Written Assignment 1 (due 8/27/12)

Exercise 1: Problem 40 from section 1.1 of the textbook. Remember to fully explain your reasoning!

Exercise 2: The following setup was discussed in class on Wednesday, 8/22/12. Consider Newton's Law of Heating applied to a roast placed in an oven. Recall that the temperature T of the roast (in Fahrenheit) is given by

$$T(t) = A - C \cdot e^{kt}$$

where t is the time in minutes since the roast started, $A = 350$ is the ambient temperature of the oven, and C and k are constants which we don't know yet. After 10 minutes the temperature of the roast is 70° and after 20 minutes the temperature is 90°.

(a) Without computing it, do you expect k to be positive or negative? Why?

(b) Find $T(t)$. That is, fill in A, C, and k. You can leave the variable t and the known constant e.

(c) Rounded off to the nearest full minute, when is the roast 145°?