SES'S L.S.RAHEJA COLLEGE OF ARTS AND COMMERCE

Course: Elementary Quantitative Techniques Unit: I Prepared by: Rahul Dandekar

1) If demand function is $D = 180p - 10$ and supply function is $S = 170p + 10$, then find equilibrium price and quantity.

2) If demand function is $D = 165p - 10$ and supply function is $S = 140p + 15$, then find equilibrium price and quantity.

3) Draw the graphs of following equations.

a) $y = x - 3$ $\quad 0 \leq x \leq 3$

b) $y = 2x + 2$ $\quad -1 \leq x \leq 2$

c) $y = 5x - 1$ $\quad -2 \leq x \leq 1$

d) $Y = x^2 + 1$ $\quad 0 \leq x \leq 3$

4) Given: C = 150 + 0.8 Y (Consumption Expenditure)

I = 100 + 0.1 Y (Investment Expenditure)

G = 50 (Government Expenditure)

Find equilibrium values of Y (National Income), C, I and G

5) Given: C = 200 + 0.8 Y (Consumption Expenditure)

I = 40 + 0.1 Y (Investment Expenditure)

G = 60 (Government Expenditure)

Find equilibrium values of Y (National Income), C, I and G

6) Evaluate following Limits

a) $\lim_{x \to 8} \left[\frac{x^2 - 64}{x-8}\right]$

b) $\lim_{x \to 4} \left[\frac{x^2 - 16}{x-4}\right]$

c) $\lim_{X \to 3} \frac{X^2+2X-15}{x^2-9}$

7) Differentiate with respect to X

a) $Y = \frac{x^2 + 7x - 20}{3x^2 - x + 15}$

b) $Y = (3x^3 - 15x^2 + 20)(7x^2 - 3)$

c) $Y = (2x^3 - 3x^2)(3x^2)$

d) $Y = 200$

e) Y = 1000

f) $Y = (5x^3 - x^2)(10x)$

g) $Y = \frac{2x^2 + x - 50}{5x^2 - x}$

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Course: Elementary Quantitative Techniques   Unit: II   Prepared by: Rahul Dandekar

1) Find second order derivatives for following

   a) $Y = 7x^4 - 5x^3 + 4x^2 + 3x + 90$

   b) $Y = 2x^3 + 3x^2 + 18x + 180$

   c) $Y = (5x^2 + 30)\,(x^2 + 15)$

   d) $Y = (x^2 + 2x)\,(50x)$

2) If Total Revenue is TR = $126x - 3x^2$ and Total Cost Function is TC = $925 - 30x$ then calculate profit maximising output and profit.

3) If Total Revenue is TR = $100x - 5x^2$ and Total Cost Function is TC = $550 - 50x$ then calculate profit maximising output and profit.

4) Solve the following L.P.P. graphically.

   Maximize Z = 9X + 13Y

   Subject to $2X + 3Y \leq 18$

   $2X + Y \leq 10$

   $X \geq 0, Y \geq 0$

5) Solve the following L.P.P. graphically.

   Minimize Z = 3X + 2Y

   Subject to $X + 2Y \geq 6$

   $2X + Y \geq 6$

   $X \geq 0, Y \geq 0$

6) If Total Cost = $15x^5 + 3x^4 + 500$, then find Average Cost, Marginal Cost and second order derivative of Total Cost.

7) If Total Revenue = $12x^5 + 5x^4 + 100$, then find Average Revenue, Marginal Revenue and second order derivative of Total Revenue.

8) A firm manufactures 2 products A and B. The profits per unit of products are Rs 30 and Rs. 20 respectively. Firm has 2 machines M1 and M2. From the given information formulate the L.P.P. to maximise profit.

	Product A	Product B	Time available in Minutes
M1	4	3	2000
M2	2	1	2500

9) Two different kinds of food A and B are being considered to form a weekly diet. The price of food A is Rs. 4 per Kg and that of food B is Rs. 3 per Kg. From the given information formulate the L.P.P to minimise the cost.

	Food A	Food B	Weekly Requirement
Fats	5	7	16
Carbohydrates	15	10	25
Proteins	8	9	15

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Course: Elementary Quantitative Techniques Unit: III Prepared by: Rahul Dandekar

1) Explain following concepts with the help of an example.

   a) Row matrix
   b) Column matrix
   c) Lowe triangular matrix
   d) Upper triangular matrix
   e) Square matrix
   f) Rectangular Matrix
   g) Zero matrix
   h) Diagonal matrix
   i) Scalar matrix
   j) Identity matrix
   k) Symmetric matrix

2) Find T_{30} of arithmetic progression 4, 12, 20, …………

3) Find T_{20} of arithmetic progression 4, 9, 14, …………..

4) For the following geometric progression 2, 12, 72, ….. find the fifth term (t_5) and the eighth term (t_9)

5) For the following geometric progression 3, 12, 48, ….. find the fifth term (t_{10}) and the eighth term (t_6)

6) Given, A = $\begin{bmatrix} 5 & 1 \\ 7 & 3 \end{bmatrix}$ and B = $\begin{bmatrix} 2 & 2 \\ -1 & -3 \end{bmatrix}$

   Prove that $(A + B)^T = A^T + B^T$

7) IF A = $\begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$, $K_1 = 2$, $K_2 = 4$ then Prove $(K_1 + K_2)A = K_1 A + K_2 A$

8) IF A = $\begin{bmatrix} -3 & 1 \\ 7 & 4 \end{bmatrix}$, B = $\begin{bmatrix} 7 & 5 \\ 5 & 3 \end{bmatrix}$ and C= $\begin{bmatrix} 3 & 8 \\ 4 & 2 \end{bmatrix}$

then prove that 1) (A + B) + C = A + (B + C)

2) A (B + C) = AB + AC

9) IF A = $\begin{bmatrix} 2 & 0 \\ 3 & 1 \end{bmatrix}$, B = $\begin{bmatrix} 3 & 0 \\ 1 & 3 \end{bmatrix}$ and C= $\begin{bmatrix} 1 & -1 \\ 4 & 3 \end{bmatrix}$ Then calculate

a) AB
b) BC
c) AC
d) BA
e) CB
f) CA
g) A+B
h) A+C
i) B+C