

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

- Value of 'b' is equal to
(A) 6 (B) -6 (C) 8 (D) -8
- 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) $3 + \sqrt{6}$
- 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) $x \in (-\infty, 4] \cup [6, \infty)$
- 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}
- Solve the following equations $x^2 + xy + xz = 18$, $y^2 + yz + yx + 12 = 0$ and $z^2 + zx + zy = 30$
- 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) $\frac{3}{x-2} < 1$
- 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