Math 29
Homework 8

Write a 1-3 sentence summary of what we did in class the previous period.

1. Solve the following equations for x.

   (a) $3^{2x+4} = 27^{x-1}$

   (b) $\log_2(x+4) + \log_2(x+2) = \log_2(3)$

   (c) $\log_x(2x-1) = 2$

   (d) $\log_{25}(x+1) = \log_5(x)$

   (e) $11(3^x) = 5(7^x)$

2. If the pH of an aqueous solution is 6.52, what is the concentration of the hydrogen ion?

3. At the end of each mile of a particular marathon, 15% of the runners drop out. After how many miles of the marathon, will there be no more than 25% of the original runners still in the race?

4. Suppose that a radioactive substance has the property that one third of it decays after .27 billion years. What proportion of it will remain after one billion years?

5. The release of chloroflorocarbons destroys the ozone in the upper atmosphere. At the present time the amount of ozone in the upper atmosphere is decaying at a rate of .25 percent per year. How long will it take for half the ozone to disappear?

6. Last year's spider population in my office was growing at the alarming rate of 10 percent per day. If there are 100 spiders in my office today, how long will it take for my office to be filled with one million spiders?

7. We measure the intensity of sound in $watts/cm^2$. The intensity $I_0 = 10^{-16}$ $watts/cm^2$, is the lowest intensity which is audible to humans. For a sound of intensity I we define the decibel rating of the sound to be $10\log(I/I_0)$ decibels (dB). Loud music can measure 110 dB whereas normal conversation measures 50 dB. How many times more intense is loud music than normal conversation?