

ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Mathematics & Statistics)

WARNING

1. **PLAGIARISM OR HIRING OF GHOST WRITER(S) FOR SOLVING THE ASSIGNMENT(S) WILL DEBAR THE STUDENT FROM AWARD OF DEGREE/CERTIFICATE, IF FOUND AT ANY STAGE.**
2. **SUBMITTING ASSIGNMENTS BORROWED OR STOLEN FROM OTHER(S) AS ONE'S OWN WILL BE PENALIZED AS DEFINED IN "AIOU PLAGIARISM POLICY".**

Course: Business Mathematics (1429)
Level: B.A, B.Com, BBA

Semester: Autumn, 2013
Total Marks: 100

ASSIGNMENT No. 1
(Units 1–4)

Note: All questions carry equal marks.

- Q.1 David Whatmore contacts Pakistani Cricketers for a charity cricket match. Due to their busy schedule he estimates that the probability that a contacted player will be agreed, is 0.27. Given two successive contacts what is the probability that
- i. Both players will be agreed.
 - ii. First will be agreed and second will not.
 - iii. 2nd will be agreed but 1st will not.
 - iv. Both will not be agreed.
- Q.2 a) Differentiate between continuous and discrete random variables giving five practical examples for each.
- b) Given a random variable X has normal distribution with mean 20 and standard deviation 10. Find the probability that $P(20 \leq X \leq 30)$.
- Q.3 a) What is the conditional probability. Explain with the help of examples.
- b) The data of calls received in emergency center of PIMS hospitals in the month of April 2013 is given below.

No. of Calls	Frequency
Below 100	1
100 – 109	3
110 – 119	5
120 – 129	8
130 – 139	7
140 – 149	5
150 +	1

- i. Construct probability distribution for this data.
- ii. What is the probability that less than 130 calls will be received in a day.

Q.4 a) Solve the following simultaneous equation by drawing the graphs.

$$\begin{aligned} 2x - y &= 4 \\ x + 3y &= 9 \end{aligned}$$

b) Solve the inequality $|5x - 4| < 1$ and represent your answer on the real line.

Q.5 a) Solve the second degree equation and discuss the nature of its roots

$$9x^2 - 3x = 2$$

b) A downward trend has been observed in the average NTS scores of applicants. Which is given by

$$R = 60 - 0.5t$$

Where R represents NTS score and t represents time in years starting from 2002 ($t = 0$).

- i. Identify and interpret R and t intercepts.
- ii. Calculate and interpret the slope of the above equation.
- iii. Sketch the graph of this above equation.

ASSIGNMENT No. 2

(Units 5–9)

Total Marks: 100

Note: All questions carry equal marks.

Q.1 a) Explain all the types of square matrices with examples.

b) Solve the following system of linear equations using matrices,

$$\begin{aligned} x_1 + x_2 + x_3 &= 6 \\ 3x_1 - 2x_2 + x_3 &= 2 \\ 3x_1 - 4x_2 - 2x_3 &= 1 \end{aligned}$$

Q.2 a) Find the inverse of the following matrix using matrix of cofactors,

$$\begin{pmatrix} 2 & 3 & -4 \\ 1 & -1 & 1 \\ 1 & 2 & 3 \end{pmatrix}$$

b) Consider the matrix of transitions probabilities related to a market dominated by two firms.

$$A = \begin{pmatrix} 0.65 & 0.35 \\ 0.55 & 0.45 \end{pmatrix}$$

Assuming that the brand 1 has 65% of the current market share. Predict the market shares in the next period. Also calculate the equilibrium shares if reached.

- Q.3 a) Determine the critical points for the functions.

$$f(x, y) = 3x^2 - 4xy + 8x + 3y^2 - 17y + 5$$

Also discuss the nature of the critical points.

- b) Find $\frac{dy}{dx}$ using implicit differentiation if $x^2 + 2xy + y^2 = 0$.

- Q.4 The cost function of producing x bikes is given by

$$C(x) = 1000000 + 50x + x^2$$

if the scale price is fixed as Rs. 45,000. Find the minimum no. of bikes to be produced to avoid loss. What is the break-even point of the cost function?

- Q.5 a) Draw the feasible region by sketching the following three linear equations

$$x + y = 3, \quad y - \text{axis}, \quad y = x$$

- b) Explain the following terms with the help of examples:
- i. Cost function
 - ii. Revenue function
 - iii. Profit function.

BUSINESS MATHEMATICS

Level: B.A/B.Com/BBA

Course Code: 1429

Unit No.1 Probability Theory

Introduction, Basic Probability Theory, Definition, Laws of Probability, Conditional Probability, Independent and Dependent Events, Applications.

Unit No.2 Random Variables

Introduction, Random Numbers and their Generation, Application of Random Numbers, Concepts of Random Variables and their Construction, Discrete and Continuous Random Variables.

Unit No.3 Equations

Solving first Degree Equations, Quadratic Equations, Solution of Quadratic Equations by Different Methods, Inequalities, Absolute Value, Co-ordinate System

Unit No.4 Linear Equations

Characteristic of Linear Equations, Slope- Intercept Form, Determining the Equations, Applications.

Unit No.5 Matrices and Determinants

Matrices, Different kinds of Matrices, Addition, Subtraction and Multiplication of Matrices, Determinants, Application of Matrices and Determinants.

Unit No.6 Inverse of Matrices

Expansion of Determinants, Different Properties of Determinants, Cofactors and Minors of Elements of a Matrix, Cramer's Rule, Solution of System of Linear Equations by use of Matrices.

Unit No.7 Differentiation

Derivatives, Differentiation of Explicit and Implicit Functions, Maxima and Minima, Applications of Derivatives.

Unit No.8 Partial Derivatives

Partial Derivatives, Maxima and Minima for Functions of Multi-Variables Applications of Partial Derivatives.

Unit No.9 Optimization

First Derivative Test. 2nd Derivative Test, Curve sketching, Revenue, Cost and Profit Applications in Business.

Recommended Book:-

1. Applied mathematics for Business, Economics and the Social Sciences. By Frank S. Budnick. McGraw-Hill