Homework assignment #2
Due on 09/15

- 3.9, 3.11, 3.15, 3.18

5. You work for RECO, a pharmaceutical company that has a wonderful new anti-osteoporosis product, LOTSABONIUM (LB for short). LB is a recombinant genetic protein, which unfortunately denatures (becomes inactive) with time in a 1^{st} order reaction ($k=3.546 \times 10^{-4}$/hr). The FDA requires that drugs with less than 60% active ingredient be removed from the shelf and discarded. How long (days) do you have to sell the product before it must be legally removed from the store shelf ? Assume at t=0 the LB is 100% active.

6. Aspartame © (L-aspartyl-L-phenylalanine methyl ester) is a well-known non-nutritive sweetener. At 25 deg. C, aspartame in the presence of water very slowly deteriorates by a 1st order reaction with respect to aspartame concentration. The half-life of aspartame is 300 days at these conditions.

Aspartame is rarely used in baked goods, however, since it lacks heat stability. If the activation energy of the aspartame reaction is 60,000 J/mol, calculate

- **the value of the rate constant, k (min^{-1}), at 250 C**
- **the loss of sweetness (% of initial aspartame that is lost during baking) in a cookie that is baked at 250 deg. C for 30 minutes.**