Problems

1.1. In 1993, when the first edition of this book was written, the world's human population was expected to double in size in approximately 50 years. Assuming population growth is continuous, calculate r for the human population. If the population size in 1993 was 5.4 billion, what was the projected population size for the year 2000?

The future is here! On August 2, 2000 the best estimate of the world population size was 6.087 billion—a bit higher than that projected by the model in 1993. To find out the current estimate of the world population size, visit this website maintained by the U.S. Census Bureau:

http://www.census.gov/main/www/popclock.html

This website has a "real-time clock" that shows the estimated world and U.S. population sizes. What is today's date for you, reader, and how large is the human population now?

1.2. You are studying a population of beetles of size 3000. During a one-month period, you record 400 births and 150 deaths in this population. Estimate r and project the population size in 6 months.

1.3. For five consecutive days, you measure the size of a growing population of flatworms as 100, 158, 315, 398, and 794 individuals. Plot the logarithm (base e) of population size to estimate r.

1.4. A population of annual grasses increases in size by 12% every year. What is the approximate doubling time?

*1.5. You are studying an endangered population of orchids, for which b = 0.0021 births/(individual • year) and d = 0.0020 deaths/(individual • year). The current population size is 50 plants. A new shopping mall is planned that will eliminate part of the orchid habitat and reduce the population to 30 plants. Estimate the effect of the proposed development on the probability of extinction.

* Advanced problem