EXAM 4 - MATH 111 Monday, November 22

YOUR NAME:_____ George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

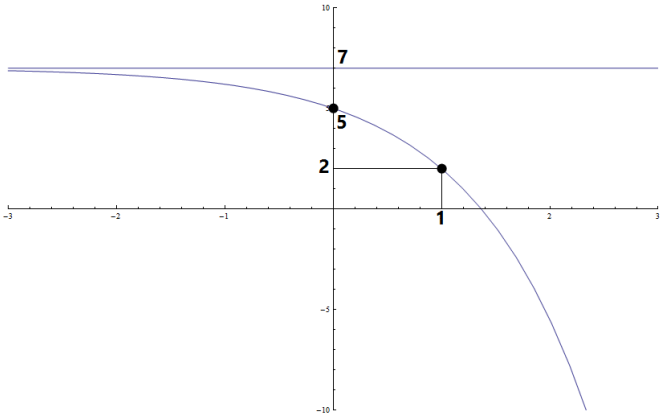
1. (a) Find a formula for the exponential function that passes through the points $(3, 1)$ and $(7, \frac{625}{16})$. Show all steps "by hand".

   (b) How much should be deposited in an account that earns interest 2% compounded quarterly in order to have available \$20,000 in 10 years' time?
   (Recall the finance formulas $A = P(1 + \frac{r}{n})^{nt}$ and $A = Pe^{rt}$.)

2. (a) Use the small table of values of the left to sketch the graph of the function $f(x) = 2^x$. Please, **label** all your points!

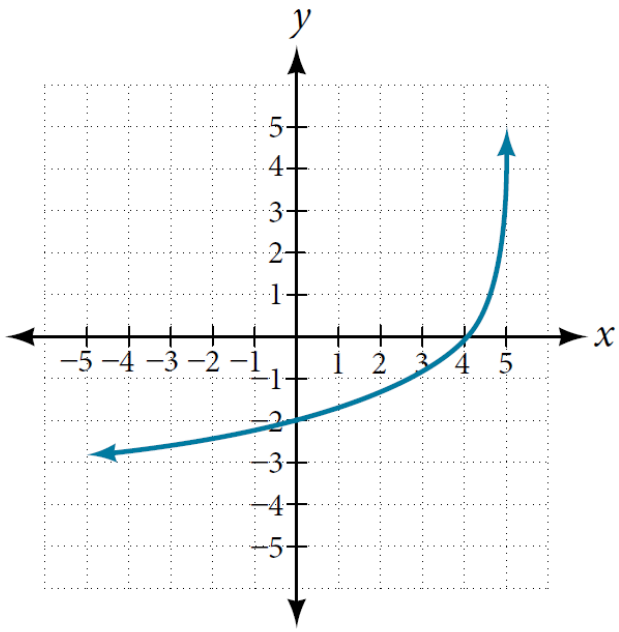
x	y
-2	
-1	
0	
1	
2	

(b) Find an exponential equation for $y = f(x)$ whose graph is shown below.
(**Hint**: Start from $y = a \cdot b^x + d$)



3. (a) Find the domain of the function $f(x) = \log(7 - 5x)$. Show all steps by hand and express your answer in interval notation.

(b) Use a logarithm to base 5 to find a formula for the logarithmic function whose graph is shown below. (**Hint**: Start from $y = a \log_5(-(x - c)) + d$)



4. (a) Solve the exponential equation $2^{-3x} \cdot \frac{1}{16} = 8 \cdot 4^{x-2}$. Please, leave your answer in exact form (without using decimals).

(b) Solve the exponential equation $-6e^{9x+8} + 2 = -70$. Please, leave your answer in exact form (without using decimals).

5. (a) Solve the logarithmic equation

$$\log_7 x + \log_7 (2x - 1) = \log_7 (4x + 3).$$

(b) Solve the exponential equation

$$e^{4x} - 3e^{2x} - 10 = 0.$$

Please, leave your answer in exact form (without using decimals).
(**Hint**: Use the substitution method!)