Name: _____ Date: _____

Exponents & Logarithms Assignment

Please show all work for full marks. Clearly indicate the question number and the final answer in your solutions, when appropriate. Due the class before the test. (20 marks total)

1. Model each scenario below using an exponential equation and define any variables. Then use your model to determine the solution to the problem. (5 marks)
   a) The viscosity of an unknown solution decreases by 3.5% for every degree Celsius it is heated. By what percentage will the solution's viscosity have decreased after being heated by 10°C?
   b) A population of bacteria is estimated to triple in 5 days. Determine the amount of time it would take the population to double.
   c) After 8 days, 800 g of an unknown substance decays to 300 g. What is the half-life of this substance to the nearest hour?
2. Which is the better investment? (2 marks)
   - Investing $5000 for 10 years at an annual rate of 4.35%, compounded semi-annually
   - Investing $5000 for 10 years at an annual rate of 4.40%, compounded daily
3. Solve using exponent rules: $\frac{16^x(8^{4x+1})}{4^{x-3}}=1$ (2 marks)
4. Describe how the graph of $y=-2^{-3x+6}+3$ can be obtained by transforming the graph of $y=2^x$. (2 marks)
5. Determine the domain, range, and any intercepts of: $y = -\log(1-x) + 2$ (2 marks)
6. Write $3+\frac{1}{2}\log_2 a+3\log_2 b-2\log_2 c$ as a single logarithm in simplest form. (1 mark)
7. Evaluate: $\log_{0.5} 8$ (1 mark)
8. The point (2, 9) is on the graph of the inverse of $y=\log_c x$. What is the value of c? (1 mark)
9. If $\log_3 2 = a$ and $\log_3 5 = b$, then express $\log_3 800$ in terms of a and b. (1 mark)
10. Solve algebraically: $\log_2(x-1) + \log_2(x-3) = 3$ (2 marks)
11. What is the magnitude of an earthquake that is 200 times more intense than an earthquake measuring 5.5 on the Richter scale? (1 mark)