AME 20231
Homework 6
Due: Thursday, 27 February 2020, in class

1. 3.93, take instead the heat treatment to be at 450°C.

2. 3.101, take instead the final temperature to be 1100 K.

3. 3.122, take instead the polytropic exponent to be $n = 1.3$.

4. 3.163, take instead the concrete to have a thickness of 40 cm.

5. 3.164, take instead the solar net influx to be 120 W/m^2.

6. 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 $h = 0.1$ 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.