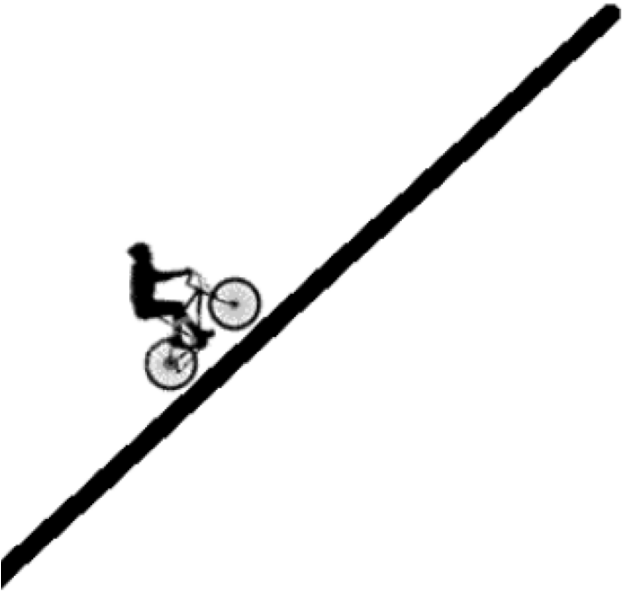
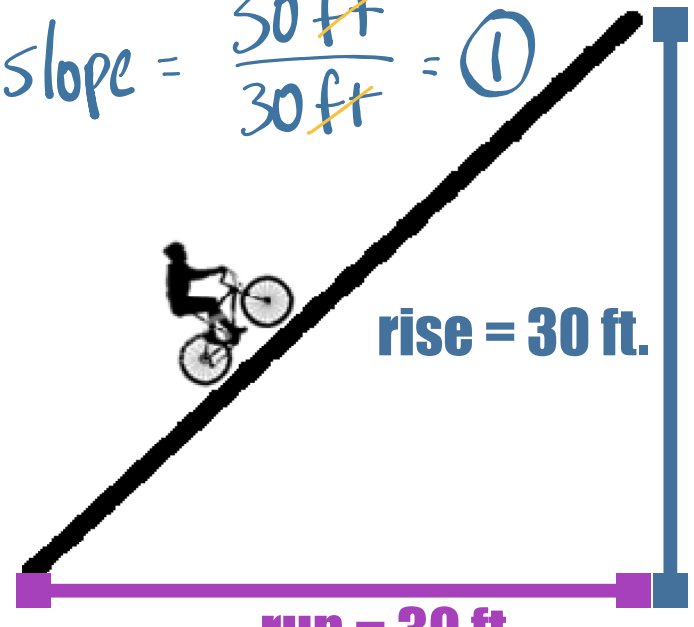
WHICH RAMP WOULD YOU RATHER JUMP?



PRINCIPLES - LESSON 7A
SLOPE

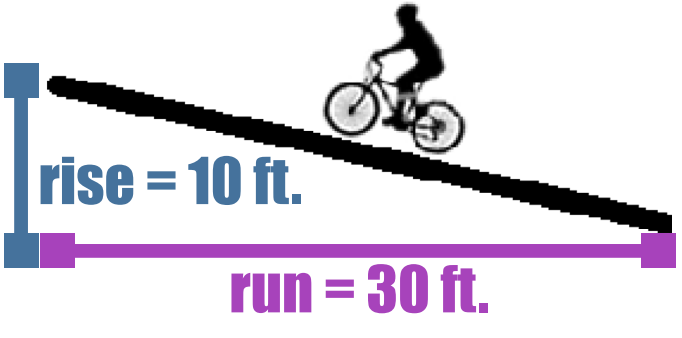
slope = $\frac{30\text{ ft}}{30\text{ ft}} = 1$



Slope is a measure of steepness.

$$\text{SLOPE} = \frac{\text{rise}}{\text{run}}$$

Find the slope of each of the ramps.



Which variable do we use for slope?

slope = $\frac{10\text{ ft}}{30\text{ ft}} = \frac{1}{3}$

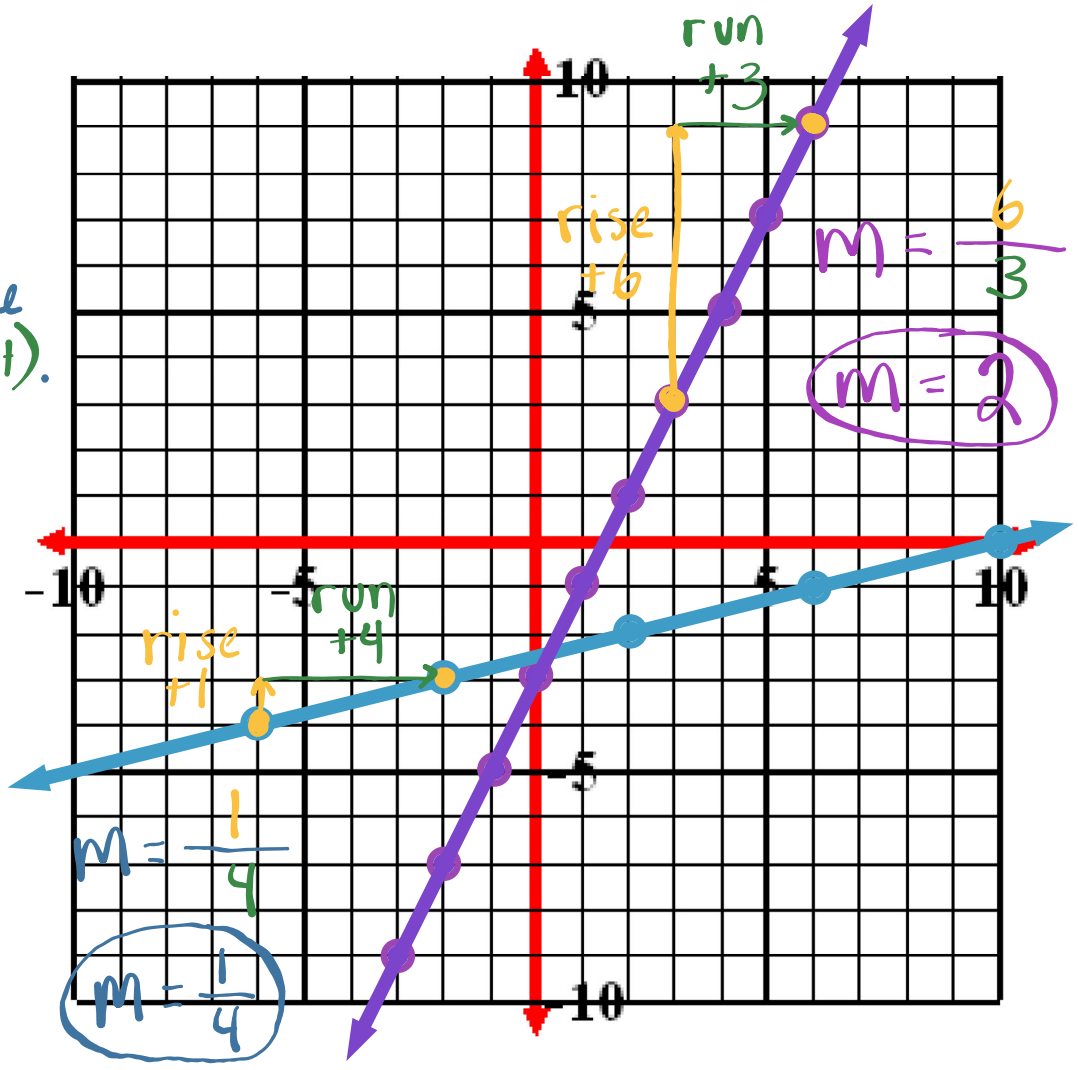
We use the variable m for slope

HOW CAN WE FIND THE SLOPE OF A LINE?

1. Choose any 2 points on the line.

2. Count the RISE between the 2 points (start with left point).
   - up = positive
   - down = negative

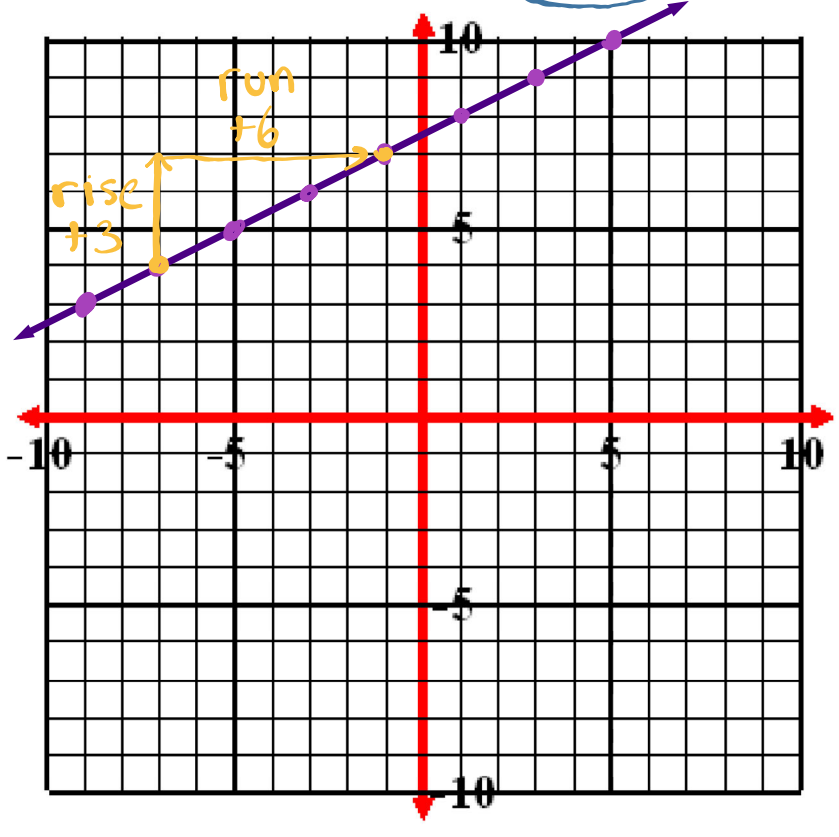
3. Count the RUN.
   - If you started with the leftmost point, you will always move right, which is the positive direction



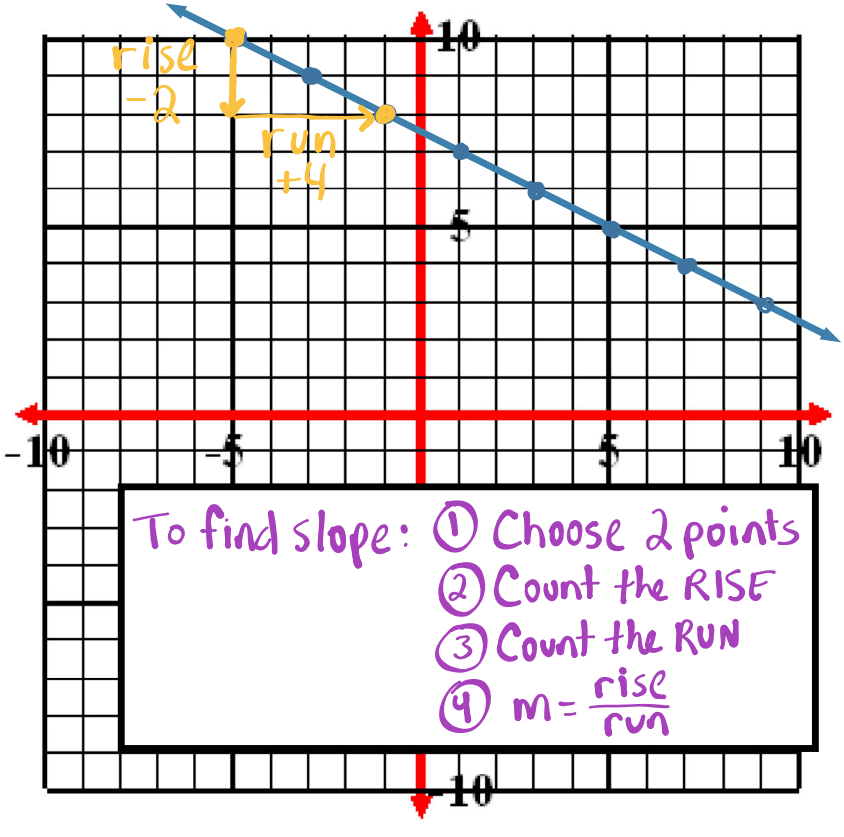
SLOPE

ex1) Find the slope of each line.

$m = \frac{3}{6} \Rightarrow m = \frac{1}{2}$ Always reduce!

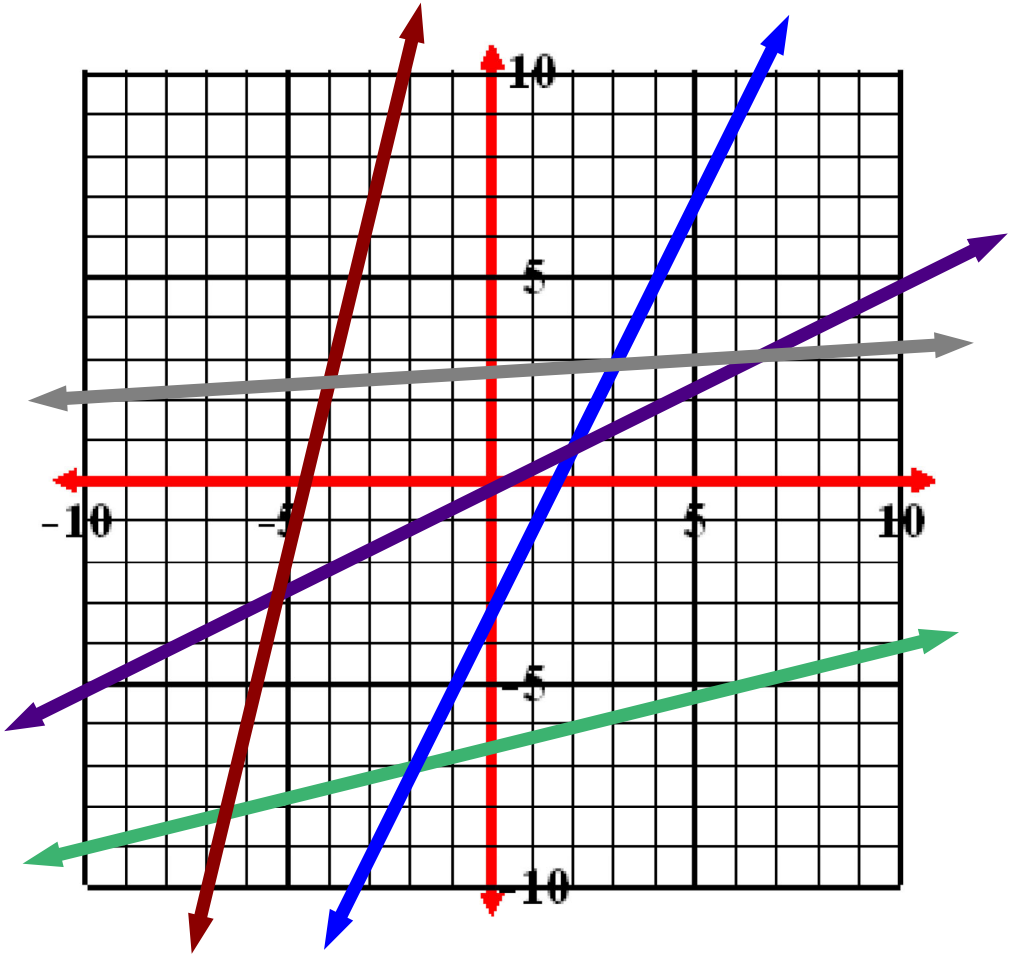


$m = \frac{-2}{4} \Rightarrow m = -\frac{1}{2}$



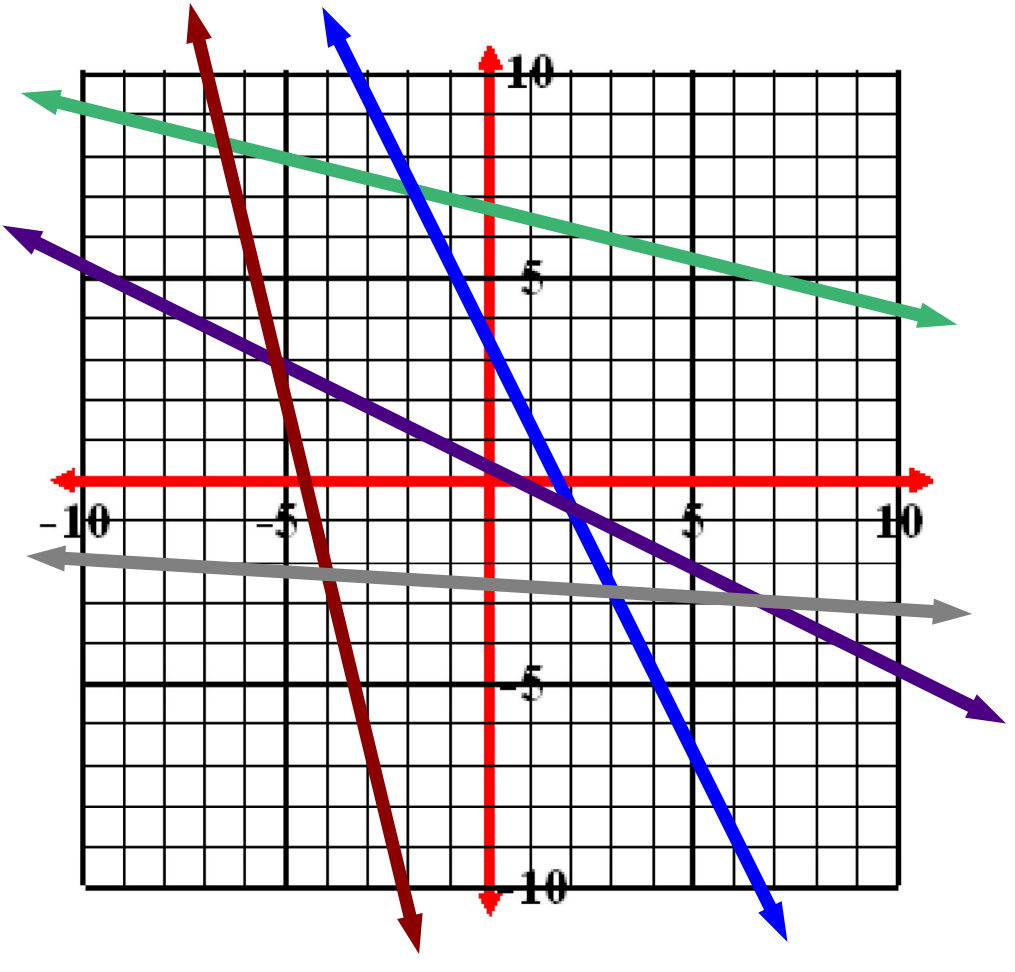
To find slope:
1. Choose 2 points
2. Count the RISE
3. Count the RUN
4. $m = \frac{\text{rise}}{\text{run}}$

POSITIVE SLOPE



POSITIVE SLOPES appear UPHILL from left to right.

NEGATIVE SLOPE

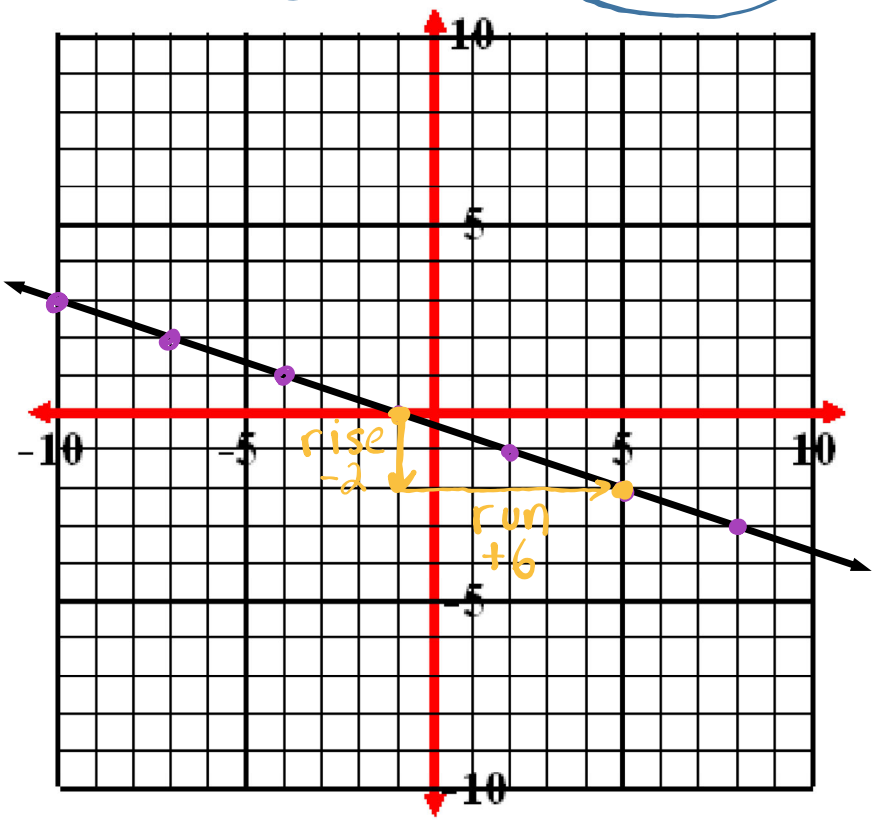


NEGATIVE SLOPES appear DOWNHILL from left to right.

SLOPE

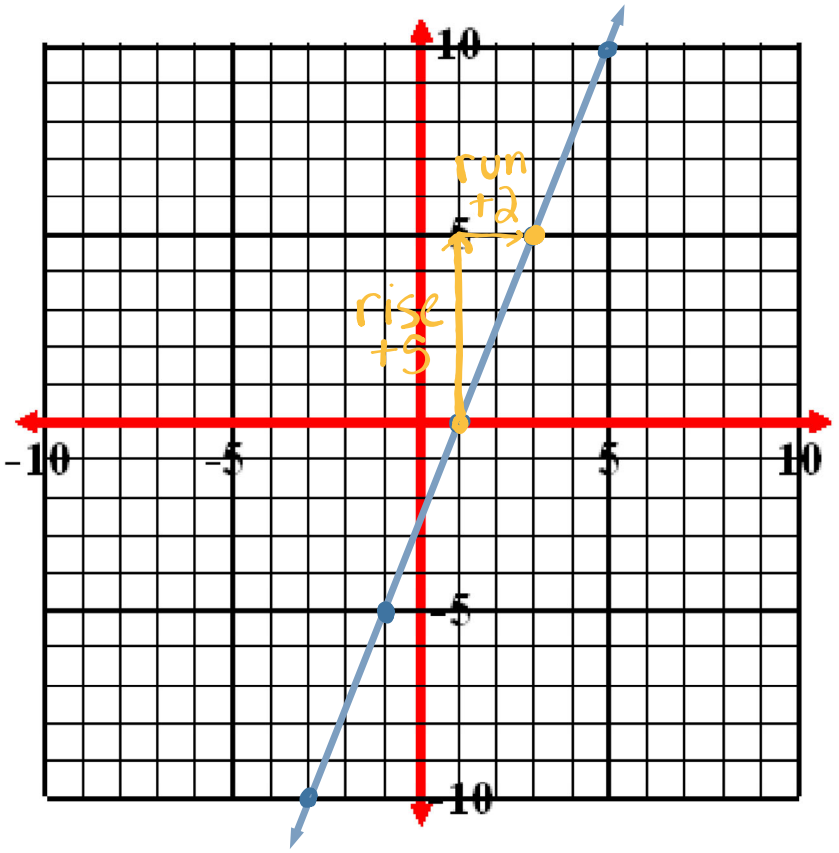
ex2) Find the slope.

$m = \frac{-2}{6} \Rightarrow m = -\frac{1}{3}$



ex3) Find the slope.

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



THE SLOPE FORMULA

$$\text{SLOPE} = \frac{\text{rise}}{\text{run}}$$

OR

subtract the 2 y-coordinates →

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

subtract the 2 x-coordinates →

THE SLOPE FORMULA

ex4) Find the slope of the line that passes through the points (9, 6) and (1, 3).

$x_1\ y_1 \qquad x_2\ y_2$

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

$$m = \frac{(3)-(6)}{(1)-(9)} = \frac{-3}{-8}$$

$$m = \frac{3}{8}$$

THE SLOPE FORMULA

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

ex5) Find the slope of the line that passes through the points (1, 3) and (9, 6).

x_1, y_1 x_2, y_2

(Switched order from example 4)

$$m = \frac{(6) - (3)}{(9) - (1)} = \frac{3}{8}$$

$$m = \frac{3}{8}$$

Notice that it does not matter which point you start with. We found a slope of $\frac{3}{8}$ for both examples 4 and 5.

The important thing is that you pick an ordered pair and start there for BOTH the x and y-coordinates.

THE SLOPE FORMULA

ex6) Find the slope of the line that passes through the points (-4, 6) and (1, -2).

x_1 y_1 x_2 y_2

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

$$m = \frac{(-2) - (6)}{(1) - (-4)} = \frac{-8}{5}$$

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

THE SLOPE FORMULA

ex7) Find the slope of the line that passes through the points (4, -1) and (-3, -8).

x_2 y_2 x_1 y_1

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

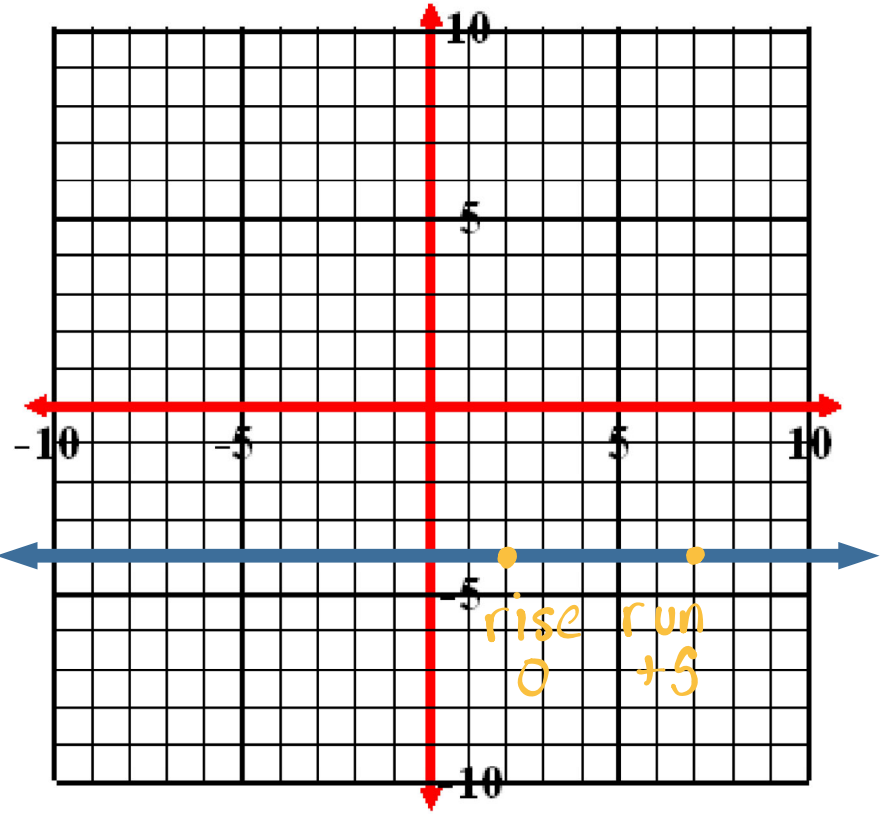
$$m = \frac{(-1) - (-8)}{(4) - (-3)} = \frac{7}{7}$$

$$m = 1$$

SLOPE

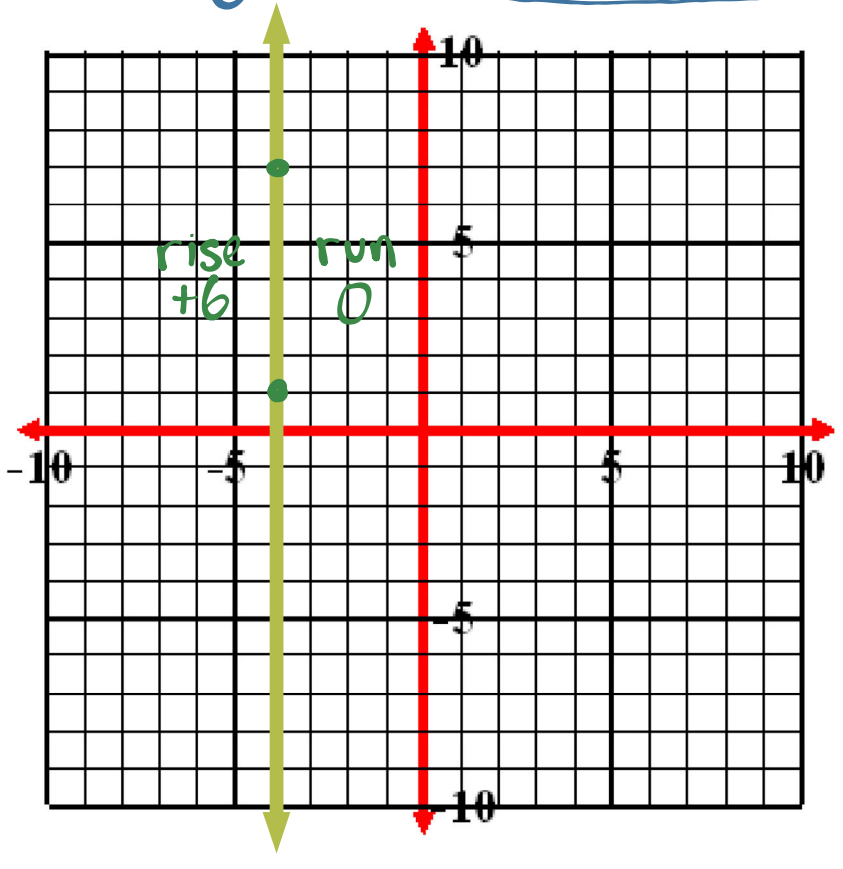
ex8) Find the slope.

$m = \frac{0}{5} \Rightarrow$ m = 0



ex9) Find the slope.

$m = \frac{6}{0} \Rightarrow$ m is undefined



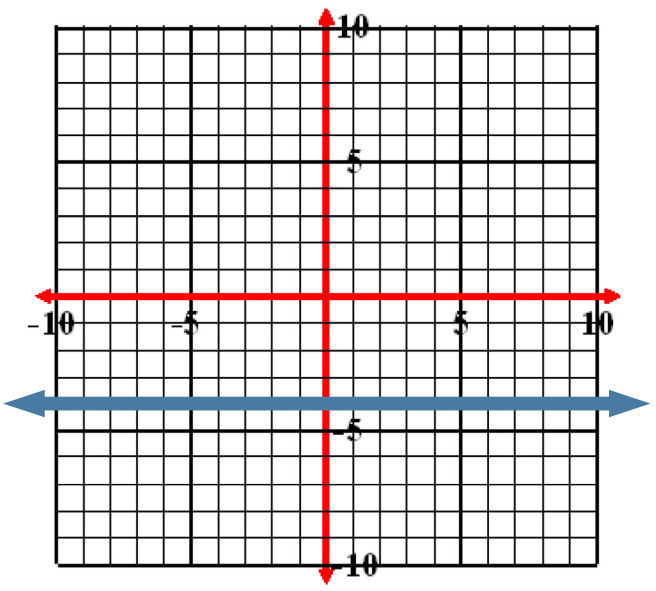
SLOPE OF HORIZONTAL AND VERTICAL LINES

HORIZONTAL LINES

m = 0

have no RISE

zero in NUMERATOR

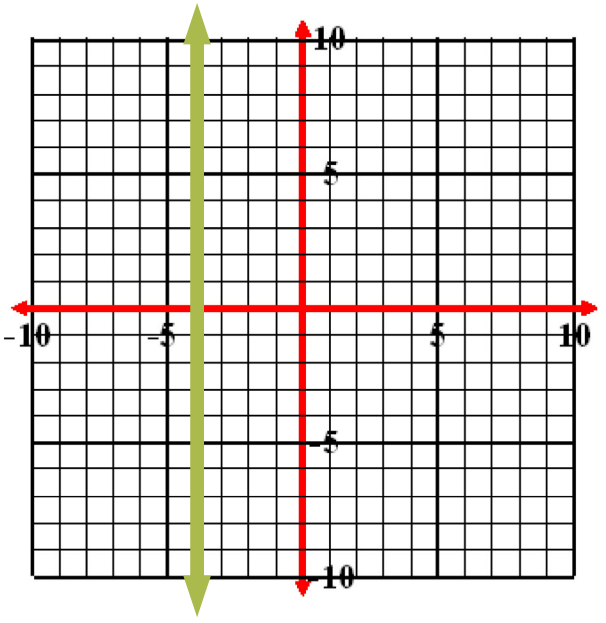


VERTICAL LINES

m is undefined

have no RUN

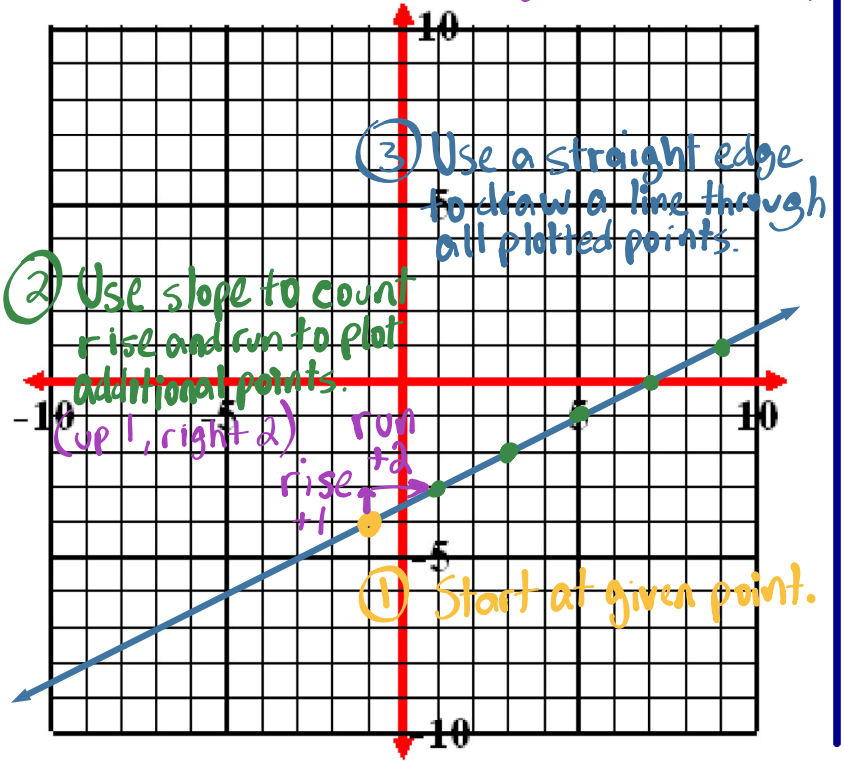
zero in DENOMINATOR



SLOPE

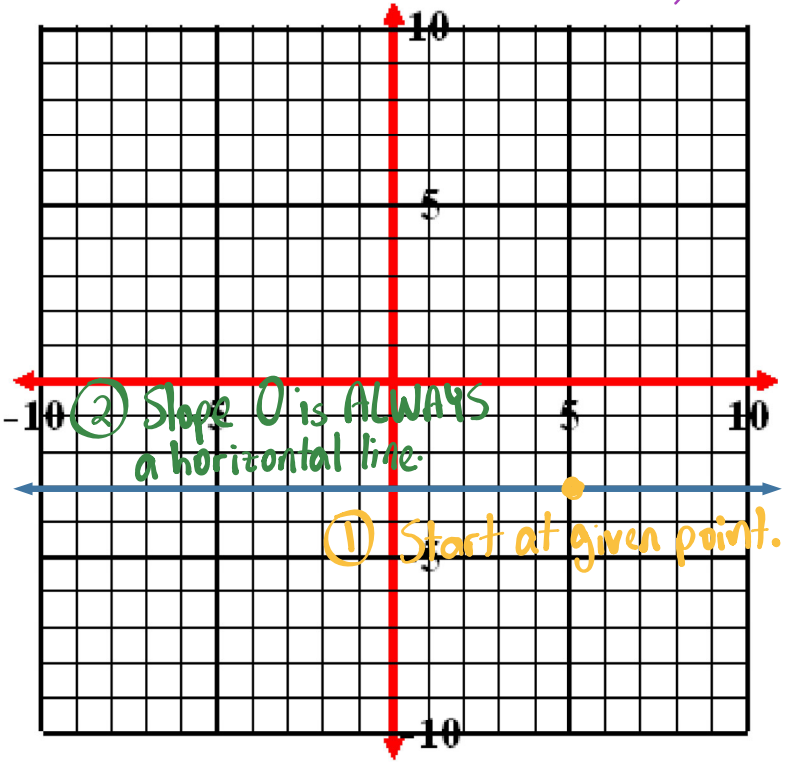
ex10) Graph the line that has a slope of 1/2 and passes through (-1, -4).

$m = \frac{1}{2}$ ← rise (up 1)
← run (right 2)



ex11) Graph the line that has a slope of 0 and passes through (5, -3).

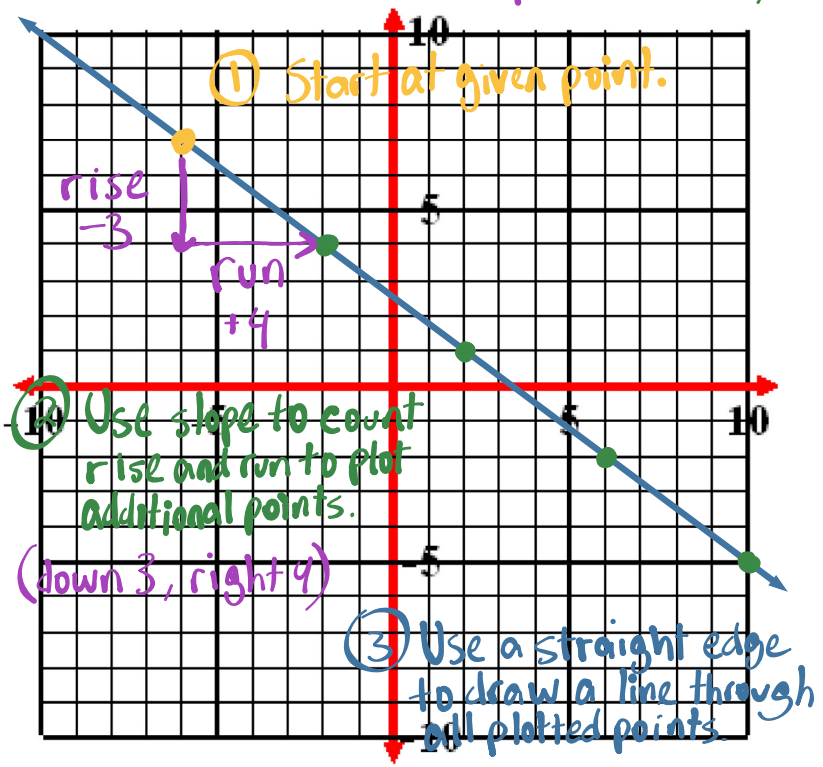
m = 0 (horizontal line)



SLOPE

ex12) Graph the line that has a slope of -3/4 and passes through (-6, 7).

$m = \frac{-3}{4}$ ← rise (down 3)
← run (right 4)



ex13) Graph the line that has undefined slope and passes through (9, -1).

m is undefined (vertical line)