Homework Optional. MAE-200B.
Prof. Donald Dabdu

1. Textbook problem: Chapter 9, Section 83, Problem 1.
2. Textbook problem: Chapter 9, Section 83, Problem 4.
3. Textbook problem: Chapter 9, Section 87, Problem 2.
4. Textbook problem: Chapter 9, Section 87, Problem 7.
5. Textbook problem: Chapter 9, Section 87, Problem 8.

6. A solid sphere initially at temperature 1 is cooled down by keeping its surface at temperature 0. Find the temperature of the sphere as a function of time and radius $T(t,r)$. The surface of the sphere corresponds to $r = 1$.

$$\frac{\partial T}{\partial t} = \alpha \frac{1}{r^2} \frac{\partial}{\partial r} \left(r^2 \frac{\partial T}{\partial r}\right)$$

$T(0,r) = 1$

$T(t,1) = 0$

Hint: use the transformation $u(r,t) = rT(r,t)$. 