MATH 158 Assignment 4, Spring 2013

Michael Monagan

Due Monday March 11th at 4:20 pm.

Section 10.4 The Method of Least Squares

Exercises 2, 14, 28, 29, 30.

To fit n data points $(x_1, y_1), (x_2, y_2), ..., (x_n, y_n)$ with a paraboler $ax^2 + bx + c$ in the least squares sense, we want to minimize the area

$$A = \sum_{i=1}^{n} (y_i - ax_i^2 - bx_i - c)^2.$$

Calculate the partial derivatives $\frac{\partial A}{\partial a}, \frac{\partial A}{\partial b}$, and $\frac{\partial A}{\partial c}$ and then simplify the equations $\frac{\partial A}{\partial a} = 0$, $\frac{\partial A}{\partial b} = 0$, $\frac{\partial A}{\partial c} = 0$. Do this using Σ notation. You should get a linear system of equations in a, b, c.

Section 10.7 Double Integrals

Exercises 3, 4, 12, 14, 26.

Section 10.8 Applications of Double Integrals

Exercises 2, 4, 5, 6, 10, 15, 18, 28, 29.

Section 11.1 Differential Equations

Exercises 4, 5, 11.

Section 11.2 Separation of Variables

Exercises 6, 26, 39, 44, 46.

Section 11.3 Applications of Differential Equations

Exercises 2, 5, 10, 18.