SM2 1-6 Growth Rate and Decay Name:_____ Period:_____

Directions: *Follow the instructions for each problem.*

1. A 250mg of a type of bacteria is growing at a RATE of 30% a day. a. What is the GROWTH FACTOR? b. What is the Initial Amount or y-intercept? c. Write the equation for the Growth: d. How much will there will after 6 days? e. About how long will it take for the bacteria to grow to an amount of 600 mg?	2. You buy a car for $30,000 and it is depreciating in value at 30% every year. a. What is the DECAY FACTOR? b. What is the Initial Amount or y-intercept? c. Write the equation for the Decay: d. How much will the car be worth in 5 years? e. How much will it be worth in 10 years?
3. A 1000mg sample is decaying at a RATE of 25% a day. a. Write the equation for the Decay: b. How much will there be after 4 days? c. About how long will it take for the sample to decay to an amount of 200 mg?	4. You buy a car for $25,000 and get a loan from the bank at 6% interest RATE a year. a. Write the equation for the Exponential: b. How much you will really pay for the car if you take 5 years to pay it off?
5. A 400 mg of a type of bacteria is growing at a RATE of 12% a day. a. Write the equation for the Growth: b. How much will there be after 5 days?	6. Your parents bought a house in 2000 for $150,000. They got an interest rate of 5.25% a year. a. Write the equation for the Exponential: b. How much will they really pay for the house if they pay it off in 30 years?
7. A 750mg sample is decaying at a RATE of 10% a day. a. Write the equation for the Decay: b. How much will there be after 7 days?	8. An area in Alaska has a population of 40 polar bears. They are disappearing at a rate of 3% every year. a. Write the equation for the Decay: b. When will there be only 10 polar Bears?

9. A 800mg sample has a DECAY FACTOR of 2/3.

a. Write the equation for the Decay:

b. What is the DECAY RATE?

10. A 1,200mg sample has a GROWTH FACTOR of 5/4.

a. Write the equation for the Growth:

b. What is the GROWTH RATE?

Directions: *Follow the instructions for each problem.*

11. Determine if the tables show a linear, or exponential function. Explain how you know. Write the equation of each.

x	y
-1	5
0	7
1	9
2	11

x	y
-1	$\frac{1}{3}$
0	1
1	3
2	9
3	27

12. Match the type of function with the correct description:

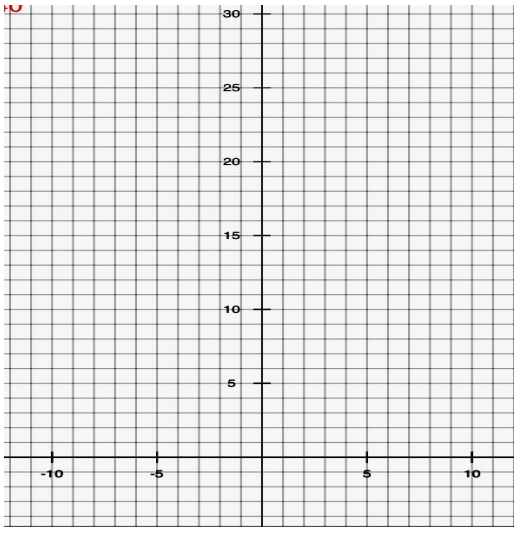
A. linear

B. exponential

1. has y-values with a common ratio
2. has y-values with a common(constant) 1st difference
3. In the end it will always have the greatest y value.
4. Has a form of y = mx+b
5. Has a form of $y = a(b)^x$

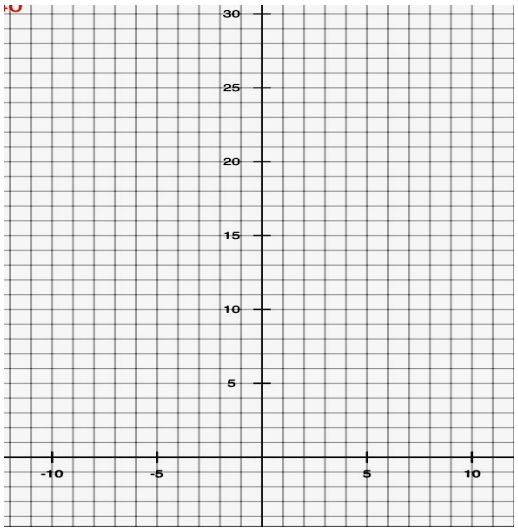
13. By making a table graph the equation $f(x) = 2(3)^x$

then graph $g(x) = 2(3)^{x-5}$



14. By making a table graph $f(x) = 10\left(\frac{1}{2}\right)^x$

Then graph $g(x) = 10\left(\frac{1}{2}\right)^x - 3$



15-16 Determine if the following are linear or exponential

x	y
0	500
1	420
2	340
3	260
4	180

x	y
0	500
1	250
2	125
3	62.5

x	y
0	4
1	12
2	36
3	108
4	324

A 5 gram substance is decaying by half each week.

You have $.50 and you get $5 each week.

Your friend bets you $2 he can beat you in arm wrestling. You win. He wants a rematch, but you tell him the stakes are 5 times higher each time he tries.

17. The table shows values of two functions over several values of x.

x	f(x)=5000x	$g(x)=2^x$
0	0	1
1	5000	2
2	10,000	4
3	15,000	8
4	20,000	16
5	25,000	32
6	30,000	64
7	35,000	128
8	40,000	256
9	45,000	512
10	50,000	1,024
11	55,000	2,048
12	60,000	4,096
13	65,000	8,192
14	70,000	16,384
15	75,000	32,768
16	80,000	65,536
17	85,000	131,072
18	90,000	262,144

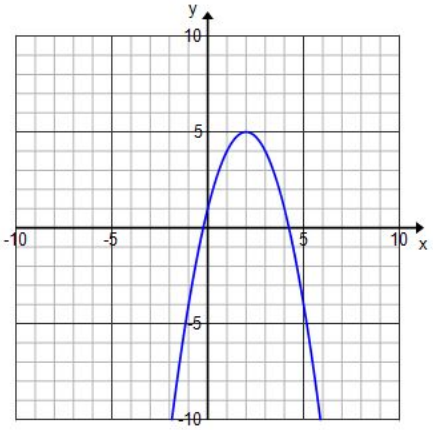
What general fact about linear and exponential functions is illustrated here?

A) Linear functions are always larger than exponential functions.
B) Exponential functions are always larger than linear functions.
C) Linear functions increase faster than exponential functions as x increases.

18. Complete the following statement:

_____functions will always win in the end.

19. f(x) is graphed.



Graph g(x)=(x+4) - 3

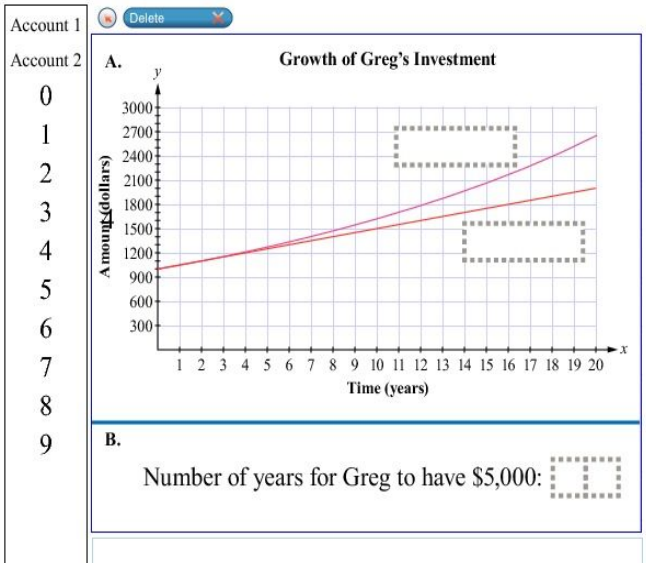
20. $f(x) = 3x + 1$, and it is moved up 3 and left 5. Write the equation of the new graph.

D) Exponential functions increase faster than polynomial functions as x increases.

21. Greg want to invest $1,000 in a bank account for 20 years. Account 1 offers 5% simple interest. Account 2 offers a 5% interest rate, compounded annually. The functions shown represent the growth of Greg's investment with Account 1 and Account 2.

A. Place the name of the account in the box next to the function that represents each account.

B. Place one number in each box to show how many years it would take Greg to have $5,000 if he invests in Account 2.



22.

Sally and Doug each invest $2. At the end of each day, Sally's balance doubles and Doug's balance increases by $5.

At the end of day 5, how much money do Sally and Doug each have?

(A) Sally: $32, Doug: $21

(B) Sally: $32, Doug: $22

(C) Sally: $64, Doug: $27

(D) Sally: $128, Doug: $32

23. Each table below represents sets of ordered pairs from two different functions.

x	$y = 8x$
0	0
1	8
2	16
3	24

x	$y = 2^x$
0	1
1	2
2	4
3	8

As x increases in value, which function will eventually have the greatest value?

a) $y = 8x$

b) $y = 2^x$

c) There is not one function from the tables that will eventually have the greatest value.