EXAM 4 - MATH 111   Friday, April 21
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) Using a small table of values, sketch the graph of the exponential function $f(x) = 2^x$.

   (b) Fill in the blank spaces with appropriate equations reflecting the transformations described inside the parentheses on the right.
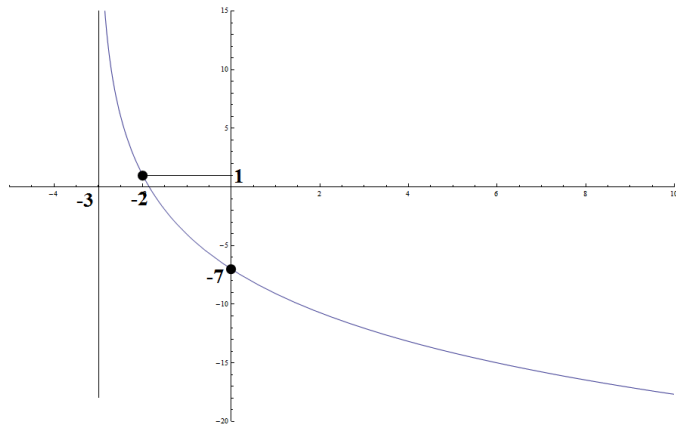
   $y = 2^x \longrightarrow$ (shift down by 3)

   $\longrightarrow$ (shift left by 1)

   $\longrightarrow$ (vertical compression by a factor of 5)

   After these transformations, the horizontal asymptote is:

2. The following graph shows a transform of the logarithmic function with base 5. Find a formula of the function whose graph is shown, explaining one-by-one all your steps.

3. Expand or combine as appropriate, using properties of logarithms:

(a) $\ln\left(\dfrac{x^2 y^7}{z^3}\right) =$

(b) $2\log x + 5\log y - \frac{1}{3}\log z =$

4. Solve the following equations:

(a) $6e^{9x+8} + 2 = -74$

(b) $10 - 4\ln(9 - 8x) = 6$

5. Solve the following equations:

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

   (b) $\log(x+3) - \log x = \log 74$.