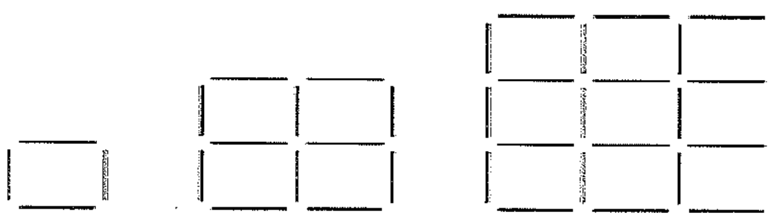
Bridges to Advanced Algebra Name:____________

Final Review Packet

IMPORTANT NOTE: There will ALSO be systems of equations word problems on the final. They can be solved using equal values or elimination. Substitution is NOT required, but you can use it if you want. This packet has ALL other types of problems in it.

1. This pattern is **NOT linear** if you count all of the boxes. It **IS linear** if you only count the edges around the border. You **DO NOT** need to find the rules.



a. Make an xy-table if you count all of the boxes.

a)

x	1	2	3	4	5
y	1	4	9	16	25

$y=x^2$

b. Make an xy-table if you only count the border.

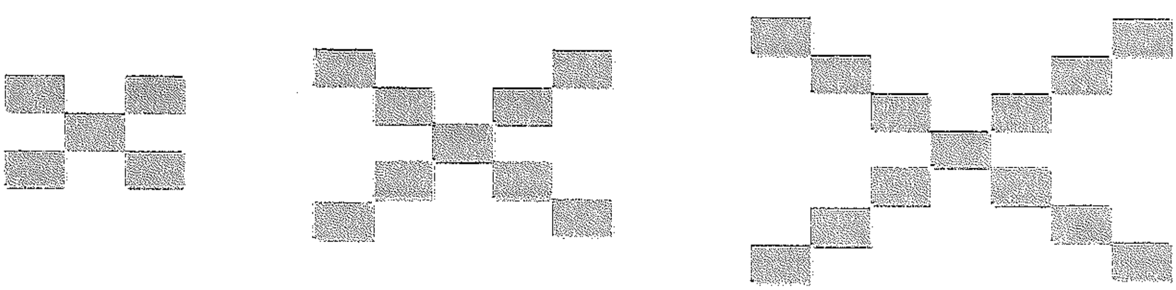
b)

x	1	2	3	4	5
y	4	8	12	16	20

$y=4x$

c. How can you tell if an xy-table is a linear pattern?

2.



a. Make an xy-table for at least the first 5 patterns.

0	x	1	2	3	4	5
1	y	5	9	13	17	21

b. How many boxes will be in pattern 53?

c. Which pattern will have 71 boxes?

b) $y=4(53)+1=213$ $y=4x+1$

c) $71=4x+1$

$70=4x$

$17.5=x$ ← No pattern has 71 boxes!

3. After the Eagle Creek fire, I volunteered to help replant trees. I came back to the same tree several times to see how it is growing. When I planted the seedling (a baby tree), it was 6 inches tall. Every week that I came back, it was 1/2 of a foot taller.

x = # of weeks, y = height (inches)

a. Write a linear model to represent the growth of the tree. Define your variables.

$y = 6x + 6$

b. Fill in the table below with at least 5 entries to model the growth of the tree.

c. Draw a graph that represents the growth of the tree.

d. How tall will the tree be in 3 months?

3 months = 3·4 = 12 weeks

$y = 6(12) + 6 = 72 + 6 = 78$ inches

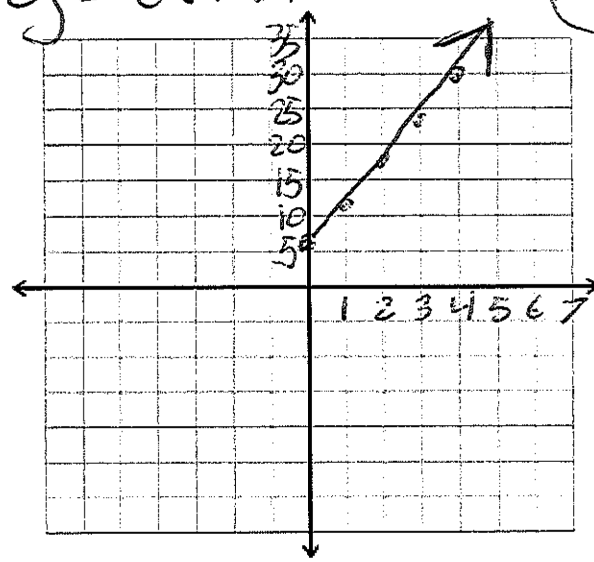
e. When will the tree be twice as tall as it started?

$12 = 6x + 6$

$\frac{6}{6} = \frac{6x}{6}$

$1 = x$

x	y
0	6
1	12
2	18
3	24
4	30



4. Mr. Maurer was stacking a different type of cups, but he spilled coffee on his table (oops). He can only read two pairs of numbers. He knows that 4 cups are 8 cm tall and that 6 cups are 9 cm tall. Fill in the rest of his table and find the rule for the stack of cups.

X = # of cups	0	1	2	3	4	5	6
Y = height (in cm)	6	6.5	7	7.5	8	8.5	9

Rule: $y = .5x + 6$

5. Mr. Maurer decides to count the number of steps he takes while walking his dog, Russet, in the morning. He records the following data:

+4 +2 +4 +3 +2

X = time	6:15	6:19	6:21	6:25	6:28	6:30
Y = # of steps	100	500	700	1100	1400	1600

+400 +200 +400 +300 +200

a. How many steps does he take in a minute?

100 steps/minute

b. How many steps does he take in an hour?

$\frac{100 \text{ steps}}{1 \text{ minute}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 6000 \text{ steps/hr}$

c. When did Mr. Maurer start his walk?

6:14

d. Write a rule for Mr. Maurer's walk. Define your variables.

x = minutes after 6:14
y = steps
y = 100x

e. If one step covers 2.5 feet, how far does he walk, total?

$1600 \text{ steps} \cdot \frac{2.5 \text{ ft}}{1 \text{ step}} = 4000 \text{ ft}$

6. If I drive 100 miles on I5 in 2 hours, how fast am I going:

a. In miles per hour?

b. In miles per minute?

c. In miles per second?

d. In feet per hour?

e. In feet per minute?

f. In feet per second?

g. In inches per hour?

h. In inches per minute?

i. In inches per second?

a) $\frac{100 \text{ mi}}{2 \text{ hr}} = 50 \text{ mph}$

b) $\frac{50 \text{ mi}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} = .8\overline{3} \text{ mpm}$

c) $\frac{50 \text{ mi}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} = .013\overline{8} \text{ mps}$

d) $\frac{100 \text{ mi}}{2 \text{ hr}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} = 264000 \text{ ft/hr}$

e) $\frac{50 \text{ mi}}{1 \text{ hr}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} = 4400 \text{ ft/min}$

f) $\frac{4400 \text{ ft}}{1 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} = 73.3 \text{ fps}$

g) $\frac{264000 \text{ ft}}{1 \text{ hr}} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 3{,}168{,}000 \text{ in/hr}$

h) $\frac{3{,}168{,}000 \text{ in}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} = 52800 \text{ in/min}$

i) $\frac{52{,}800 \text{ in}}{\text{min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} = 880 \text{ in/sec}$

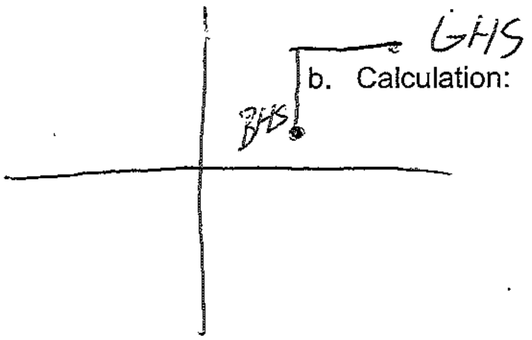
Use the addresses to map out your route. Predict how long it will take **before you do any math.** Then, calculate how long each route will take. Finally, compare your answer to Google Maps.

7. You're at Benson (546 NE 12th Ave) and you want to walk to Grant (2245 NE 36th Ave). You can walk an average speed of 3 mph. How long will it take?

a. Prediction:

North: 5th to 22nd = 17 blocks

East: 12th to 36th = 24 blocks



b. Calculation:

Total: 17 + 24 = 41 blocks

$41 \text{ blocks} \cdot \frac{250 \text{ ft}}{1 \text{ block}} \cdot \frac{1 \text{ mile}}{5280 \text{ ft}} = 1.94 \text{ miles}$

c. Google:

$t = \frac{D}{r} = \frac{1.94}{3} = .65 \text{ hrs}$

$.65 \text{ hrs} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 38.8 \text{ min}$

8. You're at Marshall (3905 SE 91st Ave) and you want to bike to Grant (2245 NE 36th Ave). You can bike an average speed of 12 mph. How long will it take?

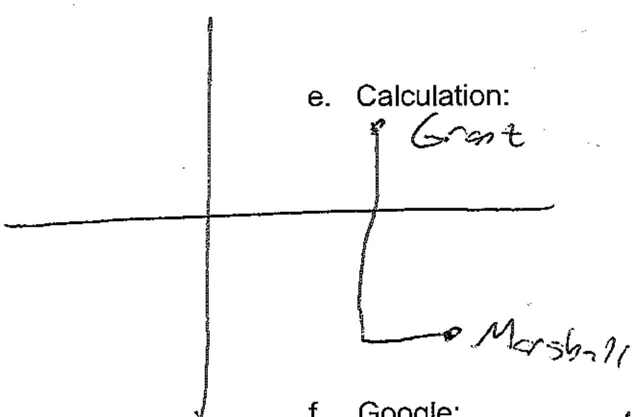
d. Prediction:

West: 91st to 36th = 55 blocks

North: 39th to 22nd = 17 blocks

e. Calculation:

Total: 72 blocks



$72 \text{ blocks} \cdot \frac{250 \text{ ft}}{1 \text{ block}} \cdot \frac{1 \text{ mile}}{5280 \text{ ft}} = 3.41 \text{ miles}$

f. Google:

$t = \frac{3.41 \text{ mi}}{12} = .284 \text{ hrs}$

$.284 \text{ hrs} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 17.05 \text{ min}$