WS #4-4
Logarithmic Functions

1. You will be responsible to read the section completely and review the definitions and application of the following:

   A. Logarithmic function to the base a

   B. Domain of Logarithmic Functions

   C. Properties of Logarithmic Functions $F(x) = \log_a x$

      1.

      2.

      3.

      4.

      5.

      6.

   D. Natural Logarithmic Functions

   E. Common Logarithmic Functions

   F. Logarithmic Equations

2. Change to logarithmic form:

   A. $1.2^3 = m$ B. $e^b = 9$ C. $a^4 = 24$

3. Change to exponential form:

   A. $\log_a 4 = 5$ B. $\log_b e = -3$ C. $\log_3 5 = c$

4. Evaluate

   A. $\log_2 16$ B. $\log_3 \frac{1}{27}$

5. Find the domain of;

A. $F(x) = \log_2(x+3)$ B. $G(x) = \log_5\left(\frac{1+x}{1-x}\right)$ C. $h(x) = \log_{\frac{1}{2}}|x|$

6. Give the transformations for:

A. $f(x) = \ln x$ to $g(x) = -\ln(x+2)$

B. $f(x) = \log x$ to $g(x) = 3\log(x-1)$

7. Solving logarithmic equations;

A. $\log_3(4x-7) = 2$ B. $\log_x 64 = 2$

C. $e^{2x} = 5$

8. The concentration of alcohol in a person's blood is measurable. Recent medical research suggests that the risk R (given as a percent) of having an accident while driving a car can be modeled by the equation $R = 6e^{kx}$ where x is the variable concentration of alcohol in the blood and k is a constant.

A. Suppose that a concentration of alcohol in the blood of 0.04 results in a 10% risk (R=10) of an accident. Find the constant k in the equation. Graph $R = 6e^{kx}$ using the k value.

B. Using this value of k, what is the risk if the concentration is 0.17?

C. Using the same value of k, what concentration of alcohol corresponds to a risk of 100%?

D. If the law asserts that anyone with a risk of having an accident of 20% or more should not have driving privileges, at what concentration of alcohol in the blood should a driver be arrested and charges with a DUI?