Name: **Date:**

Scarsdale Middle School **Popham House** **Mr. Weiss**

Quiz: Geometric Sequences, Exponential Growth and Decay

Level 2

1) Fill in the table and graph the following: $y = 3 \bullet (\frac{1}{3})^x$

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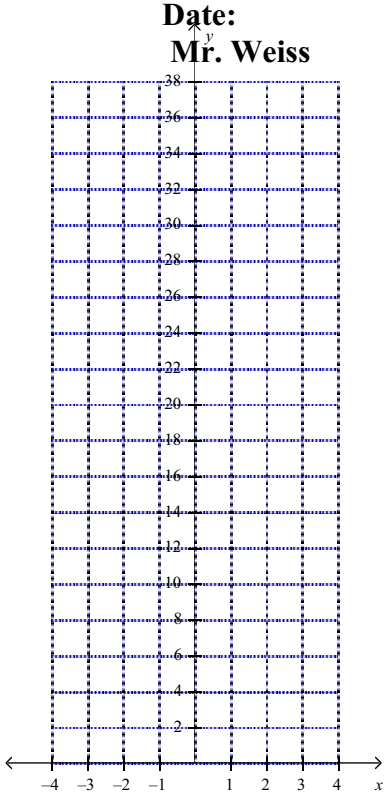
x	y
–2	
–1	
0	
1	
2	
3	



2) Determine the next two terms of the geometric sequence. 5 10 20 _____ _____

3) In 1985, there were 285 cell phone subscribers in the small town of Centerville. The number of subscribers increased by 75% per year after 1985. How many cell phone subscribers were in Centerville in 1994? *Round to the nearest whole number.*

4) An adult takes 400 mg of ibuprofen. Each hour, the amount of ibuprofen in the person's system decreases by about 29%. How much ibuprofen is left after 6 hours? *Round to the nearest tenth.*

5) In 2003, A company vowed to increase it's workforce by 15% per year. By 2010, the workforce grew to 10,640, how many employees were there in 2003? *Round to the nearest whole number.*

6) A woman deposited $20,000 into an account that grows 10% per year, compounded quarterly. Find the amount of money in the account after 9 years? *Round to nearest whole dollar.*

7) a. Find the explicit formula for the geometric sequence below. Use the formula $a_n = a_1 \, r^{n-1}$
b. Find the 10^{th} term.

2 8 32 128 …

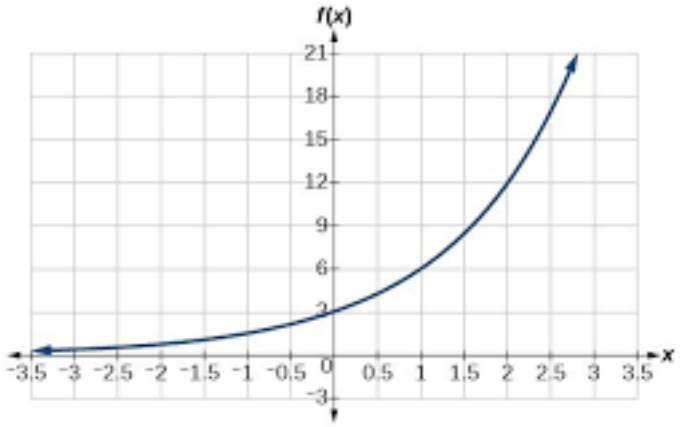
8) The fifth term of a geometric sequence is 300.125. The third term is 24.5. Write the explicit formula.

9) A group of zombies escape from a government detention center and begin infecting other humans according to the function: $Z(h) = 10(2)^h$. What is the average rate of change from hour 4 to hour 8? *Include units*.

10) Which is the equation of the exponential function shown below?

(A) $y = 3(2)^x$ (B) $y = 2(3)^x$

(C) $y = 3(1/2)^x$ (D) $y = 2(1/3)^x$



11) Write the equation of the exponential function that passes through the points (3, 128) and (1, 8). *Show your work using a system of equations*.

12) Use the **intersect function** on your graphing calculator to answer the following:

A man invested $10,000 at an annual rate of 8%. After how many years will the investment grow to $50,000? *Round to the nearest hundredth of a year*.

Below write the two equations you entered into your calculator

$Y_1 =$ $Y_2 =$

Answer:

Bonus: (DO LAST IF YOU HAVE TIME)

Today, a population of termites lives in the walls of an old house. They are increasing in number by a constant percentage rate. In 22 days there will be 3,121 termites. In 26 days, the number will be 4,354. Find the rate of increase per day and the number of termites today. *Round to the nearest hundredth of percent and round to the nearest whole number of termites. Use a system of equations.*

13) Starting in 2007, the population of a town has been growing exponentially according to the equation below, where p is the population and t is the number of years since 2007.

$$P(t) = 1810(1.095)^t$$

a) What is the growth rate?

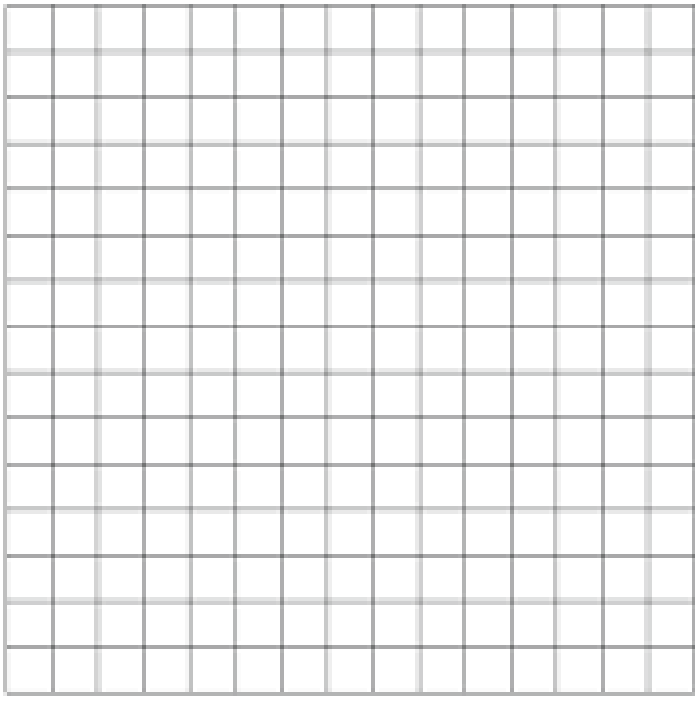
b) What will be the population of the town in 2022? *Round to the nearest whole number*.

c) Using your graphing calculator, sketch a graph of your function over the interval $0 \le t \le 15$. *Round populations to the nearest whole number*. Use the space at the bottom of the page to graph. Include **your table of values**. Remember to label your axis according to the situation.

d) After how many years will the population first exceed 20,000 people? *Round to nearest whole number.* Use the **table function**.

e) After how many years will the population reach exactly 4,000 people? *Round to the nearest thousandths*. Use the **intersect function** on your calculator.

t	population	t	population
1		9	
2		10	
3		11	
4		12	
5		13	
6		14	
7		15	
8			



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