Math 115 Carter Sample Test 2 Spring 2004

1. Compute the following (Hint: using a calculator will slow you down):

   (a) $\log_6(216)$

   (b) $\log_2\left(\frac{1}{2096}\right)$

   (c) $\log_{1/3}(729)$

   (d) $\log_{343}(7)$

2. Use the rules of logarithms and exponentials to simplify the expressions.

   (a) $\log_{12}(x) - \log_{12}(2x-1) + 3\log_{12}(x-4)$

   (b) $15^{3x+2}15^{1-3x}$

   (c) $367^{\log_{367}(453x-4)}$

   (d) $\ln(e^{42})$

3. Given that $\log_A(2) = 0.3869$, $\log_A(3) = 0.6131$, $\log_A(7) = 1.0860$, and $\log_A(10) = 1.2851$, compute

   (a) $\log_A(12)$

   (b) $\log_A(2/3)$

   (c) $\log_A(72)$

   (d) $\log_A(49)$

   (e) $\log_A(28)$

4. There will be at least four graphs that are similar to these. For each of the following graph $f(x)$ indicating horizontal, vertical and other asymptotic behavior. Write solutions to each of the the inequalities $f(x) \leq 0$, $f(x) < 0$, $0 < f(x)$, and $0 \geq f(x)$

   (a) $f(x) = \frac{x^2}{x^2-4}$

   (b) $f(x) = \frac{x}{x^2-4}$

   (c) $f(x) = \frac{1}{x^2-4}$

   (d) $f(x) = \frac{x^3}{x^2-4}$

   (e) $f(x) = \frac{1}{(x-4)(x-2)}$

(f) $f(x) = \frac{x^3}{x^2+3x-2}$

(g) $f(x) = (x-2)(x+3)(x-4)$

(h) $f(x) = (x-4)(x+2)(x+1)^2$

5. Sketch the graphs of

   (a) $y = 17^{4x-5}$

   (b) $y = \ln(x-2)$

   (c) $y = 4\ln(x-3)+3$

6. Compute the difference quotient $\frac{f(x+h)-f(x)}{h}$ for the function $f(x) = e^x$.

7. In the analogy between addition and multiplication, the analogous statement to "multiplication distributes over addition" is "exponentiation distributes over multiplication." Given that the former law of arithmetic can be expressed in the equation, $(a+b)c = ac+bc$, express the latter law as an equation.

8. Find all solutions to the equation:

   (a) $\log_{10}(x) + \log_{10}(x+3) = 1$

   (b) $\log_5(x+4) + \log_5(x-4) = 2$

9. The half-life of peanuts in the Tappa Tappa Keg Frat house is 8 days. The frat bros buy 10 barrels of peanuts on Sept. 1. How long will it take until 86% of the peanuts are GONE? How many barrels of peanuts will remain on Sept 30?

10. Compute the amount of time it will take for \$600,000 to grow to 2.5 million dollars assuming continuously compounded interest at 7.5 % per year.