Exponential change: Problems

Timothy Carstens

June 11, 2009

1. Compounding interest is an example of exponential growth. Suppose I have an account which earns 2.8% interest compounding weekly. My initial balance in the account is \$250.
   (a) Write a function which tells me the account's balance after y years.
   (b) What is the annual growth rate in this exponential system? Hint: it'll look like $(\text{something})^{\text{something}}$, and it'll rely on the fact that $\Big((\text{something})^{a}\Big)^{b} = (\text{something})^{ab}$.

2. The number of fish in the sea decreases by 5.2% per year[1]. What is the approximate half life for the fish population? What is the precise half life for the fish population? If there are 15 billion fish in the sea today, how many will there be in 3 years?

3. Park Ranger Hailey has observed that the number of visitors to her park has increased by 17% per year. What is the precise doubling time? Why would it be a bad idea to use our doubling time approximation in this situation?

4. Each semester, the number of complaints to the math department about me has gone up by 22%. Two semesters ago, there were 5 complaints registered. How many will there be in 4 semesters? What is the precise doubling time?

[1] I just made that up.