MATH 120R - TEST 2 Review

1. Simplify completely $\ln[\frac{1}{\log \sqrt[5]{1000}}] + \ln(0.1)^{\log \frac{5}{3}}$

2. Simplify $\ln(2e^4 - e^2) - \ln(2e^2 - 1) + \ln(lne)$

3. Give the equation of the asymptote (if one exists) for each of the functions:

   a) $y = e^{-x} + 1$

   b) $g(t) = \ln(t) + 4$

   c) $f(x) = 10^{x+7}$

4. Find a formula for the exponential function such that $f(3) = \frac{1}{54}$ and has an $y-$ intercept at $\frac{1}{2}$.

5. Find the domain of the the following functions:

   a) $g(t) = \ln(t-3)^2$

   b) $a(s) = (\ln s)^2$

6. A colony of bacteria is growing exponentially. At the end of 3 hours there are 1000 bacteria. At the end of 5 hours there are 4000.

   By what percent does the number of bacteria increase each hour?

7. Define "Effective Annual Rate" (EAR). Then, calculate the EAR for each of the following three investments. Based on these calculations, rank the investments from best to worst in terms of rate of return.

   Investment A: \$1500 placed for three years in an account giving 7.2% compounded annually.

   Investment B: \$1800 placed for three years in an account giving 6.9% compounded twice monthly.

   Investment C: \$900 placed for three years in an account giving 6.8% compounded continuously.

8. Determine if the table below corresponds to exponential growth. If so give the equation, if not give a reason.

x	-3	-2	-1	0	2	4
y	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{3}{2}$	3	12	48

9. Forty percent of a radioactive substance decays in five years. By what percent does the substance decay each year?

10. Complete the following table (if you have enough information)

x	-3	-2	-1	0	1	2	3
f(x)	2	3	7	-1	-3	0	8
f(x-2)							
-2f(x)							
f($\frac{1}{2}$ x)							

11. Use transformations to sketch the graph of $f(x) = -\frac{1}{3}|2x - 1| + 2$

12. If (2,0) and (0,-3) are points on the graph of $f(x)$, then find two points on the graph of each of the following:

    a) $a(x) = 2f(x)$

    b) $b(x) = f(3x)$

    c) $c(x) = f(x - 1)$

    d) $d(x) = f(x) - 5$

    e) $e(x) = -f(x)$

    f) $g(x) = f(-x)$

    g) $h(x) = -4f(\frac{1}{3}x + 1) + 2$

13. Let $f(x) = (x - 1)^2 - 1$. This gives the graph of a parabola with vertex, (1,-1). Using the transformation $h(x)$, the parabola "moves", in such way, that the vertex is now at, (-1,5). Find $h(x)$.(Use only translations).

14. Suppose that $g(x) = -x^2 + \sqrt{x} + e^2 + 2^x$. Find:

    a) $g(-2x) + 1$

    b) $g(-2x + 1)$

    c) $\frac{1}{3}(g(-2x + 1) + 2)$