AME 20231
Homework 6
Due: Friday, 26 February 2010, in class

1. 5.79
2. 5.97
3. 5.114
4. 5.169
5. You supervise an industrial process which uses forced convection to cool hot 10 g steel ball bearings. In the forced convection environment, the heat transfer coefficient is $\mathsf{h} = 0.1\ kW/m^2/K$. The initial temperature is 1500 K. The ambient temperature is 300 K. Using the method developed in class, estimate the time constant of cooling, find an expression for $T(t)$, and find the time when $T = 350\ K$. Plot $T(t)$. Repeat the analysis for a 1 kg sphere.
6. 5.228; give a computer-generated plot of the temperature increase as a function of car mass, holding all other things constant; for your plot you may hold the initial and final velocities at 60 km/hr and 20 km/hr, respectively.