Algebra 2 Name: _____

Chapter 7a Zombie Task Date: _____ Per: _____

Zombieland Mathematics

On June 30, 2035, a sleeper cell of zombies executed an evil plan 10 years in the making. Their objective: to "turn" the entire human race into evil zombies! The zombie population **triples** by the end of each day, but they are not sure how long it will take to completely turn every human on the planet.

1) Complete the table below to track how many total zombies there are at the end of each day from Day 1 to Day 10. The original sleeper cell had 5 members.

Day	Total Number of Zombies	Day	Total Number of Zombies
0	5	6	
1	15	7	
2	45	8	
3	135	9	
4	405	10	295,245
5	1215	x	$5 \cdot 3^x$

3.5

2) Does the Total Number of Zombies seem to increase following a linear model? Explain.

no, not going up by set amount

3) Write an equation that models the total number of Zombies, *y*, at the end of any given day, *x*. Use the equation to complete the table above.

$y = 5 \cdot 3^x$

4) Use the equation from #3 to determine the total number of zombies after each of the following days. Show your work.

12th day:	14th day:	16th day:
		215,233,605

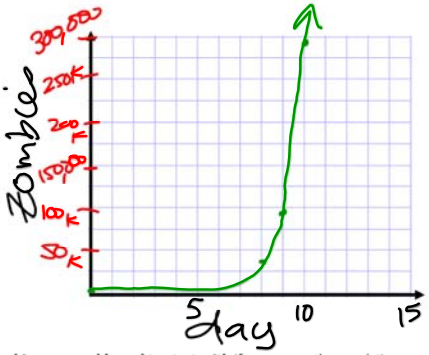
5) Sketch a graph of the data for days 1-10 on the graph provided. Be sure to label your axes!

What is the y-intercept?

(0,5)

Does this graph appear to represent exponential growth or exponential decay? Explain.

growth; going up



6) Estimate the **number of zombies we would need to start with** if we assume the population of the world is 10,000,000,000 and the zombies want to take over the world in 14 days? (Hint: set up an equation)

$10{,}000{,}000{,}000 = z \cdot 3^{14}$

$z = 2091$

7) **Suppose the original sleeper cell had 25 zombies, and all other facts were the same.**

a. Write an equation for the situation described.

$y = 25 \cdot 3^x$

b. How would the new situation affect our table values compared to the situation described of the front of the handout? How would it affect the graph?

diff. y-intercept; increase faster

8) **Suppose the zombie population doubled by the end of each day, instead of tripled, and all other facts were the same.**

a. Write an equation for the situation described.

$y = 5 \cdot 2^x$

b. How would the new situation affect our table values compared to the situation described of the front of the handout? How would it affect the graph?

increase more slowly

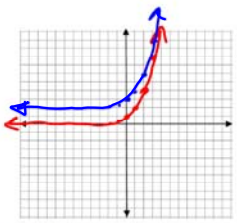
p. 22-23 Graph Exponential Functions Sec.7.2

Target 1- I can graph exponential growth functions

p.22

$y = 2^x$

Coordinate Point
(-3, .125)
(-2, .25)
(-1, .5)
(0, 1)
(1, 2)
(2, 4)
(3, 8)



x Domain: $(-\infty, +\infty)$

y Range: $(0, +\infty)$

$y = 2^x + 2$

Coordinate Point
(-2, 2.25)
(-1, 2.5)
(0, 3)
(1, 4)
(2, 6)

Domain: $(-\infty, +\infty)$

Range: $(2, +\infty)$

Standard Form of Exponential Growth Function: **Remember:** $1 < b < \infty$

Transformations $y = ab^{x-h} + k$

a stretch

if a is − the graph flips

h move left/right

+ −

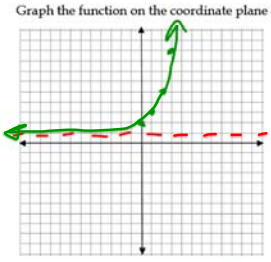
k move up/down

+ −

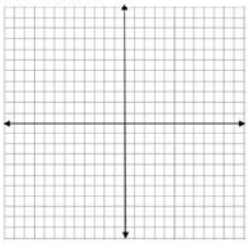
horizontal asymptote: $y = k$

p.23

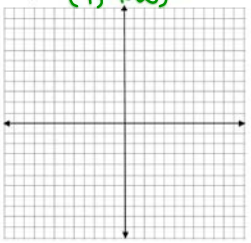
Graph the function on the coordinate plane and fill in all the information.



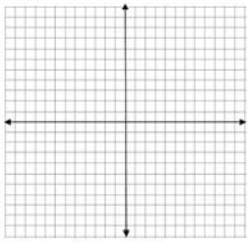
1. Graph: $f(x) = 2^x + 1$
Transformations: move up 1
Horizontal asymptote: $y = 1$
y-intercept: (0, 2)
Domain: $(-\infty, +\infty)$
Range: $(1, +\infty)$



2. Graph: $f(x) = 2 \cdot 2^x + 1$
Transformations:
Horizontal asymptote:
y-intercept:
Domain:
Range:



3. Graph: $f(x) = 2^{x+1}$
Transformations:
Horizontal asymptote:
y-intercept:
Domain:
Range:



4. Graph: $f(x) = -2 \cdot 2^{x-1}$
Transformations:
Horizontal asymptote:
y-intercept:
Domain:
Range: