

EASTERN UNIVERSITY, SRI LANKA
FACULTY OF COMMERCE AND MANAGEMENT
FIRST YEAR - FIRST SEMESTER EXAMINATION IN

12 OCT 2015

DEGREE PROGRAMME IN BUSINESS ADMINISTRATION / BACHELOR OF COMMERCE – 2013/2014 (SEPTEMBER 2015)

(PROPER/REPEAT/RE-REPEAT)

COM 1012 – FINITE MATHEMATICS

II Questions

Time Allowed: 02 Hours

Simplify and express with positive exponent:

$$\left(2x^{-1}y^2\right)^{-2} \div \left(\frac{x^0y^8}{9x^{-2}y^4}\right)^{1/2}$$

Show that $\frac{2^{n+1}}{(2^n)^{n-1}} \times \frac{4^{n+1}}{(2^{n-1})^{n+1}} = 4^{n+2}$.

Simplify to the lowest term: $\frac{x^2+y^2}{x^2-y^2} + \frac{x}{x+y} + \frac{y}{y-x}$.

Find the values of x by solving the equation $|3x + 2| = |5x - 8|$.

Find the values of x and y by solving the equations: $\frac{x+3}{5} = \frac{8-y}{4} = \frac{3(x+y)}{8}$.

Find the equation of the straight line passing through $(-3, 4)$ with slope $2/3$.

Find the transpose and additive inverse of the matrix $A = \begin{pmatrix} 3 & -7 \\ 2 & 6 \\ 1 & 0 \end{pmatrix}$.

If $\begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix} \begin{pmatrix} a & 2 \\ 7 & b \end{pmatrix} = \begin{pmatrix} 31 & 1 \\ 38 & 3 \end{pmatrix}$, then find a and b .

- ix) A and B are two independent events such that $P(A) = 0.4$, $P(B) = 0.5$.
 a) $P(A \cap B)$ b) $P(A' \cap B')$.

- x) Ten units of output are selected from the production line. Three of these 10 are defective. To be drawn from the 10, what is the probability that 2 are defective?

(3 X 10 = 30)

02. i) Let the demand for a bag of sugar be given by $2p + 5q = 200$ and supply for it be $p - 2q =$
 a) Compare the quantity demanded and quantity supplied when price is Rs. 60
 b) Will there be a surplus or shortage at this price?
 c) Find the market equilibrium price and quantity.

(06)

- ii) Factor the following expressions completely:

a) $\frac{27}{a^3 b^3} - 1$

b) $x^7 + x^4 - 16x^3 - 16$

(07)

- iii) Solve the following equations:

a) $x^4 = 5x^2 - 4$

b) $3x + 2y = 16$; $xy = 10$

c) $\frac{\sqrt{x+a}}{\sqrt{x-b}} = \frac{\sqrt{x}}{\sqrt{y}}$

(09)

(Total Ma

03. i) Explain the following terms by giving examples in the context of matrix.

a) Scalar matrix

b) Comparable matrices

c) Skew symmetric matrix

(05)

- ii) a) If $A = \begin{pmatrix} 1 & 4 \\ 3 & 2 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 1 \\ 1 & -1 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}$, then show that $(ABC)^2 = C^2$

b) Find the matrix X such that $3A + 5B + 4X = 2C$ if

$$A = \begin{pmatrix} -3 & 0 & 2 \\ 2 & 3 & 4 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & 2 & 1 \\ 3 & -4 & 5 \end{pmatrix}, \quad C = \begin{pmatrix} 7 & 0 & 3 \\ 5 & -1 & 2 \end{pmatrix}.$$

c) If $A = \begin{pmatrix} 5 & 4 \\ 1 & 1 \end{pmatrix}$ find the matrix X for which $AX = \begin{pmatrix} 1 & -2 \\ 1 & 3 \end{pmatrix}$

(10 Marks)

A retailer orders 100 jerseys. The large size costs her Rs. 560 each, medium Rs. 500 each, and small Rs. 440 each. She spends a total of Rs. 49700. She makes a profit of Rs. 80 on the large and medium size jerseys and Rs. 60 on small. Her total profit is Rs. 7400. Suppose she purchased x number of large size jerseys, y number of medium size jerseys, and z number of small size of jerseys

- Develop a system of three linear equations which can be used to find out the number jerseys x , y , and z she purchased.
- Represents the system of linear equations developed in part (a) as matrix equation.
- Find the values for x , y , and z by solving the matrix equation using inverse matrix.

(09 Marks)

(Total Marks 24)

a) Distinguish the following pair of terms using suitable examples:

- Mutually exclusive events, Independent events
- Classical approach to probability, relative frequency approach to probability

b) State the following clearly:

- Addition Rule of probability
- Multiplication Rule of probability
- Baye's Theorem

(10 Marks)

ii) The probability that house sales will increase in the next 6 months is estimated to be p , the probability that the interest rates on housing loans will go up is estimated to be q , and the probability that the house sales and interest rates will go up during the next six months is estimated to be 0.20.

- a) Find the probability that house sales or interest rates will increase during the next 6 months.
- b) Find the probability that house sales will go up given that interest rates will increase during the next 6 months.
- c) Find the probability of an increase in house sales and not an increase in interest rates during the next 6 months.
- d) Whether the event of interest rates increasing and sales increasing are independent events. Justify your answer.

(08)

iii) In a bolt manufacturing, out of the total output 25%, 35%, and 40% of the items are produced respectively by machines A, B, and C. It is found that the machines A, B, and C produce respectively 5%, 4%, and 2% defective items in their production. A bolt is selected randomly from the total production and found to be defective. Using tree diagram, find the probability that the item was manufactured by

- a) Machine A
- b) Machine B
- c) Machine C.

(08)

(Total Marks)