MATH 172 Fall, 2011 Quiz #1 Name:____________________

1. A population grows so that $P_{n+1} = (1.04)P_n$, where n represents generations; the initial population is $P_0 = 100$.
   a. Compute P_1 , P_2 , P_3 , and the general solution for P_n , which is an **equation**, for this model.

   b. Compute the population after 100 generations.

   c. Rewrite the model equation to have the form of a difference equation, that is, some equation of the form $\Delta P =$ something in terms of P_n , where you may take $\Delta P = P_{n+1} - P_n$.

2. Suppose a population $S(t)$ of skinks is growing over time so that the **per capita** rate of increase is 0.007/day. Assume that skinks reproduce continuously (at least through the summer). The initial population is $S(0) = 3000$.
   a. Write the model equation that describes this situation.

   d. Show how to get an **approximation** for the skink population in 20 days using just one step. Then do the same using two steps. (Hint: remember $\Delta S \approx S'\Delta t$; what is Δt in each case?)