



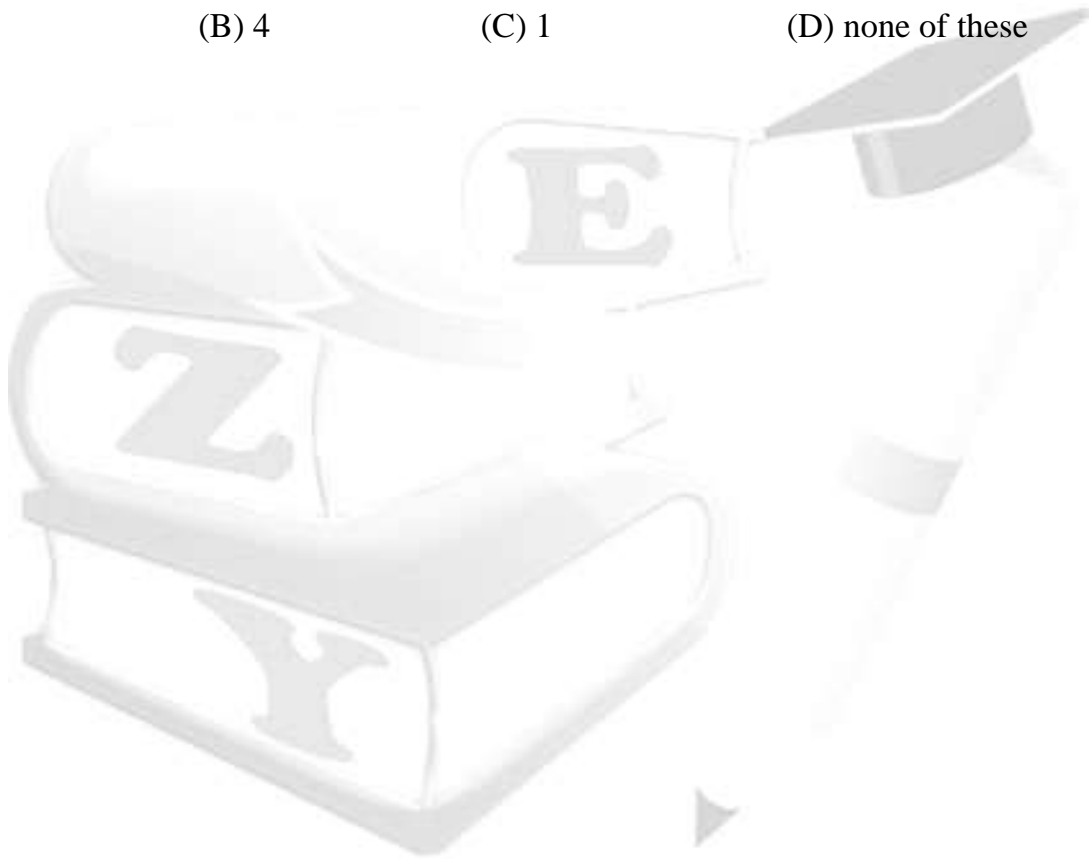
JEE MAINS PATTERN
Mathematics : Quadratic Equation
Practice Paper – 01

1. If the sum of the roots of the equation $ax^2 + bx + c = 0$ is equal to sum of the squares of their reciprocals, then bc^2, ca^2, ab^2 are in
(A) A.P (B) G.P (C) H.P (D) A.G.P
2. If $k > 0$ and the product of the roots of the equation $x^2 - 3kx + 2e^{2\log k} - 1 = 0$ is 7 then the sum of the roots is
(A) 1 (B) 4 (C) 6 (D) 8
3. The number of real solution of the equation $\left(\frac{9}{10}\right)^x = -3 + x - x^2$ is
(A) 2 (B) 0 (C) 1 (D) 3
4. If the roots of $(x-a)(x-b) + (x-b)(x-c) + (x-c)(x-a) = 0$ are equal then which of the following is not possible
(A) $a + b + c = 0$ (B) $a = b = c$ (C) $a + bw + cw^2$ (D) $a + bw^2 + cw = 0$
5. The equation $\log_2(3-x) + \log_2(1-x) = 3$ has
(A) One root (B) Two root (C) Infinite roots (D) No root
6. If $ax^2 + bx + c = 0$ and $bx^2 + cx + a = 0$ have a common $a \neq 0$ then $\frac{a^3 + b^3 + c^3}{abc} =$
(A) 1 (B) 2 (C) 3 (D) 9
7. If a, b are the roots of $x^2 + px + 1 = 0$, and c, d are the roots of $x^2 + qx + 1 = 0$, then the value of $E = (a-c)(b-c)(a+d)(b+d)$ is
(A) $p^2 - q^2$ (B) $q^2 - p^2$ (C) $q^2 + p^2$ (D) None of these
8. If $x^2 + 2ax + 10 - 3a > 0$ for each $x \in \mathbb{R}$, then
(A) $a < -5$ (B) $-5 < a < 2$ (C) $a > 5$ (D) $2 < a < 5$

9. If a, b, c are real and $a \neq b$, then the roots of the equation $2(a-b)x^2 - 11(a+b+c)x - 3(a-b) = 0$ are
- (A) real and equal (B) real and unequal
(C) purely imaginary (D) none of these
10. The minimum value of $|x| + \left|x + \frac{1}{2}\right| + |x-3| + \left|x - \frac{5}{2}\right|$ is
- (A) 2 (B) 4 (C) 6 (D) 4
11. The set of values of x for which the inequality $[x]^2 - 5[x] + 6 \leq 0$ (where $[.]$ denote the greatest integral function) hold good is
- (A) $2 \leq [x] < 3$ (B) $2 \leq [x] < 4$ (C) $2 \leq x < 3$ (D) $2 \leq x \leq 4$
12. If $(\log_5 x)^2 + \log_5 x < 2$ then x belongs to the interval
- (A) $\left(\frac{1}{25}, 25\right)$ (B) $\left(\frac{1}{5}, \frac{1}{\sqrt{5}}\right)$ (C) $(1, \infty)$ (D) $(5, 25)$
13. If the harmonic mean between the roots of $(5 + \sqrt{2})x^2 - bx + (8 + 2\sqrt{5}) = 0$ is 4, then the value of b is
- (A) 2 (B) 3 (C) $4 - \sqrt{5}$ (D) $4 + \sqrt{5}$
14. If α, β are the roots of $x^2 + ax - b = 0$ and γ, δ are the roots of $x^2 + ax + b = 0$ then $(\alpha - \gamma)(\alpha - \delta)(\beta - \delta)(\beta - \gamma) =$
- (A) $4b^2$ (B) b^2 (C) $2b^2$ (D) $3b^2$
15. If the ratio of the roots of $ax^2 + 2bx + c = 0$ is same as the ratio of the roots of $px^2 + 2qx + r = 0$ then
- (A) $\frac{b^2}{ac} = \frac{p^2}{qr}$ (B) $\frac{b}{ac} = \frac{q}{pr}$ (C) $\frac{b^2}{ac} = \frac{q^2}{pr}$ (D) $\frac{b}{ac} = \frac{q}{pr}$
16. The roots of the equation $(b-c)x^2 + 2(c-a)x + (a-b) = 0$ are always
- (A) Real and distinct (B) real and equal
(C) real (D) imaginary
17. If $a \in \mathbb{Z}$ and the equation $(x-a)(x-10) + 1 = 0$ has integral roots, then values of 'a' are
- (A) 10, 8 (B) 12, 10 (C) 12, 8 (D) 10, 12

18. The value of λ in order that the equations $2x^2 + 5\lambda x + 2 = 0$ and $4x^2 + 8\lambda x + 3 = 0$ have a common root is given by
(A) 1 (B) -1 (C) ± 1 (D) 3
19. If both roots of the equation $x^2 - 2ax + a^2 - 1 = 0$ lie in the interval $(-3, 4)$ then sum of the integral parts of 'a' is
(A) 0 (B) 2 (C) 4 (D) -1
20. Number of rational roots of the equation $|x^2 - 2x - 3| + 4x = 0$ is
(A) 1 (B) 2 (C) 3 (D) 4
21. The set of real values of x satisfying $|x - 1| \leq 3$ and $|x - 1| \geq 1$
(A) $[2, 4]$ (B) $(-\infty, 2) \cup (4, \infty)$ (C) $[-2, 0] \cup [2, 4]$ (D) $[0, 2]$
22. Let $f(x)$ be a polynomial for which the remainders when divided by $x - 1$, $x - 2$, $x - 3$ respectively 3, 7, 13. Then the remainder of $f(x)$ when divided by $(x - 1)(x - 2)(x - 3)$ is
(A) $f(x)$ (B) $x^2 + x + 1$ (C) $x^2 + 1$ (D) $x + 2$
23. The range of values of x which satisfy $5x + 2 < 3x + 8$ and $\frac{x+2}{x-1} < 4$ are
(A) $(2, 3)$ (B) $(-\infty, 1) \cup (2, 3)$ (C) $(2, \infty)$ (D) \mathbb{R}
24. For $x \in \mathbb{R}$, the least value of $\frac{x^2 - 6x + 5}{x^2 + 2x + 1}$ is
(A) -1 (B) $-\frac{1}{2}$ (C) $-\frac{1}{4}$ (D) $-\frac{1}{3}$
25. Suppose $a^2 = 5a - 8$ and $b^2 = 5b - 8$, then equation whose roots are a/b and b/a is
(A) $6x^2 - 5x + 6 = 0$ (B) $8x^2 - 9x + 8 = 0$
(C) $9x^2 - 8x + 9 = 0$ (D) $8x^2 + 9x + 8 = 0$
26. If α, β are roots of $ax^2 + bx + c = 0$, then roots of $a^3x^2 + abcx + c^3 = 0$ are
(A) $\alpha\beta, \alpha + \beta$ (B) $\alpha^2\beta, \alpha\beta^2$ (C) $\alpha\beta, \alpha^2\beta^2$ (D) α^3, β^3
27. If $P(x) = ax^2 + bx + c$ and $Q(x) = -ax^2 + dx + c$, where $ac \neq 0$, then $P(x)Q(x) = 0$ has
(A) no real root (B) exactly two real roots
(C) at least two distinct real roots (D) none of these

28. If the product of the roots of the equation $x^2 - 5kx + 2e^{4\ln k} - 1 = 0$ is 31, then sum of the root is
 (A) -10 (B) 5 (C) -8 (D) 10
29. Let α, β be the roots of the equation $x^2 - px + r = 0$ and $(\alpha/2), 2\beta$ be the roots of the equation $x^2 - qx + r = 0$. Then the value of r is
 (A) $\frac{2}{9}(p - q)(2q - p)$ (B) $\frac{2}{9}(q - p)(2p - q)$
 (C) $\frac{2}{9}(q - 2p)(2q - p)$ (D) $\frac{2}{9}(2p - q)(2q - p)$
30. The sum of all the real roots of the equation $|x - 2|^2 + |x - 2| - 2 = 0$ is
 (A) 7 (B) 4 (C) 1 (D) none of these



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