

EG02041 Advanced Mathematics

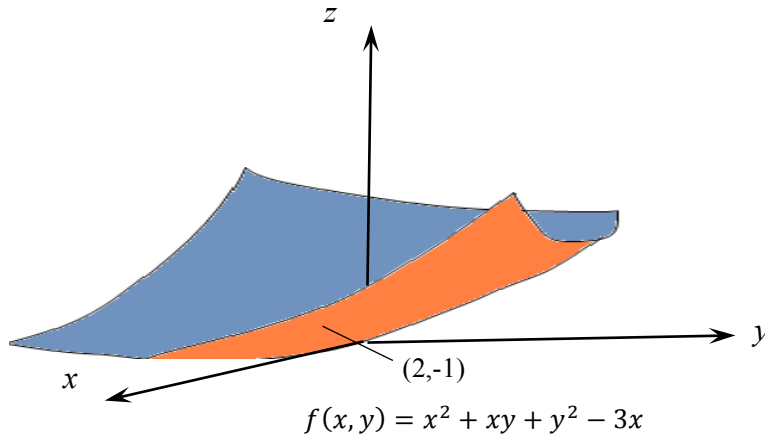
Class 4: Functions of Several Variables

7.2 Higher-Order Partial Derivatives

1. **Exercise:** Let $f(x, y) = x^3y^3 + 2xy^2$. Compute $\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2}$.

7.3 Maximum-Minimum Problems

2. **Exercise:** Find the relative maximum and minimum values of $f(x, y) = x^2 + xy + y^2 - 3x$.



7.4 An Application: The Method of Least Squares

3. **Exercise:** The table below shows the average age of mothers who had their first child in the given year. Suppose that we plot these points and try to draw a line through them that fits. Note that there are several ways in which this might be done (see Figs. 1 and 2). Each would give a different predicts average age of mothers who have their child in 2005 or 2010. Use **the method of least squares to minimize** the deviations.

Year, x	Average Age of New Mothers, y
1. 1985	23.7
2. 1990	24.2
3. 1995	24.5
4. 2000	24.9

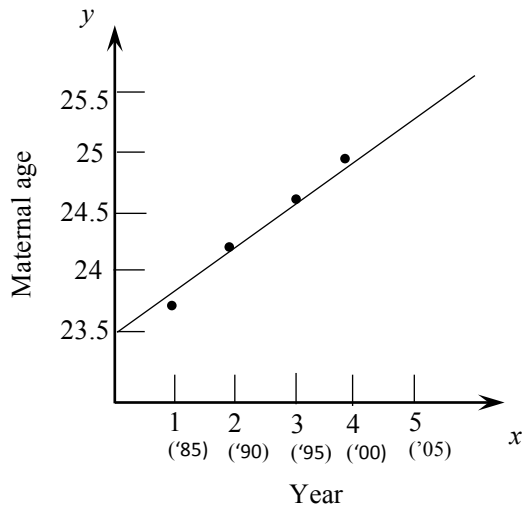


Figure 1

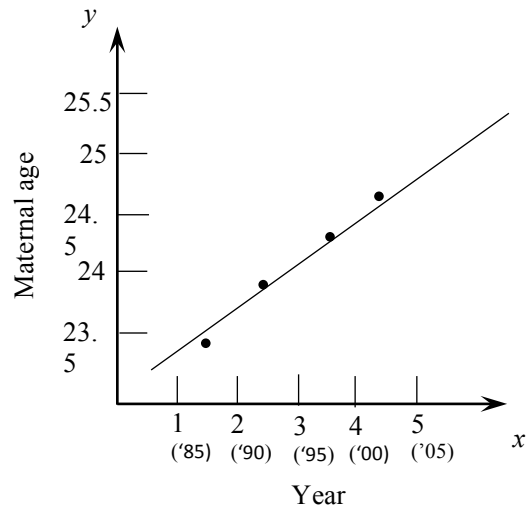


Figure 2