Homework 6 - Math 140

Calculate the following logarithms (without a calculator)!

1. $\log_2(16)$

2. $\log_{10}(1000)$

3. $\log_3\left(\dfrac{1}{9}\right)$

4. $\log_{10}(0.001)$

5. $\log_5(5\sqrt{5})$

6. $\ln\left(\dfrac{1}{\sqrt{e}}\right)$

Use a calculator to solve the following equations for x (round answers to two decimal places).

7. $10e^{-0.03x} = 4.$

8. $9 - (1/2)^x = 5$

9. $3^x = 5^{x-1}$

10. $e^x = 5.$

11. $(1.05)^x = 3$

12. $500(1.01^x) = 600$

13. A cup of hot water is set out to cool. Its temperature (in Fahrenheit) is $T(t) = 70 + 80e^{-0.1t}$ where t is the time since it was set out, in minutes. How long until the temperature of the cup reaches $90°F$?

14. Suppose you invest money in a bond that earns 1% interest (compounded annually) for 15 years. How many years will it be until the bond triples in value?

15. The population of Algeria was 34.9 million in 2009 and has been growing by about 1.5% per year. If that trend continues, when will the population of Algeria reach 45 million?