

JEE Advanced Questions Based on Most Repeated Concepts of Algebra

Q: Let $-\pi/6 < \theta < -\pi/12$. Suppose α_1 and β_1 are the roots of the equation $x^2 - 2x \sec\theta + 1 = 0$ and α_2 and β_2 are the roots of the equation $x^2 + 2x \tan\theta - 1 = 0$. If $\alpha_1 > \beta_1$ and $\alpha_2 > \beta_2$, then $\alpha_1 + \beta_2$ equals

Q: The integral $\int dx/(x+4)^{8/7} (x-3)^{6/7}$ is equal to: Where C is the constant of integration:

Q: A debate club consists of 6 girls and 4 boys. A team of 4 members is said to be selected from this club including the selection of a captain (from among these 4 members) for the team. If the team has to be included at most one boy, then the number of ways of selecting the team is

Q: If the least and the largest real values of α , for which the equation $z + \alpha|z-1| + 2i = 0$ ($z \in \mathbb{C}$ and $i = \sqrt{-1}$) has a solution, are p and q respectively; then $4(p^2 + q^2)$ is equal to

Q: The number of 5 digit numbers which are divisible by 4, with the digits from the set $\{1, 2, 3, 4, 5\}$ and the repetition of digit is allowed is

Q: If the quadratic equations $x^2 + ax + b = 0$ and $x^2 + bx + a = 0$ ($a \neq b$) have a common root, then the value of $(a+b)$ is

Q: n 1: Let α and β be the roots of $x^2 - 6x - 2 = 0$, with $\alpha > \beta$. If $a_n = \alpha^n - \beta^n$ for $n \geq 1$, then the value of $(a_{10} - 2a_8)/2a_9$ is

Q: The integral $\int (2x^3 - 1)/(x^4 + x) dx$ is equal to (here C is the constant of integration)

Q: The total number of ways in which 5 balls of different colours can be distributed among 3 persons so that each person gets at least one ball is

Q: If α is a root of the equation $2x(2x+1) = 1$, then the other root is

Q: If $x^2 + px - 444p = 0$ has integral roots, where p is a prime number, then the value(s) of p is (are)

Q: The integral $\int \sec^{2/3} x \operatorname{cosec}^{4/3} x dx$ is equal to

Q: A value of b for which the equations $x^2 + bx - 1 = 0$ and $x^2 + x + b = 0$ have one root in common

Q: Total number of six-digit numbers in which only and all the five digits 1, 3, 5, 7, and 9 appear, is

Q: If x satisfies $|x^2 - 3x + 2| + |x - 1| = x - 3$, then

Q: Let $D = a^2 + b^2 + c^2$, a, b being consecutive integers and $c = ab$ then $\sqrt{D}$ is

Q: A test consists of 6 multiple choice questions, each having 4 alternative answers of which only one is correct. The number of ways, in which a candidate answers all six questions such that exactly four of the answers are correct, is

Q: If $2 + i\sqrt{3}$ is a root of the equation $x^2 + px + q = 0$, where p and q are real, then (p, q) equals

Q: If the product of the roots of the equation $x^2 - 3kx + 2e^{2\log k} - 1 = 0$ is 7, then the roots are real for k equal to

Q: Evaluate the following $\int (e^{\log x} + \sin x) \cos x \, dx$

Q: There are 3 sections in a question paper and each section contains 5 questions. A candidate has to answer a total of 5 questions, choosing at least one question from each section. Then the number of ways, in which the candidate can choose the questions, is:

Q: Let $S = \{1, 2, 3, 4\}$. The total number of unordered pairs of disjoint subsets of S is equal to

Q: Six cards and six envelopes are numbered 1, 2, 3, 4, 5, 6, and cards are to be placed in envelopes so that each envelope contains exactly one card and no card is placed in the envelope bearing the same number and moreover the card numbered 1 is always placed in envelope numbered 2. Then the number of ways it can be done is

Q: Evaluate $\int (\sqrt{\tan x} + \sqrt{\cot x}) \, dx$

Q: A bag contains 2 apples, 3 oranges, and 4 bananas. The number of ways in which 3 fruits can be selected if atleast one banana is always in the combination (Assume fruits of same species to be alike) is

Q: The integral $\int \cos(\log_e x) \, dx$ is equal to (where C is the constant of integration)

Q: Team A consists of 7 boys and n girls and Team B has 4 boys and 6 girls. If a total of 52 single matches can be arranged between these two teams when a boy plays against a boy and a girl plays against a girl, then n is equal to

Q: The integral $\int \sec^2 x / (\sec x + \tan x)^{9/2} \, dx$ equals (for some arbitrary constant k)

Q: Evaluate $\int (x-1)e^x / (x+1)^3 \, dx$