

Date Planned : __ / __ / __	Daily Tutorial Sheet - 12	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Numerical Value Type for JEE Main	Exact Duration : _____

- 140.** Let α and β be the roots of equation $x^2 - 6x - 2 = 0$ with $\alpha > \beta$. If $a_n = \alpha^n - \beta^n$ for $n \geq 1$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$ is _____.
- 141.** Let $f(x) = kx^2 + x(3 - 4k) - 12$. If the set of values of k for which $f(x) < 0, \forall x \in (-3, 3)$ and $f(-4) > 0$ is $(p, q]$, then find the value of $4p + 3q$.
- 142.** If $5x^2 - 2kx + 1 < 0$ has exactly one integral solution. Then, find the sum of all positive integral values of k .
- 143.** Let x_1 and x_2 be the real root of the equation $x^2 - kx + (k^2 + 7k + 15) = 0$ if the maximum value of $(x_1^2 + x_2^2)$ is $\frac{18}{x}$, then find the value of x . 
- 144.** Find the number of digits in the sum of all integral values of a in $[1, 100]$ for which the equation $x^2 - (a - 5)x + \left(a - \frac{15}{4}\right) = 0$ has atleast one root greater than zero. 
- 145.** If α and β are the roots of equation $x^2 - x + 1 = 0$, then $\alpha^{2009} + \beta^{2009}$ is equal to _____.
- 146.** If $(x^2 - 5x + 4)(y^2 + y + 1) < 2y$ for all real y , then x belongs to the interval $(2, b)$ then b can be _____. 
- 147.** Let x and y be the positive real numbers such that $\log_x y = -\frac{1}{4}$, then value of the expression $\log_x(xy^5) - \log_y\left(\frac{x^2}{\sqrt{y}}\right)$ is $\frac{p}{q}$ then q is _____. {where $p, q \in \mathbb{N}$ and are coprime to each other} 
- 148.** If the system of equations $3x^2 + 2x - 1 < 0$ and $(3a - 2)x - a^2x + 2 < 0$ possesses a solution, find the least natural number a .
- 149.** Suppose $x^2 + bx + c$ { b is an odd integer and $c \in \mathbb{Z}$ } has two prime natural numbers as its roots. Then $|2b + c| =$ 
- 150.** The least integer value of x , which satisfies $|x| + \left|\frac{x}{x-1}\right| = \frac{x^2}{|x-1|}$ is
- 151.** If x is real and $4y^2 + 4xy + x + 6 = 0$, then the complete set of values of x for which y is real, is $(-\infty, a] \cup [b, \infty)$, then $(a + b)$ is _____.
- 152.** Equation $3\sqrt{-2(x+3)} - 1 = |x+3| + a$ has exactly two real roots, then the maximum possible value of $[a]$ is _____. {where $[]$ denotes the greatest integer function}
- 153.** Suppose n be an integer greater than 1, let $a_n = \frac{1}{\log_n 2002}$.
Suppose $b = a_2 + a_3 + a_4 + a_5$ and $c = a_{10} + a_{11} + a_{12} + a_{13} + a_{14}$, then $|b - c|$ equals _____.
- 154.** If the solution set of $|x - k| < 2$ is a subset of the solution of the inequality $\frac{2x-1}{x+2} < 1$, then the number of possible integral value(s) of k is/are: