NAME:**_______________________________________** *Exponential Functions – Test D*

1. At the start of an experiment there are **3** organisms present. **Every 30 minutes** the number of organisms **quadruple** in size.

a. Write a "*y* = …" rule that can be used to calculate the number of organisms present after any number of 30-minute periods.

b. Write a recursive rule that can be used to calculate the number of organisms present after any number of 30-minute periods.

c. Use the rule from Part a to **complete the following table:**

Number of 30-Minute Time Periods	0	1	2	3	4	5
Number of Organisms Present						

c. How many organisms will be present in the sample **after 7 hours (14 thirty minute time periods)?**

d. After **how many** thirty minute periods will there be **10000 cells**?

2. At the start of an experiment there are **1000** organisms present. **Every 30 minutes** the number of organisms **is** ¼ of the original amount.

a. Write a "*y* = …" rule that can be used to calculate the number of organisms present after any number of 30-minute periods.

b. Use the rule from Part a to **complete the following table:**

Number of 30-Minute Time Periods	-2	-1	0	1	2	3
Number of Organisms Present						

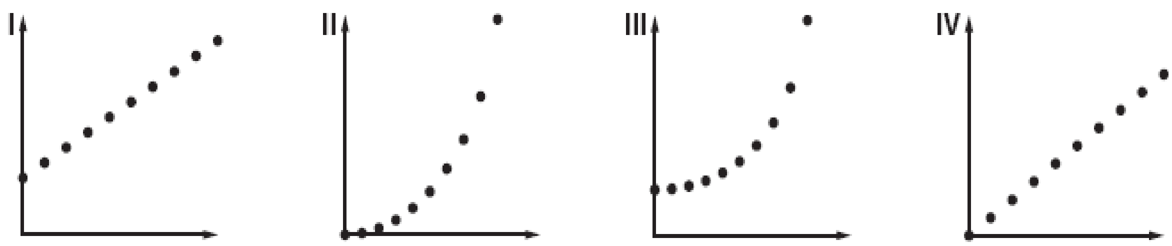
c. What do the **negative time periods** mean in the context of this problem?

3. In 1995, there were 500 cell phone subscribers in the small town of Gateway. The number of subscribers increases by 40% per year after 1995. (Round to the nearest whole number when doing all calculations.)

a. Make a table showing the number of cell phone subscribers in Gateway for the six years after 1995.

Number of years since 1995	0	1	2	3	4	5	6
Cell phone subscribers							

b. Which of the following scatterplots could be a plot of the (*year, subscribers*) data for the first few years?



c) Write a rule beginning **"*y* =…"** that could be used to calculate the number of subscribers for any number of years. **Explain** what each of the numbers used in your rule mean in the context of the problem.

d) Write a **recursive rule**.

e) How many subscribers would you expect there to be after 20 years?

f) If the local cell tower can only handle 70,000 subscribers, when would you predict an additional cell tower will be needed?

4. The following table gives the number of AIDS cases reported in the Los Angeles area for the years 1983 through 1988.

Years since 1983 (x)	0	1	2	3	4	5
Number of AIDS Cases Reported (y)	290	453	708	1107	1730	2705

a. Use your calculator to produce a scatterplot and then give the window.

b. Use your calculator to find an equation for an exponential model. **Round to two decimal places.**

c. Explain what each of the numbers in the model mean in the context of the problem.

5. Use the following table to answer questions below.

No. of Bounces	**0**	**1**	**2**	**3**	**4**	**5**
Rebound Height in inches	**200**	**112.6**	**63.4**	**35.7**	**20**	**11.3**

a. What is the initial height that the ball is dropped from? ___________________

b. What is the growth/decay factor? ____________________________

c. Explain what the decay factor in part b means in terms of the balls height.

d. Write an equation or rule for this pattern. _______________________________

e. What will the height be on the seventh bounce? _________________________

f. Between what 2 bounces will the height be 75 inches?_____________________

6. Suppose a hospital patient receives a 550 mg. injection of medication. The medication metabolizes in the blood so that only 40% of the medication from the previous hour remains in the blood after each hour.

a. Complete the following table showing the amount of medication in the blood stream after each hour. (Round to the nearest tenth.)

Hours since Injection	0	1	2	3	4	5	6
Medication Remaining in mg.							

b. Write a **"*y* = " rule** and a **recursive rule** that can be used to calculate the amount of medication remaining in the blood at any hour (measured in milligrams).

c. What amount of medication remains in the blood after 5.5 hours?

d. When will the amount of medication remaining be half of the original amount of medicine injected. Give your answer to the nearest tenth.

7. Identify if the table below represents exponential growth or decay. Then write the recursive rule and the "y =" rule for the data without typing the data into your calculator.

x	0	1	2	3	4	5	6
y	75	45	27	16.2	9.72	5.832	3.4992

8. Identify if the table below represents exponential growth or decay. Then write the recursive rule and the "y =" rule for the data without typing the data into your calculator.

x	0	1	2	3	4	5
y	75	127.5	216.75	368.48	626.4075	1064.89275

9. You deposited $5000 in a savings account that pays 12% annual interest compounded yearly.

a. Write an exponential growth model.

b. What is the balance after 4 years?

10. In 2000 you bought a 42-inch TV for $2550. The TV is depreciating at the rate of 5% per year.

a. Write an exponential decay model

b. What is the estimate value of the TV in the year 2010?

11. In 2015 you bought a 42-inch TV for $800. At the end of each year the TV is worth 90% of the amount at the beginning of the previous year.

a. Write an exponential decay model

b. What is the estimate value of the TV in the year 2020?

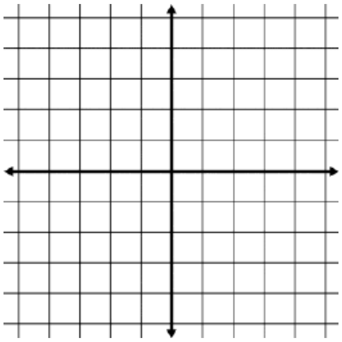
12. Classify the model as exponential growth or exponential decay. Then give the a) Starting Value; b) Growth or Decay Factor; c) Percent Increase or Decrease

a. $y = 8(1.55)^x$

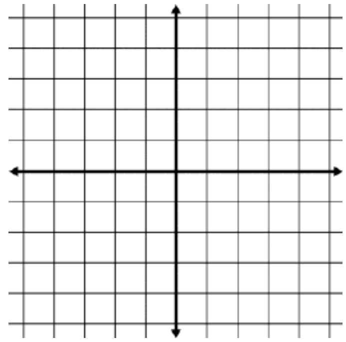
b. $y = 4(.45)^x$

13. Sketch the graph of each equation

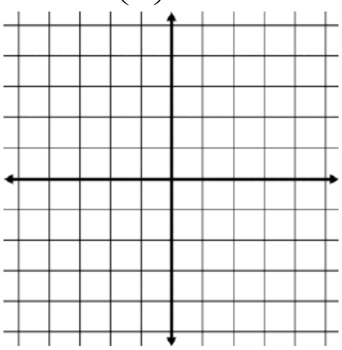
$a)\quad y = 3^x$



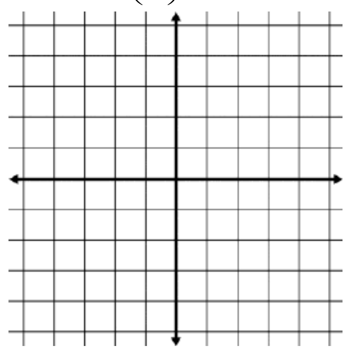
$b)\quad y = 5(2)^x$



$c)\quad y = \left(\frac{1}{2}\right)^x$



$d)\quad y = 5\left(\frac{1}{2}\right)^x$



14. Make a table for each equation

$a)\quad y = 3^x$

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

$b)\quad y = 5(2)^x$

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

$c)\quad y = \left(\frac{1}{2}\right)^x$

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

$d)\quad y = 5\left(\frac{1}{2}\right)^x$

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