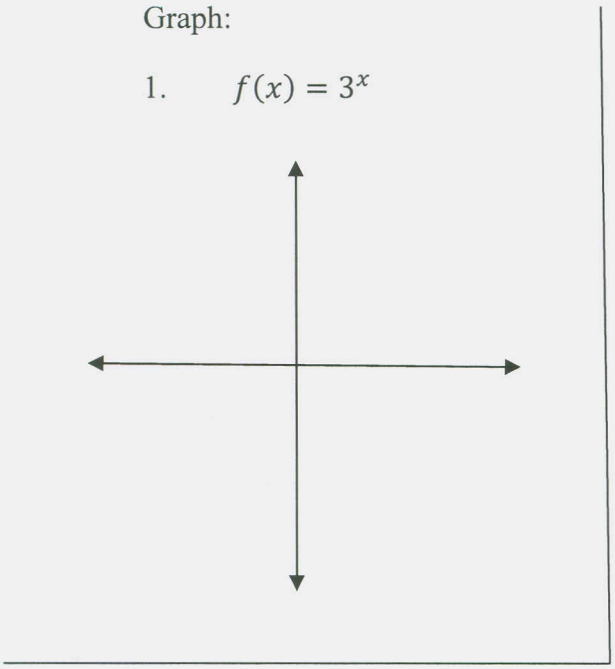
It is really important to know what the basic graphs of exponential and logarithmic functions look like, along with their 3 key points. Also, you need to know how to transform these graphs. ***MAKE SURE YOU KNOW*** your laws of logarithms and exponents!!!!!! It would be wise to review Monday's notes as well.

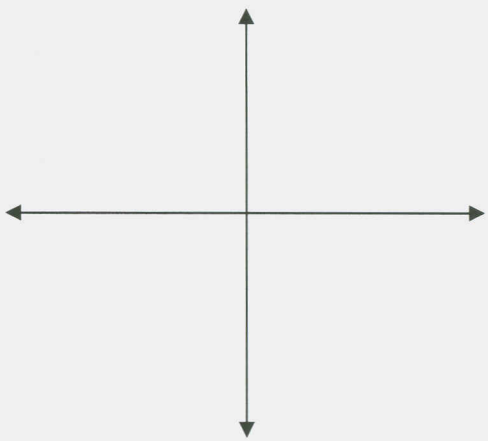
Graph:

1. $f(x) = 3^x$



This space for #2:

2. $f(x) = 2 \cdot 3^{-x+1} - 4$
(show the transformations)



3. Evaluate the following expressions without using a calculator.

i. $8^{\left(\frac{2}{3}\right)}$

ii. $\left(\frac{1}{2}\right)^{-4}$

iii. $\log_4 256$

4. Express $\log_3 \sqrt[7]{\frac{10x^7y^{-4}}{z^{-3}}}$ in terms of logarithms x, y, and z.

5. Use transformations to graph the following functions

i. $h(x) = 2 \cdot 3^{x-2} + 5$

ii. $J(x) = \log_2(x + 4) - 1$

6. Solve correct to four decimal places: $2^{3x} = 3^{2x-4}$. You will need to have a calculator to find the approximate final answer.

7. In the space for the graph #1, sketch the graph of $g(x) = \log_3 x$ on the same set of axes as your graph of $f(x) = 3^x$.

8. Solve the following equations. (check to make sure your final answers work in the original equation.)

   i. $\ln x = \ln(6-2x)$

   ii. $\log_5(x-4) + \log_5(x+2) = \log_5 7.$

iii. $4^{2x-1} = \frac{1}{2}$ iv. $\log_x 16 = 2$ v. $3^{25x^2} = 81$

9. Write the following as the logarithm of a single expression. Assume that variables represent positive numbers. $3\log_5(x+2) - 4\log_5(x-7) + \log_5 9$.

10. Find f^{-1}: $f(x) = 3^{x+2}$

11. Sketch the graph of $g(x) = -3 + \log(x+2)$ and state its domain and range and list its three key points

12. Find the amount that results from each investment.

    i. $100 invested at 11% compounded daily after a period of 3 years.

    ii. $120 invested at 12% for 12 years, compounded continuously.

13. If Joe Monty with SI publications wants to make an investment of $20 at 4% APR compounded continuously, how long will he have to wait until his investment triples?? (i.e. find the tripling time).

14. Find the time (to the nearest month) that is takes to pay off a loan of $100,000 at 9% APR compounded monthly with payments of $1250 per month

15. What is the domain of $\sqrt{\frac{x-2}{(x+3)^2(x-7)^3}}$?

16. What is the domain of $\ln\frac{x-2}{(x+3)^2(x-7)^3}$?

17. Solve: $\log_6(K-1)+\log_6(K-2)=1$

18. The half-life of Carbon-14 is ~5,730 years.

i. Find an exponential model that gives the amount of radioactive Carbon-14 present in a charcoal sample after t years.

ii. According to mainstream science, how old should a sample from a Neolithic fire pit be if it is found that 32% of naturally occurring Carbon-14 is present in the sample? (round answer to nearest year)

19. This one involves some chapter 3 stuff. May not see this on this test, but it is important to keep up on this stuff for the final.

Solve $\dfrac{e^{x}+e^{-x}}{2}=1$

20. Solve $\ln(x)-\ln(x+1)=\ln(x+3)-\ln(x+5)$