This assignment is in two parts. The answers to problems in Part I are generally in the book. It is advisable to make every effort to solve the problem before consulting the answer.

Part I

Section 12.3

1. p.865, #37.

2. p.868, #97 (a) only, by hand. Next, perform the indicated differentiations using the MAPLE command `diff`, and use the `simplify` command to show that the answer agrees with the textbook answer. Turn in your Maple output.

Section 12.5

3. p.882, #21
4. p.882, #27
5. p.883, #61 (a)

Part II

Section 12.3

6. p.866, #76

7. The error function, $\operatorname{erf}(z)$, is a special function defined by an integral

$$\operatorname{erf}(z) = \frac{2}{\sqrt{\pi}} \int_{0}^{z} e^{-s^2} ds.$$

Show that the function

$$u(x, t) = \operatorname{erf}\left(\frac{x}{2t^{1/2}}\right)$$

satisfies the heat equation

$$\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}.$$

*Hint:* Use the Second Fundamental Theorem of Calculus, section 4.4.

8. (MAPLE) Plot the surface $z = f(x, y)$ from problem 2, using Maple on the rectangle $x = -3..3, y = -3..3$, `grid = [51, 51]`. *Note:* You do not need to exclude the point $(x, y) = (0, 0)$ in your Maple specification. This is because the function is *continuous* at the point $(0, 0)$. 