EXAM 4 - MATH 111   Thursday, November 30

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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) Using a small table of values plot the graph of $f(x) = \log_{1/2} x$. (Show all important
       features!)

   (b) Show all transformations involved in leading from the graph of $f(x) = \log_{1/2} x$ to the
       graph of $g(x) = 2\log_{1/2}(3-x) + 1$.
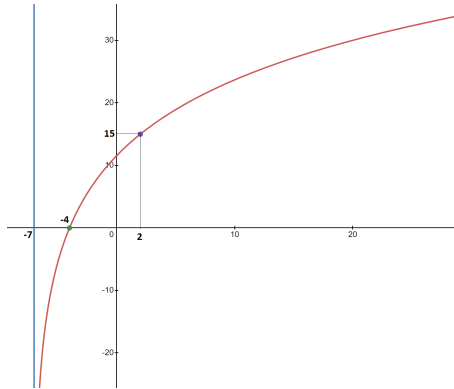
       $y = \log_{1/2} x \quad \longrightarrow$ (   )

                          $\longrightarrow$ (   )

                          $\longrightarrow$ (   )

                          $\longrightarrow \quad y = 2\log_{1/2}(3-x) + 1$ (   )

2. The following is the graph of a transformed version of $y = \log_3 x$. Find a formula for the function whose graph is shown.

3. Solve the following equations.

(a) $\dfrac{3^{5x-2}}{3^x} = 27 \cdot 3^{7-2x}$

(b) $\log x + \log (x + 7) - \log 2 = \log (x + 25)$

4. Solve the following exponential equations.

   (a) $3^{2x-1} = 5^{x+7}$.

   (b) $e^{2x} - 7e^x + 12 = 0$.

5. Solve the following system of equations and write your answer(s) in point form.

$$\left\{ \begin{array}{rcrcr} x & + & 2y & = & 3 \\ x^2 & - & 3y^2 & = & -18 \end{array} \right\}$$