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Numerical Question Bank for JEE Main

Quadratic Equations – Questions

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

2. The number of real solutions of the equation $|x^2 + 4x + 3| + 2x + 5 = 0$ are

3. The sum of roots of the equation $2^{x+2}27^{x/(x-1)} = 9$ are given by $-a - \log_b c$, Find a + b + c.

4. The value of x in the given equation $4^x - 3^{x-\frac{1}{2}} = 3^{x+\frac{1}{2}} - 2^{2x-1}$ is a/b where a and b don't have any common factor. Find ab^2.

5. 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 at least m real roots. Find m.

6. The equation $x^{(3/4)(\log_2 x)^2 + (\log_2 x) - 5/4} = \sqrt{2}$ has A rational roots and B irrational roots. Find value of $A + B^2$.

7. The value of 2a+b for which equation $x^4 - 4x^3 + ax^2 + bx + 1 = 0$ have four real roots is

8. If α, β are the roots of the equation $ax^2 + bx + c = 0$, then $\frac{\alpha}{a\beta + b} + \frac{\beta}{a\alpha + b} =$ -A/a – B/b –C/c. Find A + B + C.

9. If the roots of the equation $\frac{1}{x+p} + \frac{1}{x+q} = \frac{1}{r}$ are equal in magnitude but opposite in sign, then the product of the roots is $(A\,p^b + B\,q^c)/D$, then find A + b – c – B + D.

10. If the roots of the equation $x^2 + x + 1 = 0$ are α, β and the roots of the equation $x^2 + px + q = 0$ are $\frac{\alpha}{\beta}, \frac{\beta}{\alpha}$ then p is equal to

11. If the roots of $ax^2 + bx + c = 0$ are α, β and the roots of $Ax^2 + Bx + C = 0$ are $\alpha - k, \beta - k$, then $\frac{B^2 - 4AC}{b^2 - 4ac}$ is equal to $A^m a^n$. Find value of m – n.

12. If α, β are roots of $x^2 - 3x + 1 = 0$, then the equation whose roots are $\frac{1}{\alpha - 2}, \frac{1}{\beta - 2}$ is $x^2 - Ax + B$. Find A + B.

13. If α and β are the roots of $6x^2 - 6x + 1 = 0$, then the value of $\frac{1}{2}\left[a + b\alpha + c\alpha^2 + d\alpha^3\right] + \frac{1}{2}\left[a + b\beta + c\beta^2 + d\beta^3\right]$ is a/A + b/B + c/C + d/D. Find A + B + C + D.

14. Let α, β be the roots of $x^2 - x + p = 0$ and γ, δ be the roots of $x^2 - 4x + q = 0$. If $\alpha, \beta, \gamma, \delta$ are in G.P., then absolute value of p + q is

15. If the roots of the equation $12x^2 - mx + 5 = 0$ are in the ratio 2:3, then $m = A\sqrt{10}$. Find A.

16. If $x^2 + ax + 10 = 0$ and $x^2 + bx - 10 = 0$ have a common root, then $a^2 - b^2$ is equal to

17. If *x* is real, then the maximum and minimum values of expression $\frac{x^2+14x+9}{x^2+2x+3}$ is MAX and MIN. Find MAX – MIN.

18. If $2a+3b+6c=0$ then at least one root of the equation $ax^2+bx+c=0$ lies in the interval (A, B) find A+B.

19. The product of roots of the equation $\log(-2x) = 2\log(x+1)$ is

20. The set of all real numbers *x* for which $x^2-|x+2|+x>0,$ is $(-\infty, -\sqrt{A})\cup(\sqrt{B},\infty)$. Find value of AB.