

Topics : Fundamentals of Mathematics, Quadratic Equation

Type of Questions		M.M., Min.
Comprehension (no negative marking) Q.1 to Q.3	(3 marks, 3 min.)	[9, 9]
Single choice Objective (no negative marking) Q.4	(3 marks, 3 min.)	[3, 3]
Subjective Questions (no negative marking) Q.5,6,7	(4 marks, 5 min.)	[12, 15]

COMPREHENSION (For Q.No. 1 to 3)

Let $y = ax^2 + bx + c$ be a quadratic expression having its vertex at $(3, -2)$ and value of $c = 10$, then

1. Value of 'b' is equal to
 (A) 6 (B) -6 (C) 8 (D) -8

2. One of the roots of the equation $ax^2 + bx + c = 0$ is
 (A) $\frac{6 + \sqrt{6}}{2}$ (B) $\frac{3 + \sqrt{6}}{2}$ (C) $3 - \sqrt{6}$ (D) $3 + \sqrt{6}$

3. If $y \geq -\frac{2}{3}$, then
 (A) $x \in (-\infty, 2] \cup [4, \infty)$ (B) $x \in (-\infty, 3] \cup [4, \infty)$
 (C) $x \in (-\infty, 1] \cup [3, \infty)$ (D) $x \in (-\infty, 4] \cup [6, \infty)$

4. Find the set of values of ' α ' for which the expression $y = \frac{\alpha x^2 + 6x - 8}{\alpha + 6x - 8x^2}$ have a common linear factor in numerator and denominator
 (A) {14} (B) {2} (C) {-8, 2, 14} (D) {0, 2, 14}

5. Solve the following equations $x^2 + xy + xz = 18$, $y^2 + yz + yx + 12 = 0$ and $z^2 + zx + zy = 30$

6. Solve the following inequations
 (i) $(x - 5)(x + 9)(x - 8) < 0$ (ii) $x^2 - 4x + 9 > 0$
 (iii) $x^4 - 5x^2 + 4 < 0$ (iv) $\frac{3}{x - 2} < 1$

7. Consider the quadratic polynomial, $f(x) = x^2 - 4ax + 5a^2 - 6a$.
 (a) Find the smallest positive integral value of 'a' for which $f(x)$ is positive for every real x.
 (b) Find the largest distance between the roots of the equation $f(x) = 0$.

Answers Key

1. (D) 2. (A) 3. (A) 4. (C)
5. $x = 3, y = -2, z = 5$; $x = -3, y = 2, z = -5$
6. (i) $x \in (-\infty, -9) \cup (5, 8)$ (ii) $x \in (-\infty, \infty)$
(iii) $x \in (-2, -1) \cup (1, 2)$
(iv) $x \in (-\infty, 2) \cup (5, \infty)$
7. (a) 7 (b) 6