MAT 121 Test 4 - Fall, 2014 Name_____
70 Points Covers Chapter 4

1. (15 pts) Starting with $f(x)=4^x$, sketch the graph of $g(x)=2\cdot 4^{x-3}-9$ in 4 steps (counting $f(x)=4^x$ 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 $g(x)$. Finding the x- and y-intercepts is a separate problem, so don't worry about them, on this page.

2. Let $f(x)=\sqrt{2x+4}$ and $g(x)=\dfrac{x-2}{x-7}$.

a. (5 pts) What is the domain of f?

b. (5 pts) What is the domain of g?

c. (5 pts) Write the function $\dfrac{f}{g}$. Do not simplify.

d. (5 pts) Write the function $f \circ g$. Do not simplify.

e. (10 pts) What is the domain of $\dfrac{f}{g}$?

3. (5 pts) Let $g(x)=2\cdot 4^{x-3}-9$. Find the *x*- and *y*-intercepts for this function, rounded to 4 decimal places. For 5 **bonus** points, label these intercepts on your final graph on page 1.

4. Find the domain:

   a. (5 pts) $\sqrt{\dfrac{(x-2)(x+3)^2}{(x-7)^4(x+5)}}$

   b. (5 pts) $\log_3\left(\dfrac{(x-2)(x+3)^2}{(x-7)^4(x+5)}\right)$ (Reinterpret previous work and write the answer.

5. (5 pts) Solve $\log_7(x-4)+\log_7(x+2)=1$

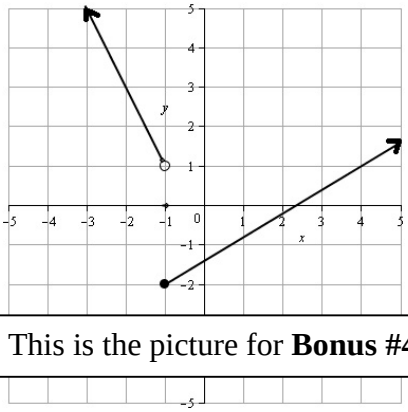
6. (5 pts) Solve $2^{x^2-8}\cdot 2^{-3x}=4$

Solve any two (2) Bonus problems for up to 10 points. I'll grade the first two I come to.

1. BONUS (5 pts) Solve the absolute value inequality $|2x-7| \geq 8$

2. **BONUS** (5 pts) Find the inverse function for $f(x) = \sqrt{2x-6}+1$. Then state the domain and range for both f and f^{-1}.

3. BONUS (5 pts) Re-write the function $g(x) = 5x^2 + 10x - 19$ in the form $g(x) = a(x-h)^2 + k$. State the vertex of this parabola.



This is the picture for **Bonus #4**

4. BONUS (5 pts) Write the formula for the piecewise-defined function shown, above right.