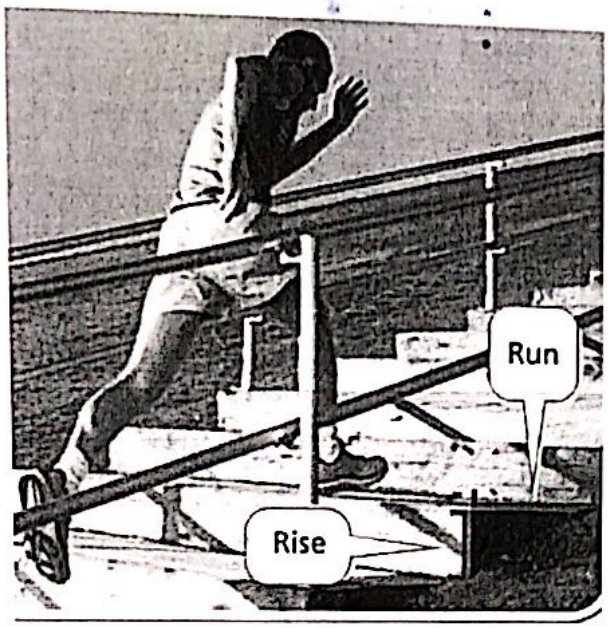
Name: _____ Date: _____ Hour: _____

Unit 3A: Day 2: Drawing Stairs to Represent Rates

Focus Question: What does rise over run mean?

A. Mathematicians call rate of change "slope" and define it as the ratio of the dependent variable to the independent variable (like we saw yesterday). It is very common to hear this ratio referred to as "rise over run."



1. What is a **ratio**?

relationship between #'s

2. Which direction does "rise" go?

↕

3. Which axis goes this direction?

y-axis

4. Which direction does "run" go?

↔

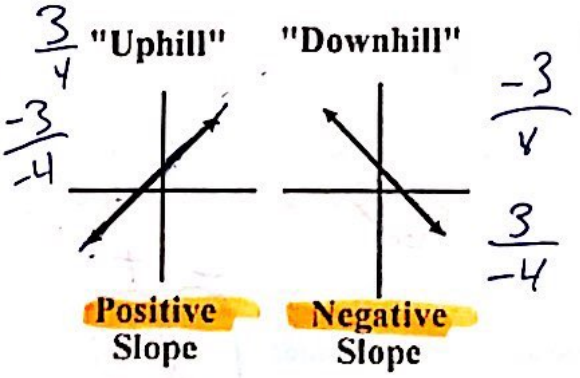
5. Which axis goes this direction?

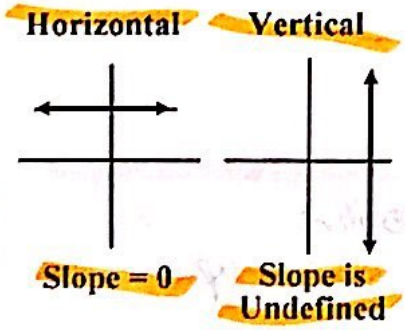
x-axis

6. Fill in the blanks to explain why slope is commonly called rise over run.

Slope = Rate of Change = $\frac{\text{Change in } D.V.}{\text{Change in } I.V.} = \frac{\text{Change in } y \text{ axis}}{\text{Change in } x \text{ axis}} = \frac{\text{Vertical Change}}{\text{horizontal Change}} = \frac{\text{Rise}}{\text{Run}}$

Remember that we read graphs from left to right so it is most common to "run right" which means the rise can go up or down. This means the slope can be either positive or negative.



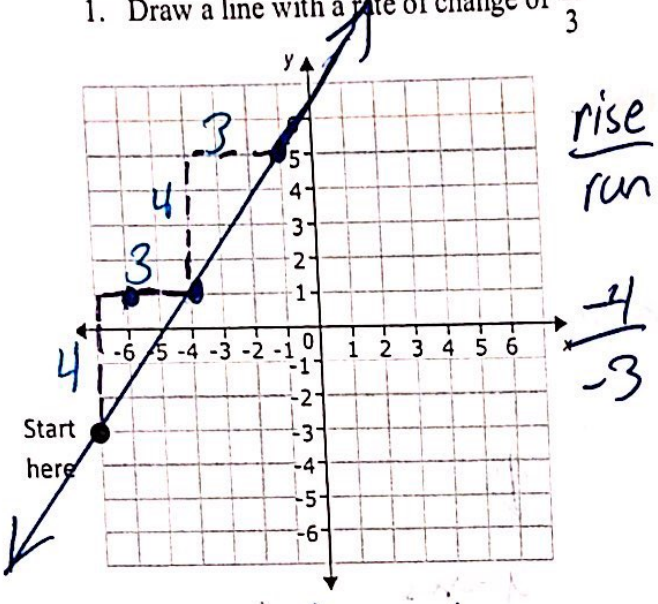


There are also two special types of lines that we sometimes encounter. They still have slopes.

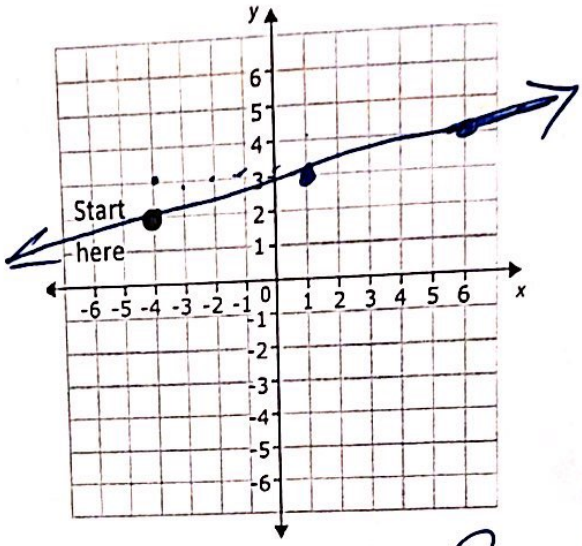
You cannot say "no slope." All lines have a slope or rate of change.

B. Drawing Lines With Positive Slopes Using Stairs

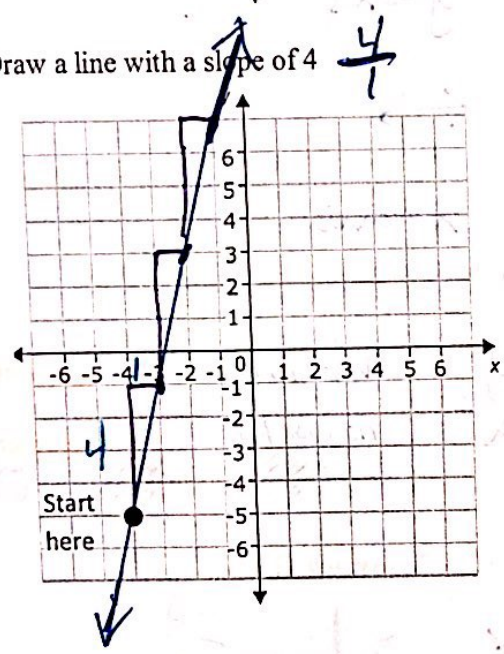
1. Draw a line with a rate of change of $\frac{4}{3}$



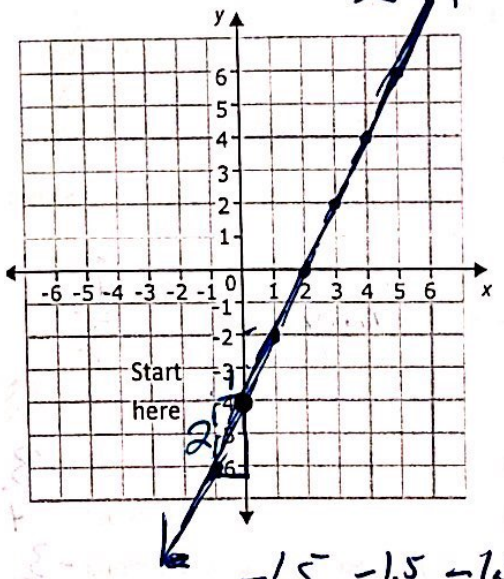
2. Draw a line with a slope of $\frac{1}{5}$



3. Draw a line with a slope of 4 $\frac{4}{1}$



4. Draw a line with a rate of change of 2 $\frac{2}{1}$



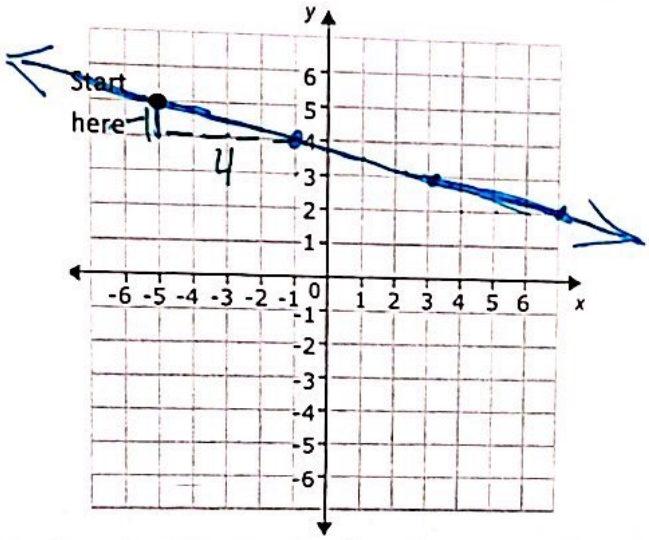
C. Drawing Lines with Negative Slopes using Stairs

1. Is the following true or false? (use a calculator to help you decide) $-\frac{3}{2}=\frac{-3}{2}=\frac{3}{-2}$

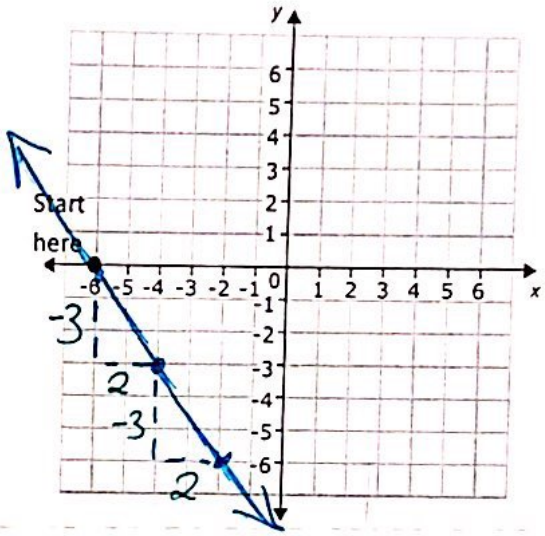
2. Is the following true or false? $-\frac{4}{5}=\frac{-4}{-5}$ (− +)

3. So when a slope is negative you can put the negative with either the numerator or the denominator, but NOT BOTH. Because we usually run right (which is the positive direction), it is most common to put the negative with the numerator and move ~~down~~ down.

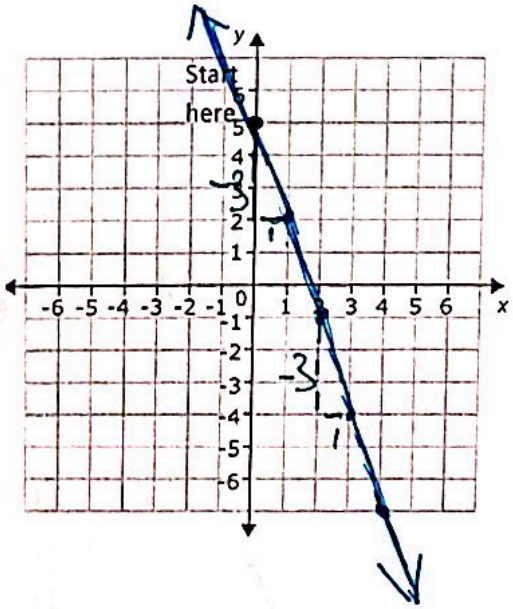
4. Draw a line with a rate of change of $-\frac{1}{4}$



5. Draw a line with a slope of $-\frac{3}{2}$



6. Draw a line with a slope of -3 $= \frac{-3}{1}$



7. Draw a line with a rate of change of -1