Quadratic Equations

JEE-MAINS (PREVIOUS YEAR)

MCQ-Single Correct

1. If, for a positive integer n, the quadratic equation, x(x + 1) + (x + 1)(x + 2) + ...+(x + $\overline{n-1}$)(x + n) = 10n has two consequitive integral solutions, then n is equal to :

(1) 12 (2) 9

(3) 10 (4) 11 **[2017]**

2. The sum of all real values of x satisfying the equation $\left(x^2-5x+5\right)^{x^2+4x-60}=1$

(1) -4 (2) 6

(3) 5 (4) 3 **[2016]**

3. Let α and β be the roots of equation $x^2-6x-2=0$. If $a_n=\alpha^n-\beta^n$, for $n\geq 1$, then the value of $\frac{a_{10}-2a_8}{2a_9}$ is equal to :

(1) -6 (2) 3

(3) -3 (4) 6 **[2015]**

4. Let α and β be the roots of the equation $px^2+qx+r=0$, p ≠ 0. If p, q , r are in A.P. and $\frac{1}{\alpha}+\frac{1}{\beta}=4$, then the value of |α - β| is

(1) $\frac{\sqrt{61}}{9}$ (2) $\frac{2\sqrt{17}}{9}$

(3) $\frac{\sqrt{34}}{9}$ (4) $\frac{2\sqrt{13}}{9}$ **[2014]**

5. If the equations x^2 + 2x + 3 = 0 and ax^2 + bx + c = 0 , a , b, c ε R, have a common root , then a : b : c is

(1) 3 : 2 : 1 (2) 1 : 3 : 2

(3) 3 : 1 : 2 (4) 1 : 2: 3 **[2013]**

6. The equation $e^{\sin x} - e^{-\sin x} - 4 = 0$ has

(1) infinite number of real roots (2) exactly one real root

(3) no real roots (4) exactly four real roots. **[2012]**

7. Let for $a \neq a_1 \neq 0,\ f(x) = ax^2 + bx + c,\ g(x) = a_1x^2 + b_1x + c_1$ and $p(x) = f(x) - g(x)$. If , p(x) =0 only for x = -1 and p(-2) = 2, then the value of p(2) is

(1) 6 (2) 18

(3) 3 (4) 9 **[2011]**

8. Sachin and Rahul attempted to solve a quadratic equation. Sachin made a mistake in writing down the constant term and ended up in roots (4,3) . Rahul made a mistake in writing down coefficient of x to get roots (3,2). The correct roots of equation are

(1) -6,-1 (2) -4,-3

(3) 6,1 (4) 4,3 **[2011]**

9. If α and β are the roots of the equation $x^2 - x + 1 = 0$, then $\alpha^{2009} + \beta^{2009}$ =

(1) -1 (2) 1

(3) 2 (4) -2 **[2010]**

10. If the roots of the equation $bx^2 + cx + a = 0$ be imaginary, then for all real values of x, the expression $3b^2x^2 + 6bcx + 2c^2$ is

(1) greater than 4ab (2) less than 4ab

(3) greater than -4ab (4) less than -4ab **[2009]**

11. The quadratic equations $x^2 - 6x + a = 0$ and $x^2 - cx + 6 = 0$ have one root in common. The other roots of the first and second equations are integers in the ratio 4 : 3. Then the common root is

(1) 1 (2) 4

(3) 3 (4) 2 **[2008]**

12. If the roots of the quadratic equation $x^2 + px + q = 0$ are $\tan 30^\circ$ and $\tan 15^\circ$, respectively then the value of $2 + q - p$ is

(1) 2 (2) 3

(3) 0 (4) 1 **[2006]**

13. All the values of m for which both roots of the equations $x^2 - 2mx + m^2 - 1 = 0$ are greater than -2 but less than 4, lie in the interval

(1) $-2 < m < 0$ (2) $m > 3$

(3) $-1 < m < 3$ (4) $1 < m < 4$ **[2006]**

14. If x is real, the maximum value of $\frac{3x^2 + 9x + 17}{3x^2 + 9x + 7}$ is

(1) ¼ (2) 41

(3) 1 (4) 17/7 **[2006]**

15. The value of α for which the sum of the square of roots of the $x^2 - (a-2)x - a - 1 = 0$ assume the least value is

(1) 1 (2) 0

(3) 3 (4) 2 **[2005]**

16. If roots of the equation $x^2 - bx + c = 0$ be the consecutive integers, then $b^2 - 4c$ equals

(1) -2 (2) 3

(3) 2 (4) 1 **[2005]**

17. If both the roots of the quadratic equation $x^2 - 2kx + k^2 + k - 5 = 0$ are less than 5, then k lies in the interval

(1) (5,6] (2) $(6,\infty)$

(3) $(-\infty,4)$ (4) [4,5] **[2005]**

18. If (1 – p) is a root of quadratic equation $x^2 + px + (1 - p) = 0$, then its roots are

(1) 0,1 (2) -1,2

(3) 0,-1 (4) -1,1 **[2004]**

19. If one root of the equation x2 + px + 12 = 0 is 4, while the equation x2 + px + q = 0 has equal roots, then the value of 'q' is

(1) $\frac{49}{4}$ (2) 4

(3) 3 (4) 12 **[2004]**

20. If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals, then $\frac{a}{c}, \frac{b}{a}$ and $\frac{c}{b}$ are in

(1) arithmetic progression (2) geometric progression

(3) harmonic progression (4) arithmetic-geometric-progression **[2003]**

21. The number of real solutions of the equation $x^2 - 3|x| + 2 = 0$ is

(1) 2 (2) 4

(3) 1 (4) 3 **[2003]**

22. The value of 'a' for which one root of the quadratic equation $\left(a^2 - 5a + 3\right)x^2 + (3a - 1)x + 2 = 0$ is twice as large as the other , is

(1) 2/3 (2) -2/3

(3) 1/3 (4) -1/3 **[2003]**

23. If $\alpha \neq \beta$ but $\alpha^2 = 5\alpha - 3$ and $\beta^2 = 5\beta - 3$, then the equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ is

(1) $3x^2 - 25x + 3 = 0$ (2) $x^2 + 5x - 3 = 0$

(3) $x^2 - 5x + 3 = 0$ (4) $3x^2 - 19x + 3 = 0$ **[2002]**

24. Difference between the corresponding roots of $x^2 + ax + b = 0$ and $x^2 + bx + a = 0$ is same and $a \neq b$, then

(1) a + b + 4 = 0 (2) a + b - 4 = 0

(3) $a - b - 4 = 0$ (4) $a - b + 4 = 0$ **[2002]**

25. If p and q are the roots of the equation $x^2 + px + q = 0$, then

(1) $p = 1 , q = -2$ (2) $p = 0 , q = 1$

(3) $p = -2 , q = 0$ (4) $p = -2 , q = 1$ **[2002]**

26. Product of real roots of the equation $t^2x^2 + |x| + 9 = 0$

(1) is always positive (2) is always negative

(3) does not exist (4) none of these **[2002]**