Most Repeated Questions in JEE Mains from Number of Roots and relation b/w roots & coefficients

Q. Let αθ and βθ be the distinct roots of $2x^2 + (\cos \theta)x - 1 = 0$, $\theta \in (0, 2\pi)$ If m and M are the minimum and the maximum values of $\alpha_\theta^4 + \beta_\theta^4$, then 16(M + m) equals :

Q: The number of distinct real roots of the equation $| |x + 1||x + 3| - 4|x + 2| + 5 = 0$ is

Q: If the set of all values of a, for which the equation $5x^3 - 15x - a = 0$ has three distinct real roots, is the interval (α, β), then β-2α is equal to _____.

Q: The number of distinct real roots of the equation $|x||x + 2| - 5|x + 1| - 1 = 0$ is _____.

Q: If the equation $a(b - c)x^2 + b(c - a)x + c(a - b) = 0$ has equal roots, where a + c = 15 and b = 36/5 then $a^2 + c^2$ is equal to _____.

Q: Let α and β be the roots of the equation $px^2 + qx - r = 0$, where $p \neq 0$. If p, q and r be the consecutive terms of a non constant G.P. and $1/\alpha + 1/\beta = 3/4$, then the value of $(\alpha - \beta)^2$ is:

Q: Let $S = \{x \in R : (\sqrt{3} + \sqrt{2})^x + (\sqrt{3} - \sqrt{2})^x = 10\}$. Then the number of elements in S is:

Q: The sum of all the real roots of the equation $(e^{2x} - 4)(6e^{2x} - 5e^x + 1) = 0$ is

Q: . Let m and n be the numbers of real roots of the quadratic equations $x^2 - 12x + [x] + 31 = 0$ and $x^2 - 5|x + 2| - 4 = 0$, respectively, where [x] denotes the greatest integer ≤ x. Then $m^2 + mn + n^2$ is equal to _____.

Q: If the value of real number a > 0 for which $x^2 - 5ax + 1 = 0$ and $x^2 - ax - 5 = 0$ have a common real root is $3/\sqrt{2\beta}$ then β is equal to _____.

Q: The sum of the cubes of all the roots of the equation $x^4 - 3x^3 - 2x^2 + 3x + 1 = 10$ is ____ .

Q: The minimum value of the sum of the squares of the roots of $x^3 + (3 - a)x + 1 = 2a$ is:

Q: . The number of distinct real roots of the equation
$x^5 (x^3 - x^2 - x + 1) + x(3x^3 - 4x^2 - 2x + 4) - 1 = 0$ is _____.