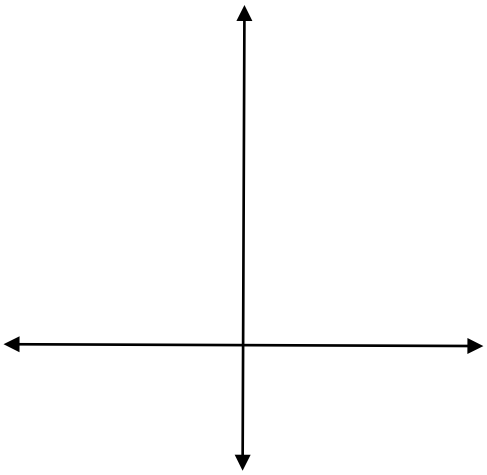
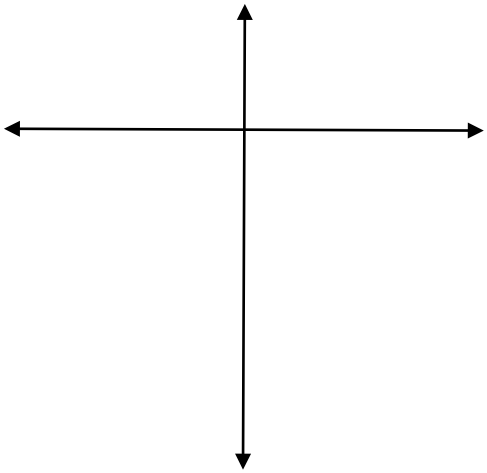
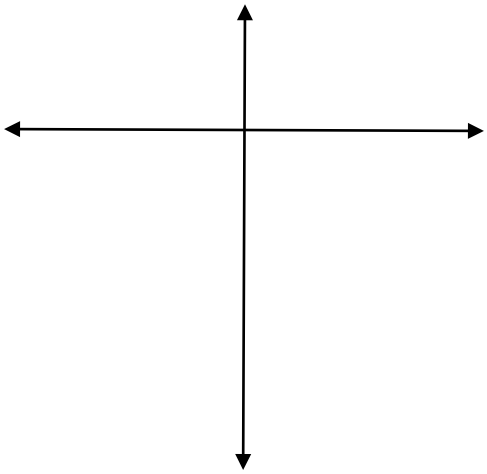
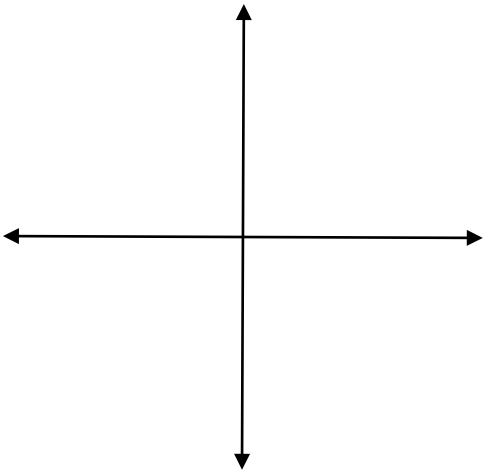
MAT 121 100 Points Spring, 2011
Test 4, Chapter 4 Name_____

1. (20 pts) Starting with $f(x) = 2^x$, sketch the graph of $g(x) = -4 \cdot 2^{x+1} + 5$ in 4 steps (counting $f(x) = 2^x$ as the first step). Use x = -1, x = 0, and x = 1 to find 3 points in the first graph, and show how these 3 points are moved around by each step in the transformation to $g(x)$. Your final graph should also show the y-intercept and, for 5 bonus points, the x-intercept (See #5b).









2. (10 pts) Find the inverse of the function $g(x) = -3^{1-x} + 7$

3. (10 pts) Solve $\ln(x-4) + \ln(x+1) = \ln(6)$ for x.

4. (10 pts) Graph $h(x) = \log_5(-2x - 8)$. You can do it in 3 graphs (counting $f(x) = \log_5(x)$ as the first), if you combine the horizontal stretch/shrink with the horizontal reflection. If you do the stretch/shrink and the reflection separately, it will take 4 graphs. Use the same 3 key points that are used in class.

5. Solve for x to the precision specified:

a. (10 pts) $9^{2x-3} = 3^{-3x+2}$. (Give an *exact* answer.)

b. (10 pts) $-4 \cdot 2^{x+1} + 5 = 0$ (Solving this equation has a lot to do with the 1st question. Give your answer to 4 decimal places.)

c. (10 pts) $5^{x-1} = 3^{x}$ for x. Give an exact answer and then round your answer to 4 decimal places.

6. (10 pts) Radioactive Wieligminium-12.5 has a half-life of 250 years. What's its decay rate? Write the function modeling the amount of radioactive Wieligminium-12.5 remaining in a sample after t years. Hint: $A(t) = A_0 e^{-kt}$.

7. (10 pts) Using your work from the previous problem (No double jeopardy – go with what you have (or make something up!)), a sample of radioactive Wieligminium decayed from 20 grams to 5 grams. How old is the sample?