

# Home Assignment

Series - 3

B.A. 1st Sem Economics (Honours)

Paper: ECO-HC-1026: Mathematical Methods for Economics-I

1. If  $y = f(x_1, x_2, x_3) = x_1^3 - 2x_1x_2 + 5x_1x_3^2 - x_2^2x_3$ , find  $\frac{\partial y}{\partial x_1}$ ,  $\frac{\partial y}{\partial x_2}$  and  $\frac{\partial y}{\partial x_3}$ . 5

2. Find the partial derivatives of the following functions: 5+5=10

(a)  $y = \frac{(2x_1^3 - x_2^2 + 3x_3^4)}{(x_1 + x_2 - x_3)}$

(b)  $y = (x_1^2 - x_2^3 + x_1x_3)(x_2^2 + 2x_3^2 - x_3x_1)$

3. If  $y = (x_1^3 - 2x_2^2)(3x_1 + x_2^2)$ , find the 2nd order partial derivatives. 6

4. If  $y = x_1^2x_2 + x_2^2x_3 + x_3^2x_1^2$ , find the 2nd order partial derivatives. 6

5. A consumer consumes two commodities  $Q_1$  and  $Q_2$  and the utility function is given by -

$$U = 3Q_1^2 - 5Q_1Q_2 + 2Q_2^3$$

Find the marginal utilities of  $Q_1$  and  $Q_2$ . 5

6. Given the production function as -

$$Q = 7L^5K^{-4}$$

Verify whether the Euler's theorem is satisfied or not for the production function? 8