

EASTERN UNIVERSITY, SRI LANKA
FACULTY OF COMMERCE AND MANAGEMENT
FIRST YEAR - FIRST SEMESTER EXAMINATION IN
BACHELOR OF BUSINESS ADMINISTRATION / COMMERCE – 2010/2011 (MARCH 2012)
(PROPER/REPEAT/RE-REPEAT/RE-RE-REPEAT)
COM 1012 – FINITE MATHEMATICS

Answer all Questions

Time: 02 Hours

I) Simplify the following expressions.

a. $\left(\frac{x^{-1}y^2}{x^2y^{-4}}\right) \div \left(\frac{x^3y^{-5}}{x^{-2}y^3}\right)^{-5}$

b. $\left(\sqrt[4]{x^{-4/3}}\right)^4$

c. $\left(x - \frac{2}{x+1}\right) \div \left(1 - \frac{4x+7}{x^2+4x+3}\right)$

II) a. Rationalize the denominator and simplify the expression.

$$\frac{3\sqrt{2} + 2\sqrt{3}}{2\sqrt{3} - 3\sqrt{3}}$$

b. If $(a^n)^m = a^{n^m}$, prove that $n^{m-1} \times m^{n-1} = m^n$.

c. If $x = 10$, $y = 81$ and $z = 16$ show that

$$\sqrt{\frac{x}{4}} - \sqrt[4]{y} + \sqrt[3]{4z} = \sqrt{\frac{5}{2}} + 1.$$

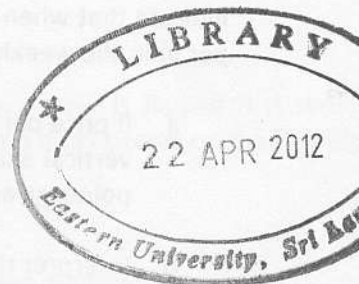
III) Factorize the following expressions completely.

a. $x^2 - y^2 + 4y - 4$

b. $x^2 - 13x + 42$

c. $3x^2 - 12y^2$

d. $x^6 + 6x^3 - 16$



02. I) Solve the following inequalities.

a. $\left| \frac{x+1}{x} \right| \geq 2$

b. $x^2 + x - 6 \geq 0$

II) Solve the following equations for x .

a. $\frac{2x-a}{b} + \frac{3x-b}{a} = \frac{3a^2 + 8b^2}{ab}$

b. $3x^2 - 12x + 1 = 6x - 23$

c. $5x - 1 = 4\sqrt{x}$

d. $x^{-4} + 144 = 25x^{-2}$

III) Solve the system of equations given below.

$$y^2 = 2x$$

$$x = y - \frac{1}{2}$$

IV) An economist believes that there is a linear relationship between the market price of a commodity and the number of units of the commodity supplied to the market. Two observations indicate that when the price is Rs. 15 per unit, the weekly supply is 30000 units and when the price is Rs. 25 per unit, the weekly supply is 48000 units.

- If price per unit, p is plotted on the horizontal axis and the quantity supplied, q is plotted on the vertical axis, determine the slope-intercept form of the line which passes through the points given above.
- Interpret the slope and intercept of the equation in this application.
- Predict the weekly supply if the market price is Rs. 25 per unit.

03. I) a. If $A = \begin{pmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & -1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{pmatrix}$, find the matrix C such that $A + 2C = B$.

b. If $A = \begin{pmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix}$, $B = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$ and $AB = \begin{pmatrix} 6 \\ 3 \\ 1 \end{pmatrix}$, find the values of x, y, z .

c. Show that the determinant of the matrix $\begin{pmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{pmatrix}$ is $4a^2b^2c^2$.



II) For the matrix $A = \begin{pmatrix} 5 & -4 \\ 2 & -2 \end{pmatrix}$, find

- a. Minors b. Cofactors c. Adjoint matrix d. Inverse matrix

III) Mahesh, Vivek and Anil have Rs. 800, Rs. 900 and Rs. 850 respectively. They utilized the amount to purchase three commodities A, B and C of prizes per unit x , y and z respectively. Mahesh purchases 100 units of A, 100 units of B and 20 units of C; Vivek purchases 130 units of A, 50 units of B and 40 units of C and Anil purchases 60 units of A, 100 units of B and 30 units of C.

- a. Develop a system of three linear equations which can be used to find out the prizes x , y and z for the commodities.
- b. Represent the system of linear equations in matrix form.
- c. Find the prizes x , y and z by solving the matrix equation using matrix inversion method.

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I) a. Explain the following terms clearly.

- i. Random experiment ii. Sample space

b. An experiment consists of flipping a coin and rolling a die. A coin is flipped first time. If head occurs on the first flip, then the coin is flipped second time and if tail occurs on the first flip, the die is rolled.

- I. Draw a tree diagram for this experiment.
- II. List the sample space for this experiment using the tree diagram.
- III. List the simple events of the event X that 'a number less than 4 occurred on the die'.

II) a. If A and B are mutually exclusive events and $P(A) = 0.4$ and $P(B) = 0.5$ calculate $P(A \cup B)$ and $P(A' \cap B)$.

b. Suppose that the probability of passing a bar exam held for graduates of Law school in the first attempt is 72%. They can rewrite the exam if they fail and the probability of passing the bar exam in the second attempt is 88%. Find the probability that a randomly selected graduate passes the bar exam.

III) In a bolt factory, machines A , B and C manufacture 60%, 25%, and 15% respectively. On the total production, 1%, 2% and 1% are defective bolts.

a. A bolt is selected at random from the total production. Calculate the following:

- I. Probability that the randomly selected bolt is defective and produced by machine C .
- II. Probability that the randomly selected bolt is defective.

b. If the randomly selected bolt from the total production is found to be defective from machine A , the defective bolt is expected to have been manufactured?

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