$



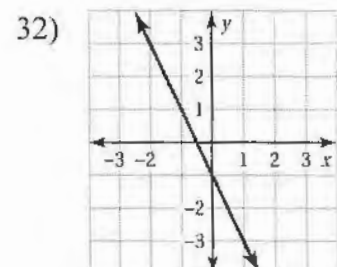
$$y\text{-intercept} = (0, 0)$$



$$y\text{-intercept} = (0, 5)$$



$$y\text{-intercept} = (0, 2)$$



$$y\text{-intercept} = (0, -1)$$

**6.2****Puzzle Time REVIEW!!!!****Did You Hear The****Story About The Smog?**

A	YOU	B	DON'T	C	HAVE	D	TO	E	TELL	F	ME
G	IT	H	IS	I	ALL	J	OVER	K	TOWN		

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

44 IS
$y = x - 5$ HAVE
$y = 3x$ YOU
$y = 10x$ TOWN
$y = 8x$ TO
-1 ALL

Write an equation that describes the function.**A. Input, x Output, y**

-2	→	6
-1	→	-3
0	→	0
1	→	3
2	→	6

B. Input, x Output, y

-55	→	-65
-45	→	-55
15	→	5
25	→	15
35	→	25

Write a function rule for the statement.

- C. The output is five less than the input.
 D. The output is eight times the input.
 E. The output is one-third the input.
 F. The output is thirteen more than four times the input.

Find the value of y for the given value of x .

G. $y = x + 7$; $x = -5$ H. $y = 6x - 4$; $x = 8$

I. $y = 2x + 4$; $x = -2.5$ J. $y = 9x - 3$; $x = 3$

- K. The number of multiple-choice questions on a test y is 10 times the number of open-ended questions x .
 Write a function that describes the relationship.

21 AIR
$y = \frac{1}{3}x$ TELL
24 OVER
2 IT
$y = x - 10$ DON'T
$y = 4x + 13$ ME