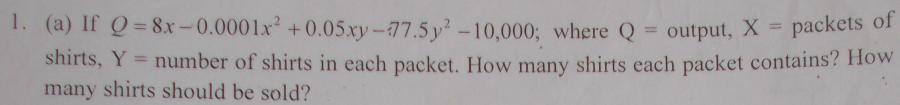
OLABISI ONABANJO UNIVERSITY AGO- IWOYE HARMATTAN MID-SEMESTER TEST 2016/2017 SESSION

COURSE TITLE: Mathematics for Economists II (3 UNITS)

OURSE CODE: ECO 303

TIME ALLOWED: 60 Minutes

INSTRUCTION: ATTEMPT ALL QUESTIONS



(b) Differentiate the followings with respect to x (i) $f(x) = x^2 e^{x^2 + 3x}$ (ii) $y = \log_e(x^4 - 2x^3 + 7)$ (iii) $f(x) = \frac{3}{\sqrt[3]{x^2 - 2}}$

Given a demand function where: $Q = 200 - 2P_1 - P_2 + 0.1y^2$; where $P_1 = 10$, $P_2 = 15$ and y = 100. Find:

(i) The price elasticity of demand

(ii) Cross price elasticity of demand

(iii) Income elasticity of demand

What are the natures of price and cross-price elasticities of demand and the goods?

(a) A manufacturing firm has its marginal cost function given as $C = 0.8q^2 + 4q + 10$. if the firm's average revenue function is $P = 3 - \frac{3}{8g}$, calculate (i) Total revenue function,

(ii) Profit function (iii) profit maximizing output and price at maximum output level.

(b) Integrate the following function by part: (i) $\int (x\sqrt{2x-x})dx$ (ii) $\int (x+2)(x-1)^4 dx$

(a) If $y^{(1)}(t) = 5t^2$, find y(t). (b) Use the general equation of the first order linear differential equation to solve each of the following:

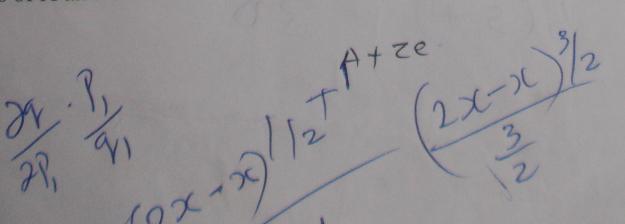
(i)
$$\frac{\partial y}{\partial t} - 6y = \frac{18}{2}$$
(ii)
$$\frac{\partial y}{\partial t} + 4t = -20$$

(ii)
$$\frac{\partial y}{\partial t} + 4t = -20$$

(iii)
$$\frac{\partial y}{\partial t} + 3t^2 = t^2$$

(c) Test for the dynamic stability in (b) above.

5. Given a utility function of a consumer as $U = X \ln Y$ and his budget constraint is 2X + 3Y = 100. (i) State his composite function (ii) the units of X and Y that will be consumed to satisfy Hessian condition (iii) Using Bordered Hessian, find the optimum units of X and Y.



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