MATHS

BOOKS - JEE MAINS PREVIOUS YEAR ENGLISH

COMPLEX NUMBERS AND QUADRATIC EQUATIONS

Others

1. If the difference between the roots of the equation $x^2 + ax + 1 = 0$ is less than $\sqrt{5}$, then the set of possible values of a is (1) $(-3, 3)$ (2) $(-3, \infty)$ (3) $(3, \infty)$ (4) $(-\infty, -3)$

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2. If $|z+4| \leq 3$, then the maximum value of $|z+1|$ is (1) 4 (B) 10 (3) 6 (4) 0

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3. The quadratic equations $x^2\text{-}6x+a=0 and x^2\text{-}cx+6=0$ have one root in common. The other roots of the first and second equations are integers in the ratio 4 : 3. Then the common root is (1) 1 (2) 4 (3) 3 (4) 2

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4. If the roots of the equation $bx^2 + cx + a = 0$ be imaginary, then for all real values of x, the expression $3b^2x^2 + 6bcx + 2c^2$ is (1) greater than 4ab (2) less than 4ab (3) greater than $4ab$ (4) less than $4ab$

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5. If $\left|z - \frac{4}{z}\right| = 2$, then the maximum value of $|Z|$ is equal to (1) $\sqrt{3} + 1$ (2) $\sqrt{5} + 1$ (3) 2 (4) $2 + \sqrt{2}$

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6. If α and β are the roots of the equation x^2-$x + 1 = 0$, then $\alpha^{2009} + \beta^{2009} =$ (1) 4 (2) 3 (3) 2 (4) 1

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7. Let α, β be real and z be a complex number. If $z^2 + \alpha z + \beta = 0$ has two distinct roots on the line Re $z = 1$, then it is necessary that : (1) $b \in (0, 1)$ (2) $b \in (-1, 0)$ (3) $|b| = 1$ (4) $b \in (1, \infty)$

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8. If $\omega(\neq 1)$ is a cube root of unity, and $(1 + \omega)^7 = A + B\omega$. Then (A, B) equals

$(i.)(0, 1)$

$(ii.)(1, 1)$

$(iii.)(1, 0)$

$(iv.)(-1, 1)$

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9. If $z \neq 1$ and $\frac{z^2}{z-1}$ is real, then the point represented by the complex number z lies (1) either on the real axis or on a circle passing through the origin (2) on a circle with centre at the origin (3) either on the real axis or on a circle not passing through the origin (4) on the imaginary axis

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10. If the equation $x^2 + 2x + 3 = 0$ and $ax^2 + bx + c = 0, a, b, c \in R$ have a common root, then $a : b : c$ is

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11. If z is a complex number of unit modulus and argument q, then $arg\left(\frac{1+z}{1+\bar{z}}\right)$ equal (1) $\frac{\pi}{2}-\theta$ (2) θ (3) $\pi-\theta$ (4) $-\theta$

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12. The real number k for which the equation, $2x^3+3x+k=0$ has two distinct real roots in [0, 1] (1) lies between 2 and 3 (2) lies between -1 and 0 (3) does not exist (4) lies between 1 and 2

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13. Let a and b be the roots of equation $px^2 + qx + r = 0, p \neq 0.$. If p, q, r are in A.P. and $\frac{1}{\alpha} + \frac{1}{\beta} = 4$, then the value of $|\alpha - \beta|$ is (1) $\frac{\sqrt{61}}{9}$ (2) $\frac{2\sqrt{17}}{9}$ (3) $\frac{\sqrt{34}}{9}$ (4) $\frac{2\sqrt{13}}{9}$

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14. If z is a complex number such that $|z| \geq 2$ then the minimum value of $\left|z + \frac{1}{2}\right|$ is

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15. A complex number z is said to be unimodular if . Suppose z_1 and z_2 are complex numbers such that

$\frac{z_1 - 2z_2}{2 - z_1 z_2}$ is unimodular and z_2 is not unimodular. Then the point z_1 lies on a : (1) straight line parallel to x-axis (2) straight line parallel to y-axis (3) circle of radius 2 (4) circle of radius $\sqrt{2}$

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16. Let α and β be the roots of equation $x^2 - 6x - 2 = 0$. If $a_n = \alpha^n - \beta^n, f \text{ or } n \geq 1$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$ is equal to: (1) 6 (2) -6 (3) 3 (4) -3

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17. A value of θ for which $\dfrac{2+3i\sin\theta}{1-2i\sin\theta}$ purely imaginary, is :

(1) $\dfrac{\pi}{3}$ (2) $\dfrac{\pi}{6}$ (3) $\sin^{-1}\left(\dfrac{\sqrt{3}}{4}\right)$ (4) $\sin^{-1}\left(\dfrac{1}{\sqrt{3}}\right)$

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18. Let ω be a complex number such that $2\omega+1=z$ where $z=\sqrt{-3}$. If $\left|(1,1,1),(1,-\omega^2-1,\omega^2),(1,\omega^2,\omega^7)\right| = 3k$, then k is equal to

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19. If, for a positive integer n, the quadratic equation,

$x(x+1)+(x-1)(x+2)+ +(x+n-1)(x+n)=10n$

has two consecutive integral solutions, then n is equal to :

$(1) 10$ (2) 11 (3) 12 (4) 9

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