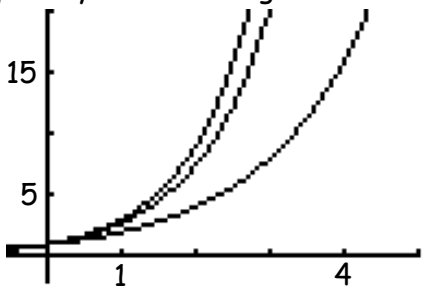
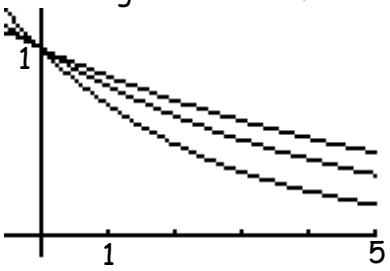
Acc. Geom/Algebra II Name_____

Analyzing Graphs of Exponential Functions Period _____Date _____

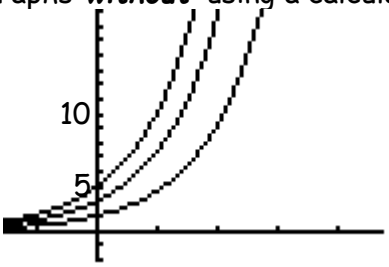
1.) The three exponential functions $y = 2^x$, $y = 3^x$, and $y = e^x$ are shown below. Which formula goes with which graph? ***Explain*** your reasoning.



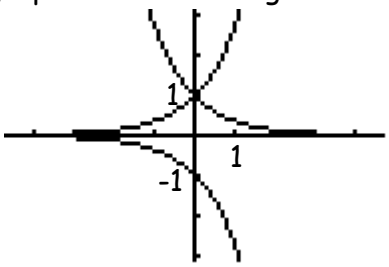
2.) The graphs of $f(x) = (0.7)^x$, $g(x) = (0.8)^x$, and $h(x) = (0.85)^x$ are shown below. ***Explain how*** you can match these equations to their graph ***without*** using a calculator.



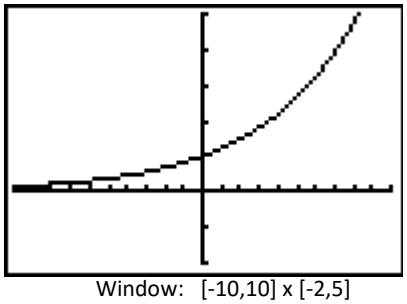
3.) The graphs of $y = e^x$, $y = 2e^x$, and $y = 3e^x$ are shown below. ***Explain how*** you can match these equations to their graphs ***without*** using a calculator.



4.) The graphs of $y = e^x$, $y = e^{-x}$, and $y = -e^x$ are shown below. you can match these equations to their graphs ***without*** using a calculator.



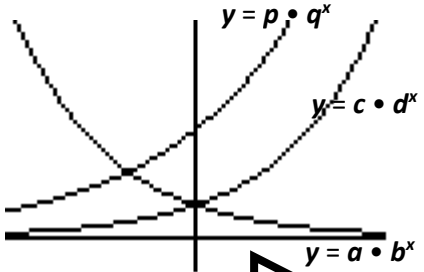
5.) Suppose you use your calculator to graph $y = 1.04^{5x}$. You correctly enter ***y*** =1.04^(5***x***), and see the graph shown to the right. A friend graphed the function by entering ***y*** = 1.04^5***x*** in his calculator and said, "The graph is a straight line, so I must have the wrong window." ***Explain why*** changing the window will **not** correct your friend's error.



Window: [-10,10] x [-2,5]

6.) Consider the exponential functions graphed to the right, and the six constants ***a***, ***b***, ***c***, ***d***, ***p***, and ***q***.

(a) Which of these constants are **definitely** positive?
(b) Which of these constants are **definitely** between 0 and 1?
(c) Which of these constants **could** be between 0 and 1?
(d) Which two of these constants are **definitely** equal?
(e) Which one of the following pairs of constants **could** be equal?
a and ***p*** ***b*** and ***d*** ***b*** and ***q*** ***d*** and ***q***



Continued **on the back**

7.) For which value(s) of a and b is $y = ab^x$ an **increasing** function? . . . a **decreasing** function?

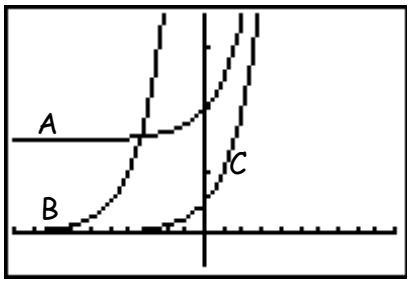
8.) The functions $f(x) = \left(\frac{1}{2}\right)^x$ and $g(x) = \frac{1}{x}$ are similar in that they both tend toward zero as x becomes large. Using your calculator, determine which function, f or g, approaches zero **faster**.

9.) List the specific transformations needed to transform the graph of $h(x) = 2^x$ into the graph of the given functions:

(a) $f(x) = 2^x - 5$ (b) $g(x) = 3(2^x)$ (c) $k(x) = 2^{x+2} - 5$ (d) $m(x) = -5(2^{x-1}) + 7$

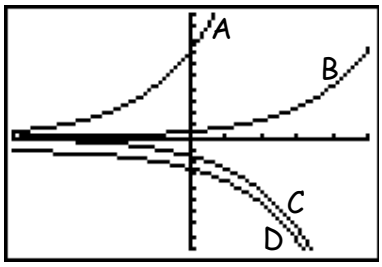
10.) **Match** each of the following functions to the graphs shown below:

(a) $f(x) = b^x$
(b) $g(x) = b^x + 3$
(c) $h(x) = b^{x+5}$



11.) **Match** each of the following functions to the graphs shown below:

(a) $f(x) = a^x$
(b) $g(x) = -3a^x$
(c) $h(x) = a^{x+5}$
(d) $k(x) = -3a^x - 2$



12.) Determine whether each of the following functions are **even** (symmetric across the y-axis), **odd** (rotational symmetry around the origin), or neither. (HINT: Look at the possible **symmetry** of their graphs.)

(a) $f(x) = 10^x$ (b) $g(x) = \frac{e^x + e^{-x}}{2}$ (c) $h(x) = e^{-x^2}$

13.) **Explain why** $e^x + e^{-x}$ is approximately equal to e^x when x is very large.

14.) The population of a colony of fruit flies t days from now is given by the function $P(t) = 100 \cdot 3^{t/10}$.

(a) What will the population be in 15 days? . . . in 25 days?

(b) How many days will it take the population to reach 2500?

15.) A certain type of bacteria grows according to the function $f(t) = 5000 \cdot e^{0.4055t}$, where the time t is measured in hours.

(a) What will the population be in 8 hours?

(b) When will the population reach one million?