

vii) $\sqrt{25x^2 + 25y^2} =$

a) $5\sqrt{x^2 + y^2}$

b) $5x + 5y$

c) $5xy$

viii) $\frac{x^2 - y^2}{\frac{1}{x} + \frac{1}{y}} =$

a) $xy(x - y)$

b) $xy(x + y)$

c) $-xy(x + y)$

ix) $5x - 3[4(x - y) + 6x] =$

a) $-5x + 4y$

b) $-25x + 12y$

c) $-10x - 12y$

x) $\frac{x^2 - 25}{5(x + 5)} \times \frac{x}{(x - 5)} =$

a) $\frac{x}{5}$

b) $\frac{x}{x + 5}$

c) $\frac{x(x - 5)}{5(x + 5)}$

xi) If $3^{x-1} + 3^{x-1} + 3^{x-1} = (81)^y$, then $\frac{x}{y} =$

a) 4

b) 2

c) 3

xii) If $\sqrt{5x - 4} = 4$, then $x =$

a) $\frac{2\sqrt{2}}{5}$

b) $\frac{8}{5}$

c) 4

02. i) Simplify the following expressions:

a) $\left(\frac{a^2 b^{-3}}{x^{-1} y^2}\right)^3 \left(\frac{x^{-2} b^{-1}}{a^{3/2} y^{1/3}}\right)$

b) $\frac{3x}{2 - 3x + x^2} + \frac{4}{1 - x} + \frac{6}{2 - x}$

i) Factor the following expressions completely:

a) $128x^2 - 98y^2$

b) $2(x+y)^2 - 3(x+y) - 27$

ii) Solve the following equations:

a) $9(x-2)^2 = 121$

b) $\frac{2x-5}{x+1} - \frac{3}{x^2+x} = 0$

iv) Solve the following simultaneous equation:

a) $20x + 4y = 280$
 $10y - 9x = 110$

b) $2x - 3y = 1$
 $2x^2 + 3x - 3y^2 = 38$

(Total Marks 25)

i) If $\begin{pmatrix} 1 & x+y \\ -4 & x-y \end{pmatrix} = \begin{pmatrix} 1 & 6 \\ -4 & 2 \end{pmatrix}$, then find the values of x and y .

ii) If $A = \begin{pmatrix} 1 & 2 & 1 \\ 1 & -1 & 1 \\ 2 & 3 & -1 \end{pmatrix}$, and $B = \begin{pmatrix} 1 & 4 & 0 \\ -1 & -2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$, then find $AB + 2B^T$.

iii) If $\left(A + 3 \begin{pmatrix} 1 & -1 & 0 \\ 1 & 2 & 4 \end{pmatrix} \right)^T = \begin{pmatrix} 2 & 1 \\ 0 & 5 \\ 3 & 8 \end{pmatrix}$, then find A .

iv) Using matrix inverse, solve the following system of linear equations.

$$10x + 3y + 6z = 76$$

$$4x + 5z = 41$$

$$5x + 2y + 2z = 34$$

(25 Marks)

04. i) A market researcher asked a consumer to rank her preferences of energy drinks among Monster, Red Bull, and Rockstar.

- Write the sample space of this experiment.
- What is the probability that the consumer will rank Red Bull first?
- What is the probability that two consumers will both rank Red Bull first?

ii) A survey of 100 recent college graduates found that 50 owned only mutual funds, 35 stocks, and 15 owned both.

- What is the probability that an individual owns a stock?
- What is the probability that an individual owns a mutual fund?
- What is the probability that an individual owns neither stocks nor mutual funds?
- What is the probability that an individual owns either a stock or a mutual fund?

iii) A department store manager has monitored the number of complaints received per week for poor service. The probabilities for number of complaints in a week, established by this manager, are shown below.

Number of complaints	0	1	2	3	4	5
Probability	0.14	0.39	0.23	0.15	0.06	0.03

Let A be the event "There will be at least one complaint in a week" and B the event "There will be at most 3 complaints in a week"

- Find the probability of event A.
- Find the probability of event B.
- Describe the event that is the complement of A and find its probability.
- Describe the event that is the union of A and B and find its probability.
- Describe the event that is the intersection of A and B and find its probability.
- Are A and B mutually exclusive?
- Are A and B collectively exhaustive?
- Are A and B independent?