MA111 Pre-Calculus Worksheet

1. Write $log x = 15$ in exponential form. $10^{15} = x$

2. Write $e^x = 5.2$ in logarithmic form. $\log_e 5.2 = x$ $\ln 5.2 = x$

3. Find the domain and range of $log(x-3)$. $x - 3 > 0 \rightarrow x > 3$

4. Find to two decimal places: $log_5 7$. 1.21

5. Express in expanded form: $log_c\left(\frac{x^6\sqrt{y}}{x}\right)$. $6\log_c x + \frac{1}{2}\log_c y - \log_c x = 5\log_c x + \frac{1}{2}\log_c y$

6. Express in condensed form: $6lnW + \frac{1}{3}lnT - 6lnS$. $\ln \frac{W^6 T^{1/3}}{S^6}$

Solve for x:

7. $log_x 12 = 2$ $x^2 = 12 \rightarrow x = \pm\sqrt{12} = \pm 2\sqrt{3} = \pm 3.46$

8. $x^{log_2 10} = 10$ $\log_x 10 = \log_2 10$ $x = 2$

9. $e^{5x} - 3 = 0$ $e^{5x} = 3 \Rightarrow \ln 3 = 5x$ $x = .2197$

10. $3^{x+1} = 4^{2x}$ $(x+1)\log 3 = 2x \log 4 \Rightarrow x(2\log 4 - \log 3) = \log 3$ $x = .656$

Solve for t:

11. $6(3)^{.09t} = 15$ $\ln 3^{.09t} = \ln \frac{15}{6}$ $t = \frac{\ln 15/6}{.09 \ln 3} = 9.27$

12. $A = Pe^{rt}$ $t = \frac{\ln(A/P)}{r}$

13. If \$3000 is invested at a rate of 9% and is compounded continuously, how long will it take for the investment to triple? $t = \frac{\ln(3)}{.09} = 12.21$

14. At a nearby high school, someone overhears the principal say that school will be closed a day early this week. The number of people, N, who hear this rumor in t minutes is given by $N = N_f - N_f e^{-.15t}$, where N_f is the fixed population of the school. If the school has 1800 students and staff members, how many minutes will it take for 3/4 of the school to hear the rumor? $\frac{1}{4} = e^{-.15t}$ $t = 9.24$ min.

15. The length L of a fish is related to its age by means of the growth formula $L = a(1 - be^{-kt})$, where a, b, and k are positive constants that depend on the type of fish. Solve this equation for t to obtain a formula that can be used to estimate the age of a fish from a length measurement. $t = \ln\left(\frac{L/a - 1}{-b}\right) / -k$

16. The energy E (in ergs) released during an earthquake of magnitude R (from the Richter scale) may be approximated by the formula $logE = 11.4 + (1.5)R$. Find the energy released during the biggest earthquake in history which took place in 1933 in Japan and had a magnitude of 8.9.

$\log E = 24.75$

$10^{24.75} = E = 5.62 \times 10^{24}$