Economics 43535: Assignment 2
(due Wednesday, March 19)

Professor Jensen Spring 2014

1. Assume the market value of a pine forest as a function its age t is given by

$$V = 1000 + 10t - 5t^2$$

so that its rate of change over time is

$$dV/dt = 10 - 10t.$$

Also assume the interest rate is R = 0.1, the standing value of the forest is 300, the harvest cost is 500, and the value of the land is 3000.

Determine the optimal rotation t* that maximizes the net benefits of harvesting this forest.

2. Suppose the firm that owns the forest hires an environmental economist and asks her to use state-of-the-art techniques to estimate the standing value of the forest. How does the optimal rotation change if her estimate of the standing value is 500? (HINT: It might be useful to graph the marginal benefit and marginal cost functions in this case.)

3. Provide an economic interpretation for the result found in #2 (i.e., what does an increase in ecological value do to the optimal harvesting rotation, and why?).

Note: Given quadratic $at^2 + bt + c = 0$, the roots are

$$t_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

and

$$t_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$