Math 273 - Fall 2015
Homework 6
Due October 18, 2016

If a man's wit be wandering, let him study the mathematics.

—Francis Bacon

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(1) Suppose that a population of bacteria begins (time 0) with 500 bacteria and that 40 minutes later contains 1000 bacteria.
   (a) Each bacterium splits (a process called *binary fission*) into two in order to reproduce. So, on average, our bacteria are each splitting once per 40 minutes. How much time does it take for one bacterium to become 8?
   (b) Assuming this growth continues, we have $\frac{dP}{dt} = k_0 P$, where $P = P(t)$ is the population at time t and k_0 is a constant. Find the constant k_0. (Be clear about what units of time you are using.)
   (c) How many hours does it take for there to be 1 million bacteria?

(2) Do the following problems from the textbook: 3.4.86, 3.5.9, 3.5.29, 3.5.71, 3.6.25.

Recommended (not to turn in): 3.4.63, 3.5.5, 3.5.53, 3.6.14, 3.6.43, 3.6.51.