

Topic : Fundamentals of Mathematics

Type of Questions

M.M., Min.

Subjective Questions (no negative marking) Q.1,2,3,4,5,6

(4 marks 5 min.)

[24, 30]

1. Solve the following equations :

(i) $||x - 1| - e| = 3$

(ii) $|x - 3|^2 + |x - 4| + x^2 + 7 = 0$

(iii) $|x - 2| = \sqrt{x - 4}$

(iv) $\frac{|x - 2|}{x - 1} = \frac{1}{x - 1}$

2. Solve :

(i) $-2 \leq ||x^2 + 1| - 3| \leq 7$

(ii) $|x^2 - 4x| \leq 5$

(iii) $|x^2 - 2x| \leq x$

(iv) $(x^2 - 9)(|x| - 2) \leq 0$

3. Solve :

(i) $\frac{x^2 - 9|x| + 14}{x^2 - 12x + 36} \leq 0$

(ii) $(|x| - 1)(|x| - 2) < 0$

(iii) $(|x^2 - 2| - 2)(x - 1) \geq 0$

4. Solve equation :

(i) $|x^2 - 2x| + |x^2 - 4x + 3| \leq |2x - 3|$

(ii) $|x^2 - 4| - |2x - 1| = |x^2 - 2x - 3|$

5. Solve :

(i) $|x| \leq a$

(ii) $x^2 \leq a^2$

(iii) $a^2 \leq x^2 \leq b^2$

6. Solve :

(i) $a \leq |x| \leq b$

(ii) $|x| < \frac{a}{x}$

(iii) $x^2 < 4^{|a|}$

Answers Key

1. (i) $x = e + 4, -e - 2$ (ii) No solution (iii) $x \in \phi$
(iv) $x = 3$

2. (i) $[-3, 3]$ (ii) $[-1, 5]$ (iii) $[1, 3] \cup \{0\}$
(iv) $[-3, -2] \cup [2, 3]$

3. (i) $[-7, -2] \cup [2, 6] \cup (6, 7]$ (ii) $(-2, -1) \cup (1, 2)$
(iii) $[-2, 1] \cup [2, \infty)$

4. (i) $x \in [0, 1] \cup [2, 3]$

(ii) $x \in \left[-1, \frac{1}{2}\right] \cup [3, \infty)$

5. (i) $\begin{cases} -a \leq x \leq a & \text{if } a > 0 \\ x = 0 & \text{if } a = 0 \\ x \in \phi & \text{if } a < 0 \end{cases}$ (ii) $x \in [-|a|, |a|]$

(iii) $x \in [-|b|, -|a|] \cup [|a|, |b|]$

6. (i) $\begin{cases} [-b, -a] \cup [a, b] & \text{if } a \geq 0, b > 0 \\ \phi & \text{if } a < 0, b < 0 \\ [-b, b] & \text{if } a < 0, b > 0 \\ 0 & \text{if } b = 0 \end{cases}$

(ii) $\begin{cases} (-\sqrt{-a}, 0) & \text{if } a < 0 \\ \phi & \text{if } a = 0 \\ (0, \sqrt{a}) & \text{if } a > 0 \end{cases}$ (iii) $x \in (-2^{|a|}, 2^{|a|})$