

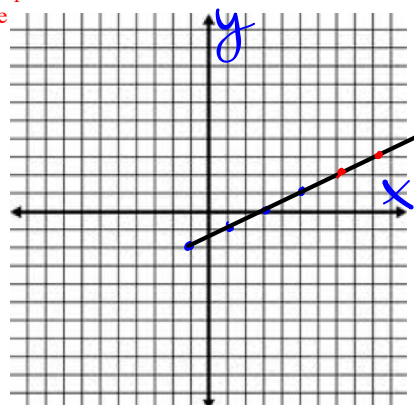
1. On the coordinate plane to the right, label the x and y axis.

2. Plot a point at (-1, -2). From that point, go up 1 and right 2 and plot a second point. From that second point go up 1 and right 2 again and plot your third point. From that point, go up 1 and right 2 again and plot the 4th point. Write the

ordered pair for the 4th point here (5 , 1)

How would you describe a line that contain each of these points?

A Straight Line



3. Using your ruler sketch a line that runs through these points and plot several other points that lie on that line. Write down the directions for finding the next point.

UP 1 & over 2

A **ratio** is a mathematical term that compares two objects. In our example we are comparing how far we move up/down to how far we move left/right. So we can write that **change** or distance as a ratio. This ratio is called the slope. Our ratio would be:

$$\frac{1}{2}$$

4. What makes the line straight rather than being curvy?

Slope is constant

When we move vertically (up and down) we are moving parallel to the y-axis.

We call this the change in y, because the y-coordinates are changing.

When we move horizontally (right and left) we are moving parallel to the x-axis.

We call this the change in x because the x-coordinates are changing.

This means that our ratio can be called the rate of change. Therefore slope is the ratio of the change in our y and the change in our x.

$$\frac{\text{how far we move up/down}}{\text{how far we move right/left}} = \frac{\text{change in } y}{\text{change in } x}$$

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

The slope of a line is the measure of how

Steep a line is.

When the slope is a small number then the line will be less steep.

When the slope is a large number the line will be MORE steep.

In the picture to the right list the lines that satisfy the following:

1. Have a slope close to 0

(no steepness)

5

2. Have a fairly small slope

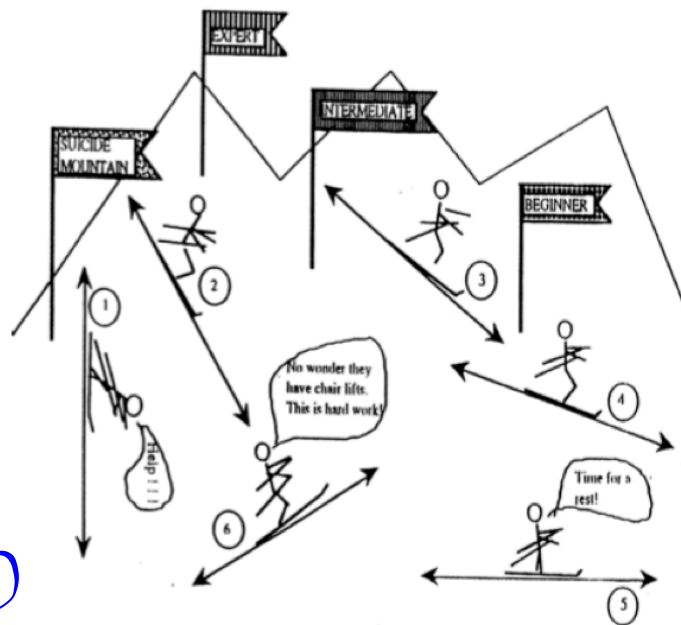
(not very steep)

4 3

3. Have a large slope (steep)

2, 1, 6

4. None of the above



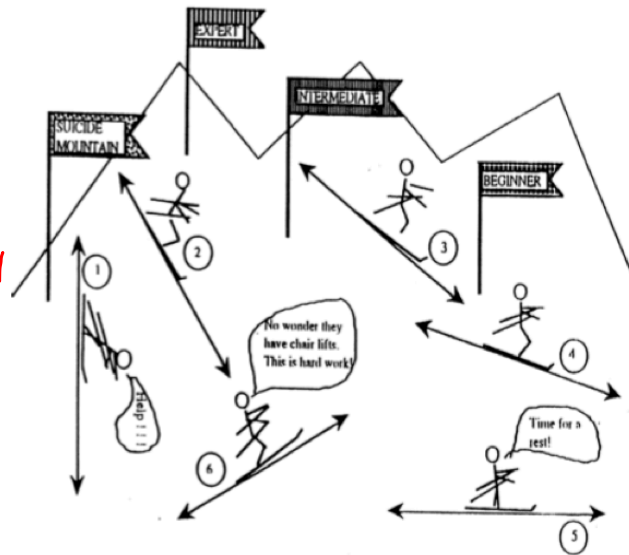
Which of the above lines have:

Positive slope: 6

Negative slope: 2, 3, 4

0 slope: 5

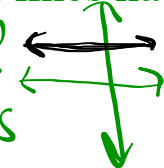
No slope at all: 1



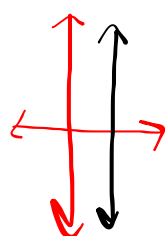
What is the difference between having 0 slope and not having slope?

0 Slope: NO steepness
 NO slope (undefined): Steepness is not definable

What kind of lines have 0 slope? Why?

Horizontal
 Flat lines  $\frac{0}{X} = 0$

What kind of lines have NO slope? Why?

Vertical lines
 They go on forever  $\frac{X}{0} = \text{undefined}$

Remember from above that we can think of slope as:

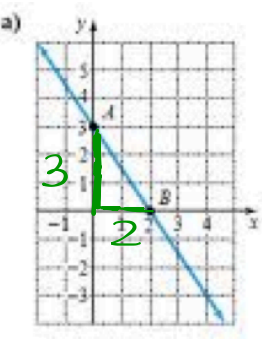
$$\frac{\text{how far we move up/down}}{\text{how far we move right/left}} = \frac{\text{change in } y}{\text{change in } x} = \frac{\text{rise}}{\text{run}} = \text{slope}$$

To be able to find (give the numerical ratio) slope we need to know how far we move up/down and how far we move Right/left.

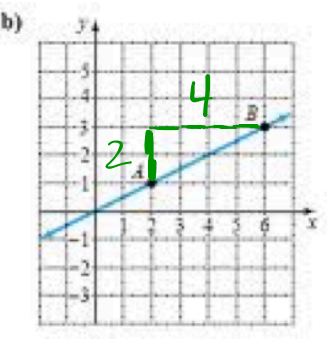
To do this on a graph we choose the points where our line crosses a grid intersection.

We then count how far we move up/down and how far we move Right/left from one grid intersection to another.

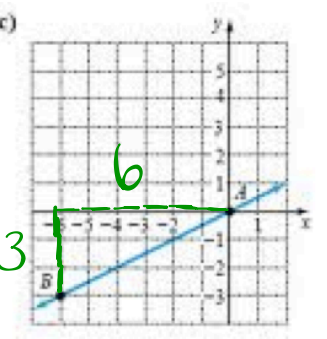
The slope is the change in the y over the change in the x.



Example a)
 1. Positive or Negative slope?
 The slope is: $-\frac{3}{2}$



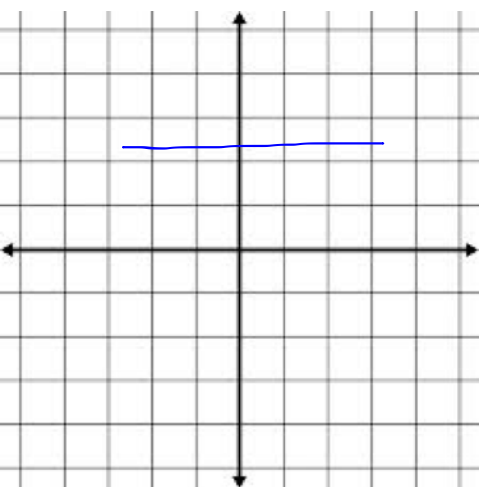
Example b)
 1. Positive or negative slope?
 The slope is: $\frac{2}{4} = \frac{1}{2}$



Example c)
 1. Positive or negative slope?
 The slope is: $\frac{3}{6} = \frac{1}{2}$

On the following two coordinate planes draw a line with the following slopes:

Slope: 0



Slope: NONE

