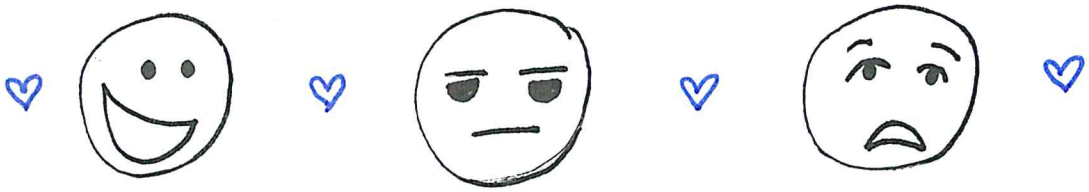
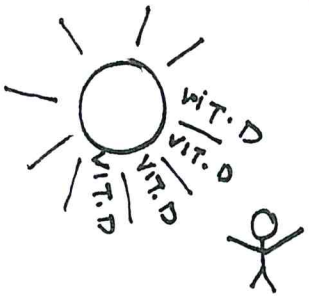
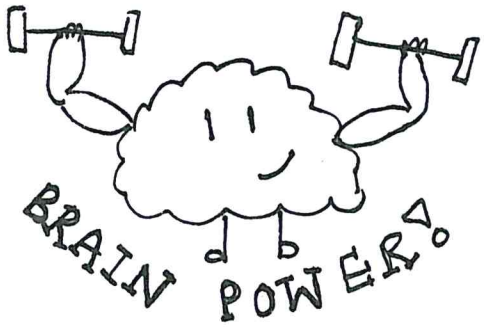
I miss your smiling faces! And your annoyed faces! And even your bored faces!



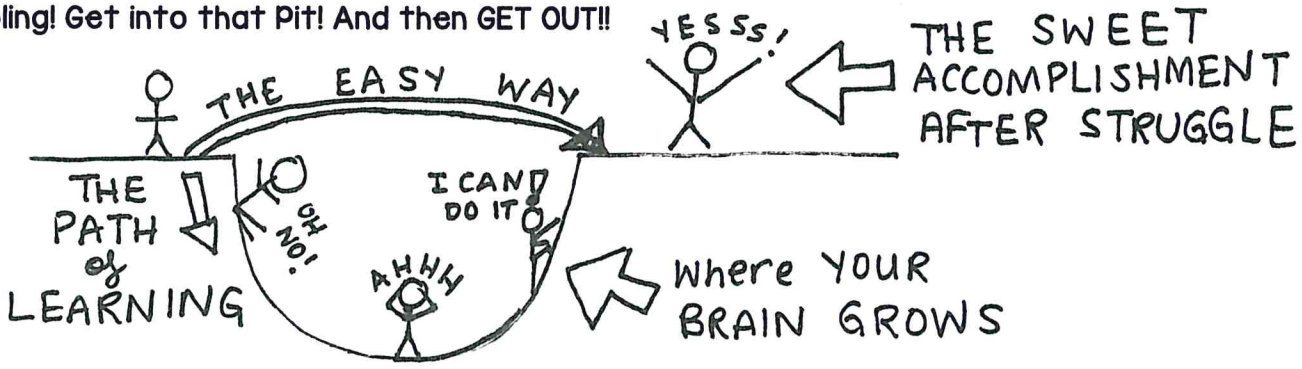


Quick shout out to the month of May for being full of sunshine so far! Hoping you are all getting some sweet vitamin D from the sun. I know that with the weather becoming nicer, there is added difficulty in staying focused and putting energy into your learning.

I am so proud of the work you are doing so far. You are proving that you are superstars and will not let school closure get in the way of your learning. Big thumbs up to you doing what you can and getting some brain exercise into your days. I've blabbbbbbed away too many times to you about the mental, emotional, and physical benefits of problem solving and brain-exercise through learning.



Remember the analogy of "The Pit", this is soooooooooooo relevant with home-schooling! Get into that Pit! And then GET OUT!!



Here are some fun days for you to look forward to this week:

- May 12th - **International Hummus Day** (maybe try some hummus!)
- May 15th - **International Day of Families** (be nice to your family...for one day...)
- May 16th - **International Day of Light** (play with flashlights! Keep your lights off all day!)
- May 18th - **International Museum Day** (there are TONS of free virtual tours available online right now! A few incredible ones include: The Louvre, The Met, The Smithsonian, NASA Langley Research Center, and The Museum of the USA Air Force...check them out!!)

Hoping you are happy and healthy, and learning every day,

Ms. Burns

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9 Math

This week:

- ☐ Start wherever you left off!
- ☐ Organize all yellow assignments and test to send to me! (With the bus driver or by taking photos and sending them to me online!)
- ☐ U5 Booklet 2
- ☐ U5A2
- ☐ Send me a message if you have any questions!

9 math

Unit 5

Linear Relations

booklet 2

May 12th - May 19th

Name:_____

Visit www.burnspvw.weebly.com to help fill this booklet

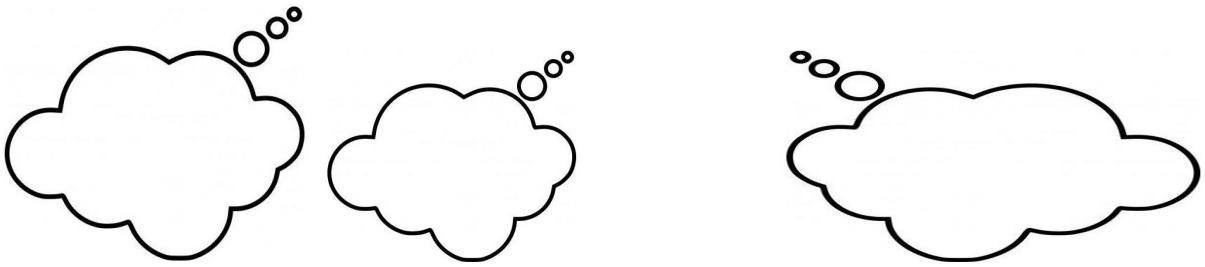
Patterns and Equations

This lesson looks at creating NEXT LEVEL equations for rules of input/output tables.

Input/output tables are also known as Table of Values.

When asked to "write an equation" we should keep in mind a few things...

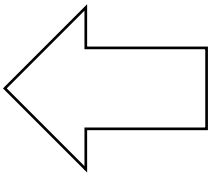
"write an equation"



An algebraic equation can either start as:

X= _____

Y=_____



Our linear relation equation will always follow the pattern:

$$y = mx + b$$

y=mx+b

In your linear relation equation, "y" and "x" will always stay as variables (letters). You will have to find the numbers that "m" and "b" are...

Finding "m"...

Your "m" will always be the pattern you find with your "y" values:

x	y
2	20
4	40
6	60
8	80
10	100
12	120

$y = \square x + b$

x	y
5	8
6	9
7	10
8	11
9	
10	

$y = \square x + b$

x	y
-2	11
-1	21
0	31
1	
2	

$y = \square x + b$

x	y
-2	10
-1	11
0	12
1	
2	

$y = \square x + b$

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

$y = \square x + b$

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

$y = \square x + b$

y=mx+b

Finding "b"...

Your "b" will always be what needs to be added / subtracted from "mx" to make the equation / rule work for ALL values.

***ALWAYS FIND "m" FIRST!**

x	y
2	20
4	40
6	60
8	80
10	100
12	120

$y = 10\,x + \square$

x	y
5	8
6	9
7	10
8	11
9	
10	

$y = 1x + \square$

x	y
-2	11
-1	21
0	31
1	
2	

$y = 10x + \square$

x	y
-2	10
-1	11
0	12
1	
2	

$y = 1x + \square$

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

$y = 2x + \square$

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

$y = -1x + \square$

y=mx+b

Verifying your equation.

- ✓ If you have found the equation (or are given the equation) you need to be able to check that it is correct.
- ✓ Each PAIR of values (x,y) must work with the equation.

For each table of values below, fill in the table (follow the "y" pattern), and check to see if the given equation is correct. If it is wrong, give the proper equation.

Example:

Boxes Sold	Profit
10	5.00
11	5.50
12	6.00
13	
14	
15	

$$y = 0.5x + 5$$

Number of Tickets	Cost
1	6
2	12
3	18
4	
5	
6	

$$y = 6x + 1$$

x	y
-2	-2
-1	
0	2
1	4
2	

$$y = 2x + 2$$

x	y
-2	-7
-1	-4
0	-1
1	2
2	5

$$y = 3x + 1$$

x	y
-2	-21
-1	-11
0	-1
1	9
2	19

$$y = 9x - 1$$

Remember, that a **LINEAR EQUATION** is an equation that makes a line.

One way to identify a linear equation, is that the exponent of the "x" is always ONE.

For an equation to be LINEAR, it <u>does not</u> necessarily need to be in the form $y = mb + b$

For example, the following ARE all linear equations:

$y = x + 3$	$y = 43x$	$y + 19 = \frac{1}{2}x$	$\frac{y}{90} = -x$

The following are NOT (their "x" exponents are not ONE)

$y = x^2 + 3$	$y = 43x^4$	$y + 19 = \frac{1}{2}x^3$	$y = -x^5 + 90$

Write whether the following equations are LINEAR or NON-LINEAR:

1) $5y = 7x + 6$

2) $y = 4 + \frac{x^5}{3}$

3) $y - \frac{x}{9} = 12$

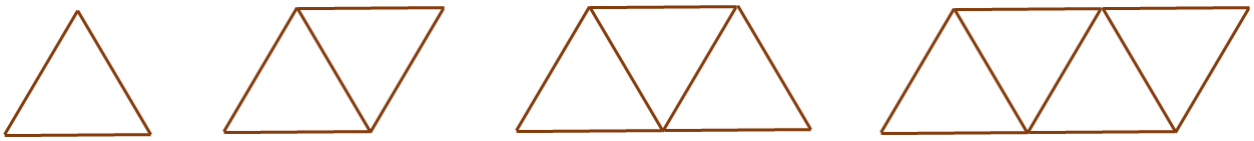
4) $2x^3 = y - 11$

5) $9x^4 - y = 13$

6) $y = -5(x + 7)$

Recognizing Patterns and Creating Equations

Consider the following pattern:



Make a table of values for the figure number (x) and the number of toothpicks (y)

x	y
1	
2	
3	
4	
5	

Write an equation for this pattern in the form $y = mx + b$

How many toothpicks will there be in figure 45?

Which figure will have 17 toothpicks?

NAME:_____

U5:A2 Linear Equations

/15

1) Which of the following is a linear function?

i) $y = 4x^4 + 10$ ii) $x^2 = 7y - 3$ iii) $y + \frac{x}{5} = 14$ iv) $8y = -5x(3 + x)$

[1]

2) Which of the following is a nonlinear function?

i) $2x + 1 = y$ ii) $y = -\frac{x^3}{9} + 12$ iii) $y + 6x = 5$ iv) $y = -10x - 3$

[1]

3) Find the value of "m" in the y=mx+b equation for the following tables:

x	y
1	4
2	7
3	10
4	13
5	16

x	y
1	3
2	7
3	11
4	15
5	19

x	y
1	11
2	21
3	31
4	41
5	51

$y = \square x + b$ $y = \square x + b$ $y = \square x + b$

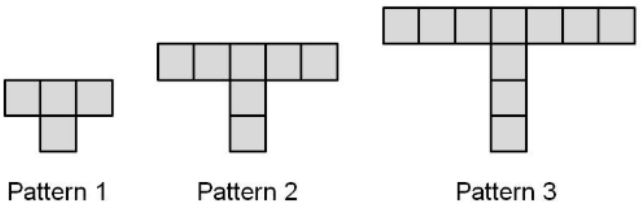
[3]

4) When creating an algebraic expression for a linear relation, in the form y=mx+b, which two variables (letters) stay as variables?

[1]

5) What will all linear relations look like on a graph?

[1]



6) Create a table of values for the above pattern, with the pattern number (x) and the number of blocks (y). [2]

x	y
1	
2	
3	
4	
5	

What equation can you use to describe this pattern? Write in the form y=mx+b

[2]

How many blocks will be in the 10^{th} pattern number?

[2]

What pattern number will have 46 blocks?

[2]