

Date Planned : __ / __ / __	Daily Tutorial Sheet – 2	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	JEE Advanced (Archive)	Exact Duration: _____

11. If $a \in \mathbb{R}$ and the equation $-3(x - [x])^2 + 2(x - [x]) + a^2 = 0$ (where, $[x]$ denotes the greatest integer $\leq x$) has no integral solution, then all possible values of a lie in the interval. **(2014)**
- (A) $(-1, 0) \cup (0, 1)$ (B) $(1, 2)$ (C) $(-2, -1)$ (D) $(-\infty, -2) \cup (2, \infty)$
12. If $x^2 + (a - b)x + (1 - a - b) = 0$ where $a, b \in \mathbb{R}$, then find the value of a for which equation has unequal real roots for all values of b . **(2003)**
13. Let a, b, c be real. If $ax^2 + bx + c = 0$ has two real roots α and β , where $\alpha < -1$ and $\beta > 1$, then show that $1 + \frac{c}{a} + \left| \frac{b}{a} \right| < 0$. **(1995)**
14. The smallest value of k , for which both the roots of the equation $x^2 - 8kx + 16(k^2 - k + 1) = 0$ are real, distinct and have values atleast 4, is _____. **(2009)**
15. Let a, b, c be real numbers, $a \neq 0$. If α is a root of $a^2x^2 + bx + c = 0$, β is the root of $a^2x^2 - bx - c = 0$ and $0 < \alpha < \beta$, then the equation $a^2x^2 + 2bx + 2c = 0$ has a root γ that always satisfies.
- (A) $\gamma = \frac{\alpha + \beta}{2}$ (B) $\gamma = \alpha + \frac{\beta}{2}$ (C) $\gamma = \alpha$ (D) $\alpha < \gamma < \beta$
16. Let α, β be the roots of the equation $x^2 - px + r = 0$ and $\frac{\alpha}{2}, 2\beta$ be the roots of the equation $x^2 - qx + r = 0$. Then, the value of r is : **(2007)**
- (A) $\frac{2}{9}(p - q)(2q - p)$ (B) $\frac{2}{9}(q - p)(2p - q)$
- (C) $\frac{2}{9}(q - 2p)(2q - p)$ (D) $\frac{2}{9}(2p - q)(2q - p)$
17. Let (x_0, y_0) be the solution of the following equations $(2x)^{\ell n 2} = (3y)^{\ell n 3}$, $3^{\ell n x} = 2^{\ell n y}$. Then x_0 is:
- (A) $\frac{1}{6}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) 6 **(2008)**
- *18. If $3^x = 4^{x-1}$, then x is equal to: **(2013)**
- (A) $\frac{2 \log_3 2}{2 \log_3 2 - 1}$ (B) $\frac{2}{2 - \log_2 3}$ (C) $\frac{1}{1 - \log_4 3}$ (D) $\frac{2 \log_2 3}{2 \log_2 3 - 1}$
19. The value of $6 + \log_{3/2} \left(\frac{1}{3\sqrt{2}} \sqrt{4 - \frac{1}{3\sqrt{2}}} \sqrt{4 - \frac{1}{3\sqrt{2}}} \dots \right)$ is _____. **(2013)**
20. The largest interval for which $x^{12} - x^9 + x^4 - x + 1 > 0$ is : **(1989)**
- (A) $-4 < x < 0$ (B) $0 < x < 1$ (C) $-100 < x < 100$ (D) $-\infty < x < \infty$