



Tutoring Sheet # 15

Unit 05a : Mathematics 1

HomeWork to be submitted: # 1:a,b,c,f,3,4

1. Find the partial derivatives and the second partial derivatives of the following functions :

a. $f(x,y) = x^2y + xy^3$ b. $f(x,y) = x^3y - \frac{x}{y}$ c. $f(x,y) = x + \sqrt{y}$
d. $f(x,y) = x^{\frac{3}{4}}y^{\frac{1}{4}}$ e. $f(x,y) = x^2(x^2 + y^3)^{\frac{2}{3}}$ f. $f(x,y) = 5x^{\frac{2}{3}}y^{\frac{1}{4}}$

2. The function f is given by : $f(x,y) = x^{-y}$ for $x > 0$ (LSE 2004)

Find partial derivatives $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ (Note that: $x^{-y} = e^{-y \ln x}$)

3. The function f is given by : $f(x,y) = 2^{x^2y}$ for $x > 0$ (LSE 2004)

Find the partial derivatives $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$

4. The function f is given by : $f(x,y) = \left(\frac{x-y}{x+y}\right)^n$ where $n > 0$

Find the partial derivatives $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ (LSE 2003)

5. The function f is given by : $f(x,y) = \frac{x^2}{y} + \frac{\sqrt{x^4 + y^4}}{x+y}$ (LSE 2003)

Find the partial derivatives of f and show that $x \frac{\partial f}{\partial x} + y \frac{\partial f}{\partial y} = f(x,y)$