

DASHAIN VACATION ASSIGNMENT

Business Maths – XII (Mgmt.)

Unit 2: Number System

- Find the value of : $3 + i^2 + i^5 + i^7$
- Express the following complex number in the form of $A + iB$.
 - $(4 - 3i)(2 - i)$
 - $\frac{3 - \sqrt{-4}}{2 + \sqrt{-2}}$
 - $\frac{1 - i}{1 + i}$
 - $\left(\frac{1 - i}{1 + i}\right)^3$
- Find the modulus of the following complex numbers:
 - $(3 - 2i)(6 - 8i)$
 - $\frac{1 + i}{1 - i}$
- Find the multiplicative inverse of
 - $\frac{3 - i}{2 + i}$
 - $(3 + i)^2$
- If $z_1 = 1 - 4i$ and $z_2 = 3 + 2i$, verify that
 - $\overline{z_1 + z_2} = \overline{z_1} + \overline{z_2}$
 - $\left|\frac{z_1}{z_2}\right| = \left|\frac{z_1}{z_2}\right|$
- If $x - iy = \frac{2 - 3i}{2 + 3i}$, prove that $x^2 + y^2 = 1$
 - If $(3 + 4i) \cdot (x + iy) = 3\sqrt{5}$, show that $x^2 + y^2 = \frac{9}{5}$
 - If $x + iy = \sqrt{\frac{1+i}{1-i}}$, show that $x^2 + y^2 = 1$
- Rewrite the following inequality without using absolute value sign and hence solve:
 - $|x - 6| \leq 2$
 - $|3x + 5| < 1$
- Rewrite the following inequality using absolute value sign.
 - $-1 < x < 5$
 - $-5 \leq x \leq -2$

Unit 2: Sets and Relations

- Given $A = \{1, 2, 3, 4\}$, find the relation set in $A \times A$ determined by the condition $y < x$, where $x, y \in A$.
- Let $A = \{1, 2, 3\}$. Find the relation in $A \times A$ satisfying the condition $x + y < 4$, where $x, y \in A$.
- If $A = \{-1, 0, 2, 4, 6\}$ and $f : A \rightarrow \mathbb{R}$ be defined by $f(x) = \frac{x}{x+2}$, find the range of f .
- If $A = \{1, 2, 3\}$ and $B = \{2, 3\}$, find the relation in $A \times B$ satisfying $y > x$. Is this relation a function?
- If $A = \{-1, 0, 1\}$ and R be a relation on A such that $R = \{(x, y) : x + y \leq 2\}$, write the elements of the relation R . Also find the domain and range of R .
- If $f(x) = x + |x|$, find $f(2)$, $f\left(-\frac{5}{2}\right)$ and $f(-2)$.
- In a statistical investigation of 500 families in a certain town, it was found that 40 families had neither a radio nor a T.V., 320 families had a radio and 190 T.V. How many families in that group had both radio and T.V.?
- In a city of 26000 population, 500 read English news paper, 1200 read Nepali newspaper and 1000 read both, what percentage read neither English nor Nepali newspaper?

Unit 3: Sequence and Series

- What term is 359 in the sequence 5, 11, 17, 23, 29, ... ?
- Find the sum of the series $3 + 6 + 12 + 24 + \dots + 768$.
- Find the sum of the series: $-10 - 5 - 0 + \dots + 75$.
- If $x + 2$, $3x$ and $4x + 1$ are in A.P., find x .
- Find 1st term and common difference of A.P. whose 7th and 15th term are $2\frac{5}{6}$ and $5\frac{1}{2}$ respectively.
- Insert 5 arithmetic means between 2 and 26.
- The sum of 3 numbers in A.P. is 15. The sum of their squares is 83. Find the numbers.
- Find the sum of all integers between 50 and 500 which are divisible by 7.
- If the 3rd and 8th terms of a G.P. are 8 and 256 resp., find the series.
- Insert 3 geometric means between 5 and 80.
- Which term of the series $\frac{1}{27} + \frac{1}{9} + \frac{1}{3} + \dots$ is 243?

- The sum of a G.P; whose common ratio is 2 and last term is 768, is 1533. Find the first term.
- The sum of 3 numbers in G.P. is 14 and their product is 64. Find the numbers.
- A service holder has a monthly salary of Rs. 22,000. If he gets an increment of Rs. 500 every year, how much salary does he receive in the 5th year?

Unit 5: Matrices and Determinants

- Construct 2×2 matrix whose elements are given by $a_{ij} = 3i - 2j$
- If $A = \begin{pmatrix} 2 & 1 \\ -3 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 2 & 3 \\ 1 & -1 & 0 \end{pmatrix}$, find $5AB$.
- If $A = \begin{pmatrix} 4 & 2 & -1 \\ 3 & -7 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & 3 \\ -3 & 0 \\ -1 & 5 \end{pmatrix}$, find the product AB and BA .

Comment on the result.

- Define a matrix. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix}$, show that $A^2 - 2A - 5I = 0$, where I and 0 are 2×2 identity and null matrix respectively.
- If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 0 \\ 2 & -3 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix}$ verify that: $A(BC) = (AB)C$.
- Solve the equations using Cramer's rule:
 $x + y = 8$, $y + z = 4$, $z + x = 6$.
- Solve the equations with the help of determinant:
 $9y - 5x = 3$, $x + z = 1$, $z + 2y = 2$
- Prove that: $\begin{vmatrix} 1 & x & yz \\ 1 & y & xz \\ 1 & z & xy \end{vmatrix} = \begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix}$
- Prove that: $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc \left(1 + \frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$
- Prove that: $\begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix} = (a-b)(b-c)(c-a)$.

Unit 6: Coordinate Geometry

- Find the slope, X-intercept and Y-intercept of the line whose equation is $3x - 4y = 6$.

- If the slope of the line joining the points $(x, 5)$ and $(-1, 2)$ is $\frac{3}{4}$. Find the value of x . Also determine the distance between them.
- Prove that the points $(-1, 0)$, $(3, 1)$, $(2, 2)$ and $(-2, 1)$ are the vertices of a parallelogram.
- Find the equation of the straight line passing through the point $(-3, 5)$ and making equal intercepts on the axes.
- If the points $(-2, -1)$, $(1, 0)$, $(x, 3)$ and $(1, y)$ represent the vertices of a parallelogram. Find the value of x and y .
- If the points $(a, 0)$, $(0, b)$ and (x, y) are collinear, prove that $\frac{x}{a} + \frac{y}{b} = 1$.
- Find the equation of the locus of the point which moves so that it is always equidistance from the points $(1, 3)$ and $(-2, 6)$.
- Find the equation of straight line through the point of intersection of the lines $x + y = 3$ and $x - y = 1$, and having slope equal to 1.

Unit 13: Measure of Dispersion

- Compute quartile deviation and its coefficient from the following table.

Size of items	2	4	6	8	10	12
Frequency	3	5	10	12	6	4

- Find the mean deviation (i) from the mean (ii) from the median in the following data: 25, 28, 32, 44, 50.
- Find mean and standard deviation of five observations: 11, 14, 15, 17, 18
- Calculate mean deviation from mean of the following frequency distribution:

Bonus	10	15	20	25
Frequency	3	5	5	7

- Calculate mean, standard deviation and coefficient of variation from the following data:

Income (Rs.)	300-400	400-500	500-600	600-700	700-800
No. of persons	8	12	20	6	4

Unit 15: Ratio and Proportion

1. If 30 men can do a piece of work in 11 days working 9 hours a day, how many hours a day have 55 men to work in order to finish another work twice as great in 18 days?
2. A road of 300 m long was constructed by 50 people in 20 days working 8 hours a day. How many people will be required to construct similar road of 1 km length in 20 days working 6 hours a day?
3. If three quantities a, b, c are such that $a:b = 2:3$ and $b:c = 5:8$, find the ratio between a and c and also the continued proportion.
4. 20 men can do a piece of work in 24 days. After working for 6 days an additional number of men is taken to finish the work in 21 days from the beginning. Find the number of additional men?
5. The value of diamond varies as the cube of its weight. A diamond costing Rs. 64,000 is broken into 4 pieces, the weights of piece are in the ratio 2:4:6:8. Find the reducing in the value by breakage?
6. In a race of 1 km, X beats Y by 70 meter, Y beats Z by 80 meter. By how much does X beat Z?