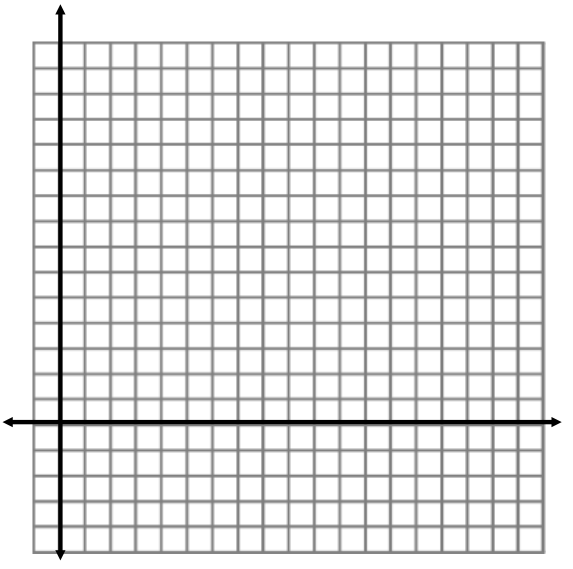
Date: _____

5.6 Connecting Variation, Slope and First Differences

Bellwork:

The table below shows the height, relative to the ground, of a snail as it crawls up a pipe.

Time, t (min)	Height, h (m)
0	-3
3	1
6	5
9	9
12	13



1. Graph the relation. Is it a direct or partial variation? How do you know?

2. Describe the pattern in the 't' values in words.

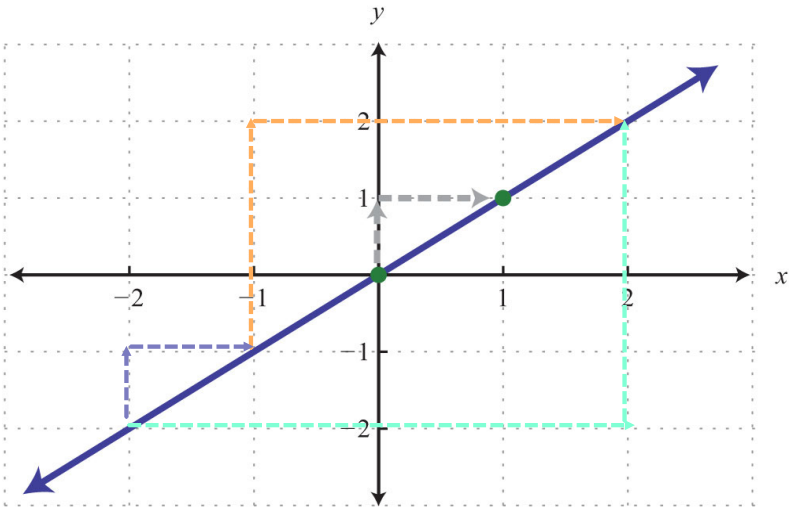
3. Use first differences to confirm that the relation is linear. What is the pattern in the 'h' values?

4. Calculate the slope from the graph. How does the slope relate to the first differences and the differences in the 't' values?

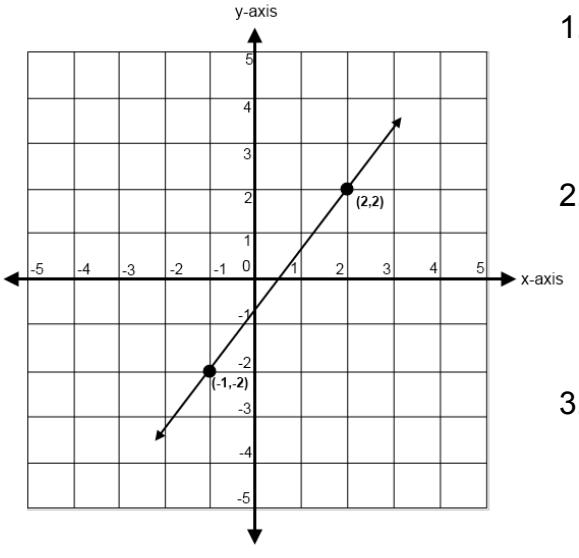
5. What was the initial height of the snail? At what rate was it climbing the pipe?

6. Write an equation to model the snail's climb.

As most of you have discovered, the slope of a linear relationship is constant. No matter which points you choose to use to find your slope, you will get the same ratio in lowest terms for the rise and the run (see picture below).



We already know that the slope of a line can be found using the relationship m = rise. Let's use the diagram below to find a **formula for slope**.
run



1. Draw a triangle and find slope.

2. How can we find the rise using the ordered pairs?

3. How can we find the run using the ordered pairs?

Practice Problem

Find the slope of each of the following lines.

a) Passes through (-3, 1) and (5, -2).

b) Passes through (-55, 40) and (97, -22). Why wouldn't you want to find this slope by graphing?

Equations of Lines

The general equation for any linear relation takes the form **y = mx + b**.

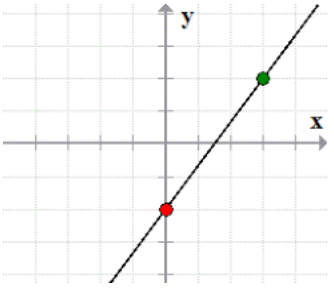
What does each part of the equation represent, using vocabulary that we already know?

Practice Problem

Write an equation for each of the linear relations below.

a) An electrician charges $100 for a visit plus $35 per hour of work. Write an equation to model the cost of a single visit.

b)



c)

x	y
-2	6
0	0
2	-6
4	-12
6	-18

When you are using a table of values to find the rate of change (slope), make sure that you compare the change the y-values to the change in the x-values!