GSE Algebra 1 6.1 – 6.2 – **Quadratics Notes** Name: _____

Cell phones often indicate the strength of a phones' service with a series of bars.
Let's look at the following pattern.

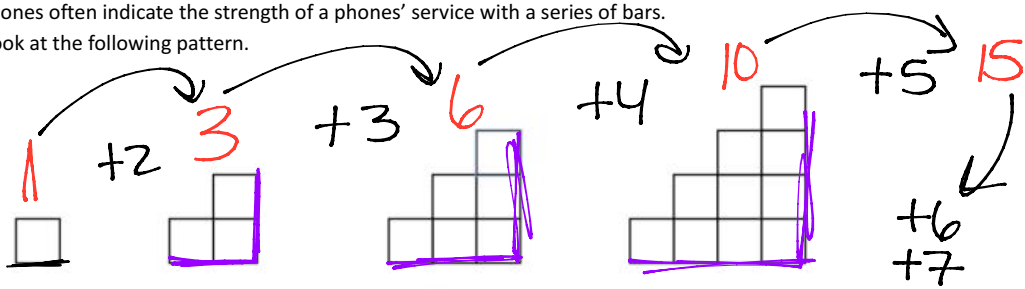


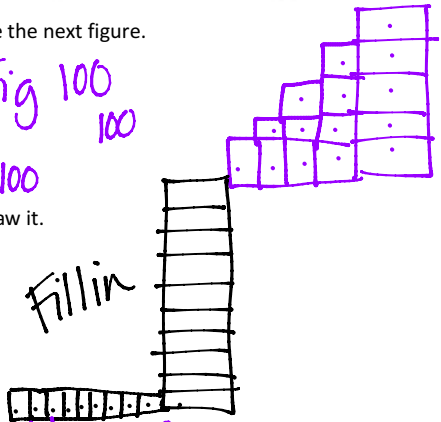
Figure 1 Figure 2 Figure 3 Figure 4

1) Assuming that the pattern continues, create the next figure.

15 blocks

Fig 100
100
100

Add one column of that Figure



2) How many blocks would figure 10 have? Draw it.

55

3) Create a table of the pattern.

Figure #	# of squares
1	1
2	3
3	6
4	10
5	15
6	21
7	28
8	36
9	45
10	55
11	66

+2 +3 +4 +5 +6 +7 +8 +9 +10 +11

Double Difference → 2nd Difference +1

Quadratic

Looking at the table to the left, is there a pattern that you see? In words, describe what is happening to get to the next picture. For example, do you want to draw out 154 pictures to get the 154th image?

take image 153 and all 154 blocks

Recursive need prev term

either OR

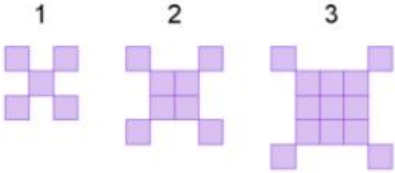


Figure #	1	2	3	4	5	6	7	8	9
# of squares	5	8	13	20	29	40	53	68	85

+3 +5 +7 +9 +11 +13 +15 +17

+2 +2 +2 Quadratic

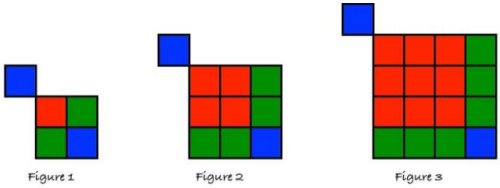
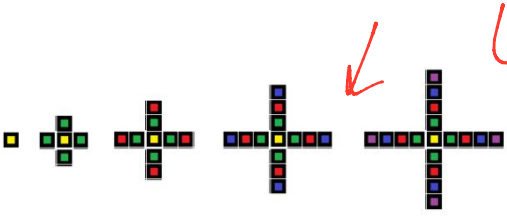


Figure #									
# of squares									



Linear +4

Figure #									
# of squares									

For each of the tables below, look at the **y-value column** or **row**. Find the difference. Then if needed, find the 2nd difference. Based on that information, **label** them as **linear**, **exponential** or **quadratic** (this is the new one).

+/- x Fraction Double difference

Quadratic

x	y
0	24
1	6
2	0
3	6
4	24
5	54

-18 -6 +6 +18 +30 → +12

x	y
1	5
2	20
3	45
4	80
5	125
6	180
7	245
8	320

x	y
-2	-5
-1	-2
0	1
1	4
2	7
3	10

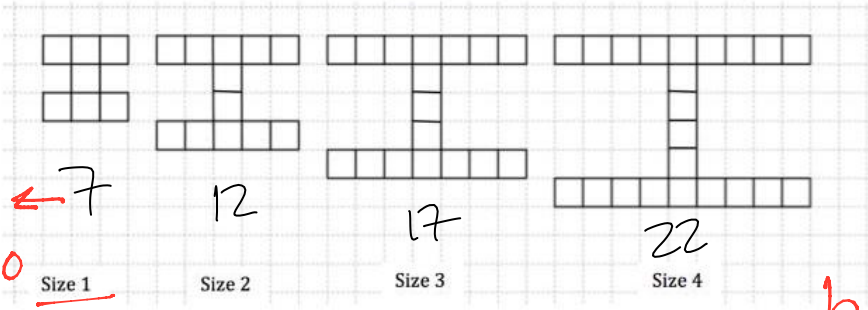
x	y
-1	½
0	1
1	2
2	4
3	8
4	16

x	-2	-1	0	1	2	3	4
y	4	1	0	1	4	9	16

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

Marco has started a new blog about sports at Imagination High School (mascot: the fighting unicorns) that he has decided to call "I Site". He created a logo for the web site that looks like this:

He is working on creating the logo in various sizes to be placed on different pages on the website. Marco developed the following designs:



Linear

+5

slope

2 ← 7 12 17 22

size 0

b = y-int

0 term

1) Can you come up with a model/equation that could fit this?

$y = mx + b$ $y = 5x + 2$

X	Y
0	2
1	7
2	12
3	17
4	22

2) How many squares will be needed to create the size of the 100 logo?

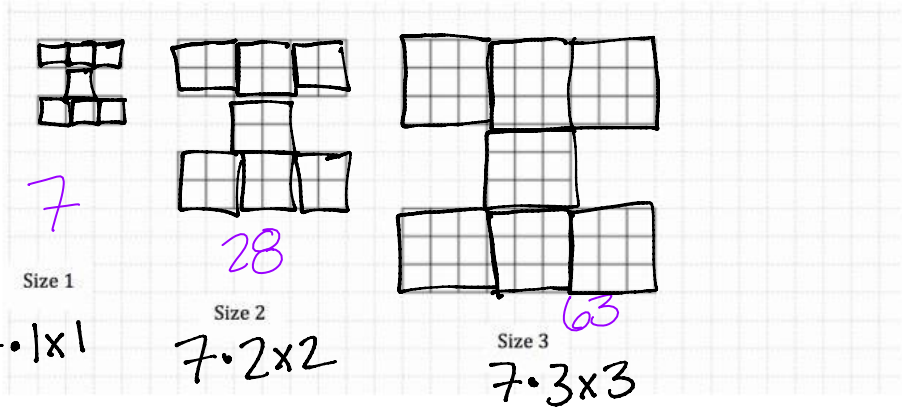
$y = 5(100) + 2$

502 squares

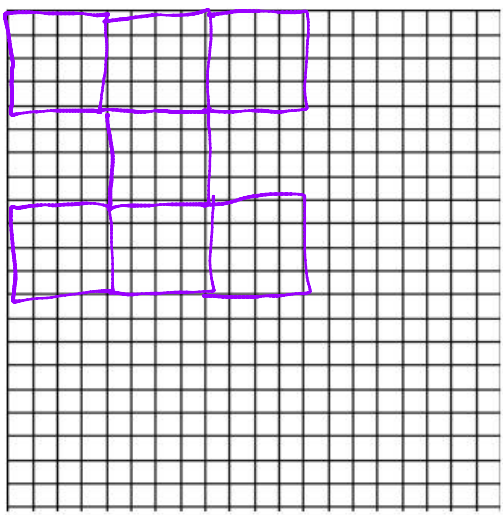
Linear

Marco decides to experiment with making his logo "blockier" so that it looks stronger.

Here's what he came up with:



3) Assuming that this pattern is good, draw what the image would look like for size #4 on the grid below. How many blocks make up this pattern?



7•4x4 = 112 blocks

4) Can you come up with a model/method to figure out an equation for this?

$y = 7x^2$

size 100

$7(100)^2 =$ 70,000 blocks

5) How are the logos in this different? How are they similar?

thicker multiply
thinner Add

- 7's
- same shape
- both increasing

Graph Paper

$y = (x-4)(x+2)$ intercept form

$x-4=0$ $+4$ $+4$

$x=4$

$x+2=0$ -2 -2

$x=-2$

Multiplied

x^2-2x-8 → Std. form

y-int: -8

$(1)^2-2(1)-8=-9$

$(1,-9)$