

9 math

# Unit 5

## Linear Relations

booklet 3

May 19<sup>th</sup> - May 26<sup>th</sup>

Name: Answers

\*Visit [www.burnspvw.weebly.com](http://www.burnspvw.weebly.com) to help fill this booklet\*

# Quick Review

Last week, we were introduced to our new favorite equation:

$$y = mx + b$$

We practiced finding "m" from a table of values:

x	y
-1	-5
0	-3
1	-1
2	1
3	3

+ 2  
+ 2  
+ 2  
+ 2

$$y = \underline{2}x + b$$

+ 2

And we practiced finding "b" by:

- 1) Plugging in any pair of (x,y) values
- 2) Solving for "b"

x	y
-1	-5
0	-3
1	-1
2	1
3	3

(x,y)  
(2,1)  
X=2  
Y=1

$$y = 2x + b$$

$$(1) = 2(2) + b$$

$$1 = 4 + b$$

$$\underline{-3 = b}$$

- 3

Once we have "m" and "b", we plug them into the original equation, and leave "x" and "y" as variables!

$$y = \underline{2}x - \underline{3}$$

# What is "m"?

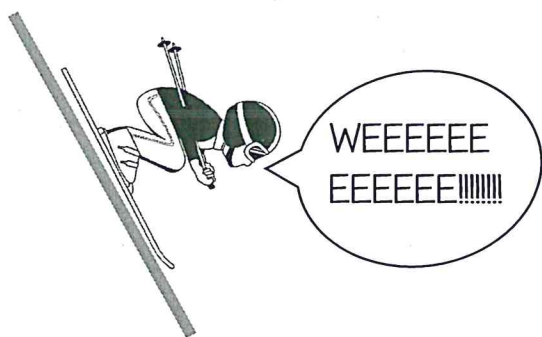
When we look at equations in the form  $y=mx+b$  we can find out information immediately about what the linear graph will look like!

"m" is the **SLOPE OF THE LINE**

The "slope" of a line is how STEEP it is.

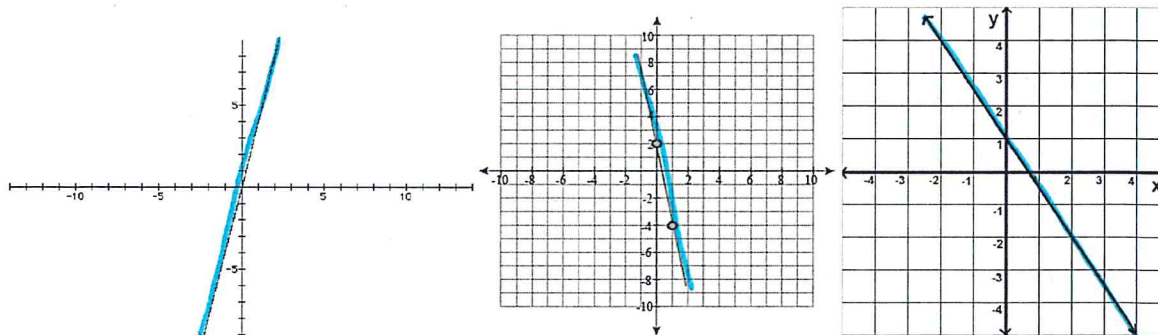
Think of skiing...

If a hill is very STEEP it looks like this:



- FUN! / SCARY!
- **STEEP** INCLINE
- **LARGE** SLOPE
- **BIG "m"**

This is what these graphs look like:



\*\*\*NOTICE THEY DON'T ALL HAVE TO BE GOING THE SAME DIRECTION!\*\*\*

Because these linear graphs are STEEP, they have a LARGE slope. This means their "m" numbers will be bigger than ONE.

EX:  $y=3x+2$  or  $y=5x-1$  or  $y=11x+4$  or  $y=32x-5$

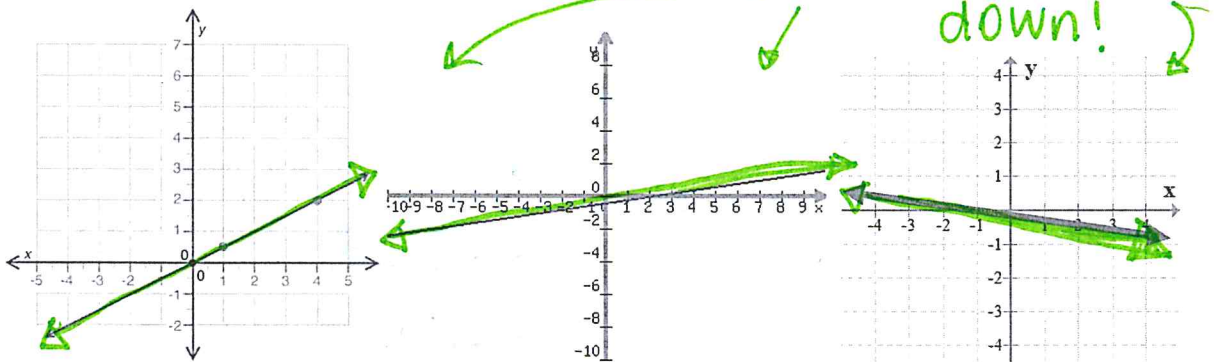
PICTURE SKIING  
down the line!  
line!

If a hill is NOT steep it looks like this:



- Less fun
- NOT very steep
- SMALL SLOPE
- SMALL "m"

This is what these graphs look like:



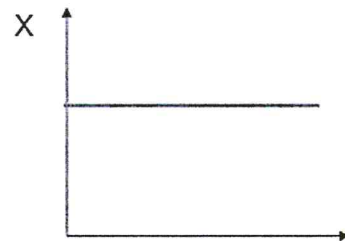
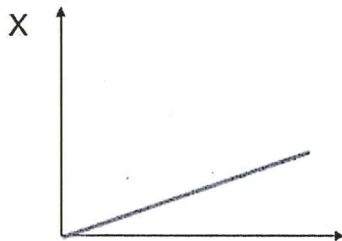
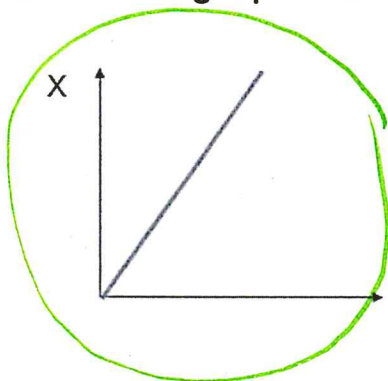
\*\*\*NOTICE THEY DON'T ALL HAVE TO BE GOING THE SAME DIRECTION!\*\*\*

Because these linear graphs are NOT steep, they have a SMALL slope, which means their value or "m" will be small.

EX:  $y = \underline{x} + 2$  or  $y = \underline{0.5}x - 1$  or  $y = \underline{1.2}x + 4$  or  $y = \underline{0.75}x - 5$

Practice :

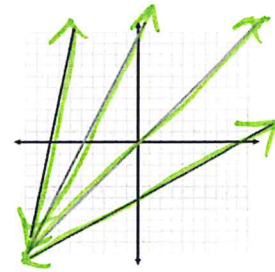
Circle the graph that has the largest "m":



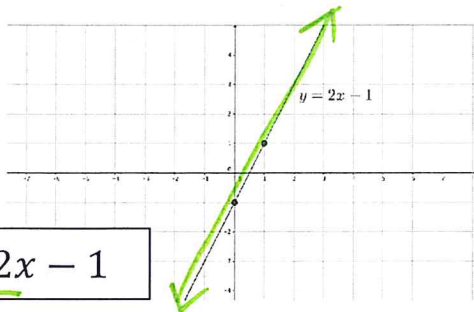


# + or - "m"?

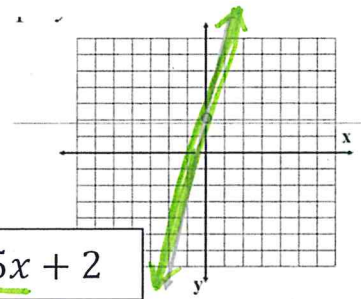
If your slope is POSITIVE, your "m" value will be POSITIVE. These linear graphs are "going up":



EXAMPLES:

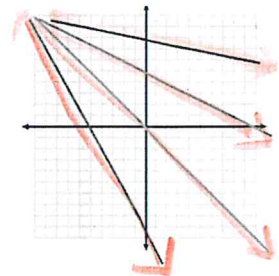


$$y = +2x - 1$$

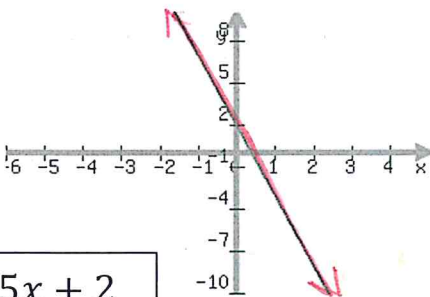


$$y = +5x + 2$$

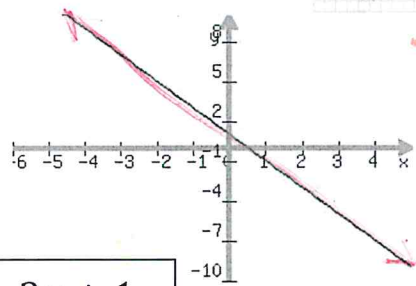
If your slope is NEGATIVE, your "m" value will be NEGATIVE. These linear graphs are "going down":



EXAMPLES:

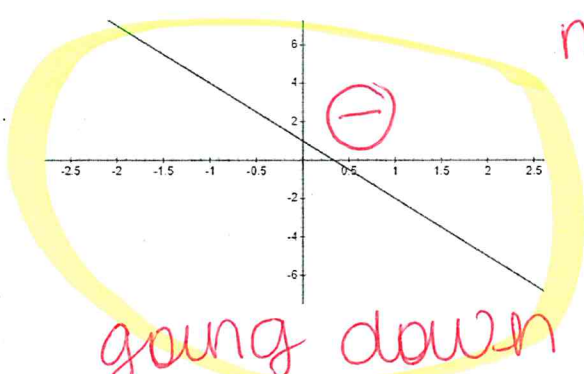


$$y = -5x + 2$$

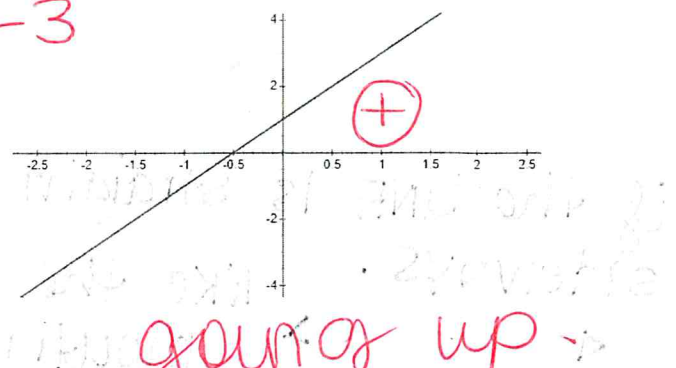


$$y = -2x + 1$$

Which of the following is  $y = -3x + 1$ ????????????????????

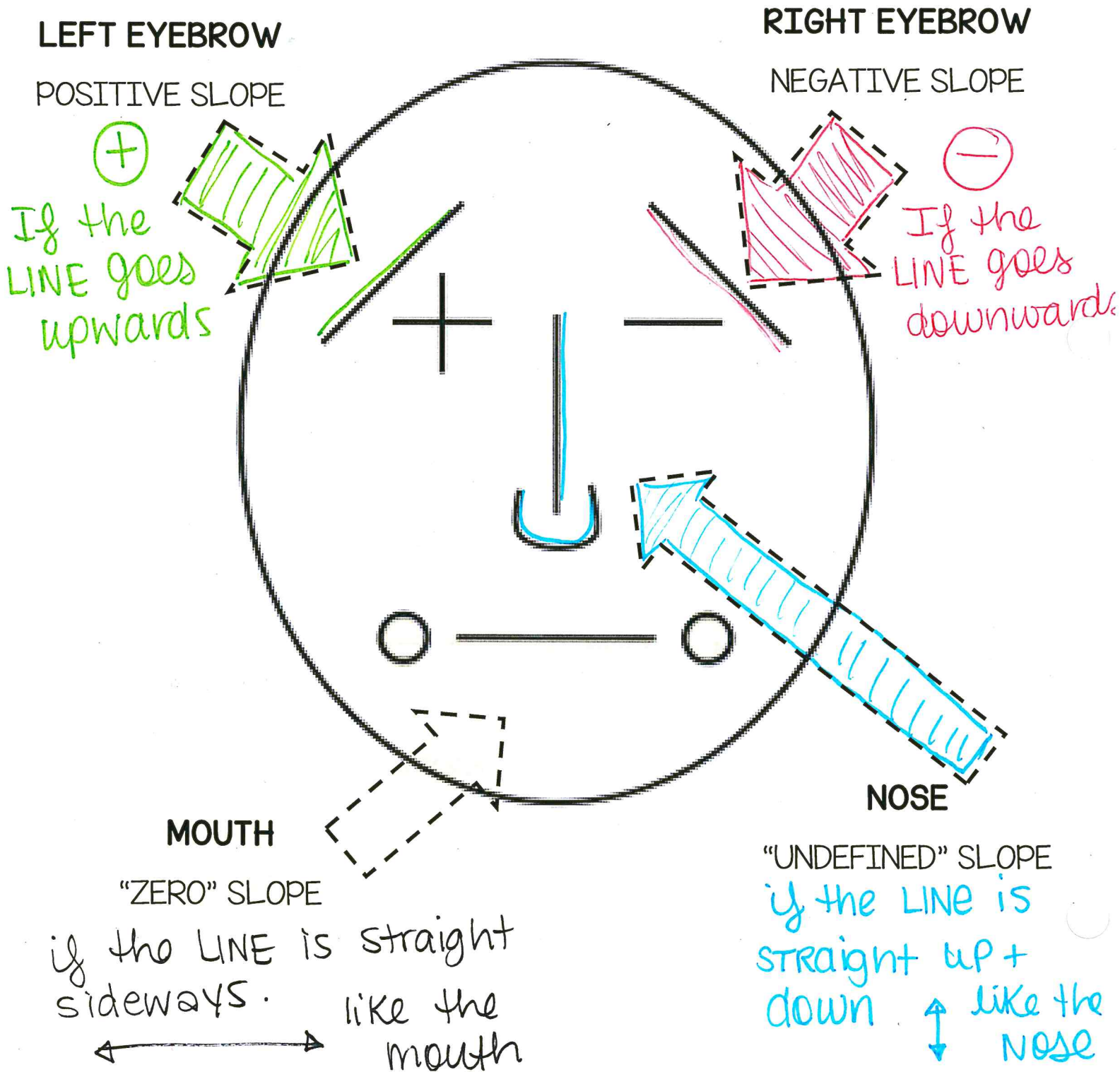


$$m = -3$$



# Slope Dude

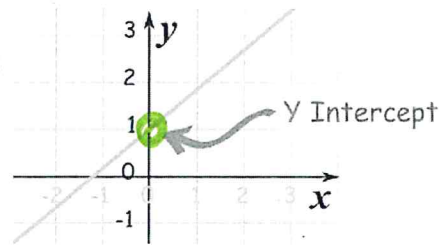
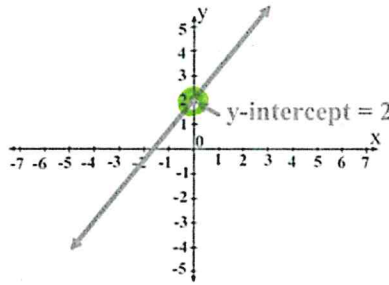
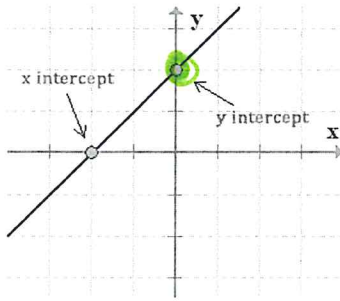
Say HELLO to Mr.Slope Dude! He is our best friend in this unit, because he helps us remember what linear graph slopes look like!



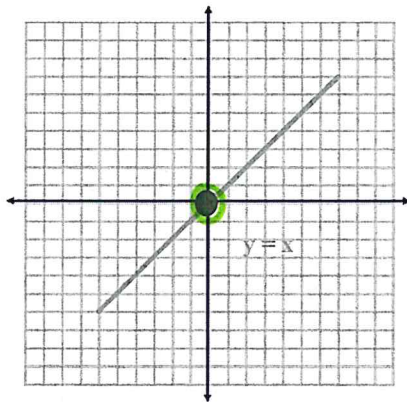
# What is "b"?

"b" is what we call the **Y INTERCEPT** of a linear graph.

The "Y INTERCEPT" is where the line crosses the y-axis.



If we think of the regular graph  $y=x$  ...



We can think of  $y=x$  in the form  $y=mx+b$  as...

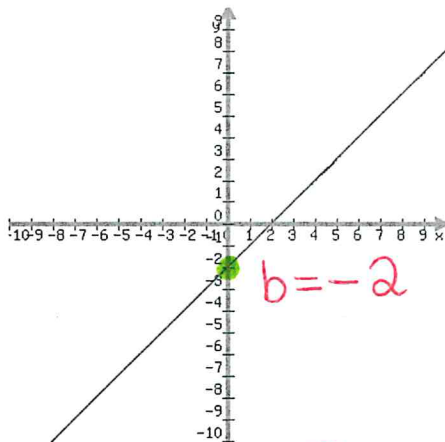
$$y = 1x + 0$$

[ $m=1$  and  $b=0$ ]

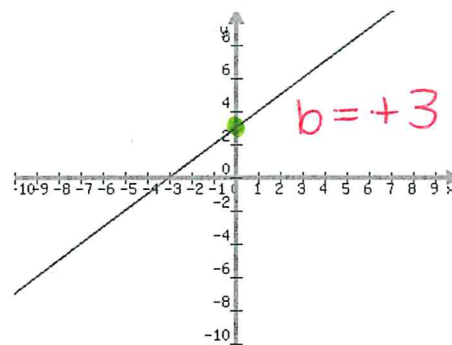
It makes sense that  $b=0$  because of the y intercept @ (0,0).

If we compare all graphs to this original  $y=x$ , we notice that our "b" (y-intercept) is

★ **HOW MUCH WE MOVE THE GRAPH UP OR DOWN** ★



$$y = x - 2$$



$$y = x + 3$$

