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MATHS

BOOKS - RESONANCE DPP ENGLISH

COMPLEX NUMBERS AND QUADRATIC EQUATIONS

Others

1. If a, b c are real numbers satisfying the condition $a+b+c=0$ then the roots of the quadratic equation $3ax^2+5bx+7c=0$ are

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2. Find the value of 'k' for which the following set of quadratic equations has exactly one common root, $x^2-kx+10=0$ and $x^2+kx-18=0$.

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3. The least integral value of $'a'$ for which the graphs $y = 2ax + 1$ and $y = (a-6)x^2 - 2$ do not intersect: (a) -6 (b) -5 (c) 3 (d) 2

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4. If $\alpha, \beta \gamma$ are the roots of the equation $x^3 + px^2 + qx + r = 0$, then $\left(1-\alpha^2\right)\left(1-\beta^2\right)\left(1-\gamma^2\right)$ is equal to

(a) $(1+q)^2 - (p+r)^2$ (b) $(1+q)^2 + (p+r)^2$

(c) $(1-q)^2 + (p-r)^2$ (d) none of these

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5. if $(x-a)(x-5)+2=0$ has only integral roots where $a \in I,$ then value of $'a'$ can be: a. 8 b. 7 c. 6 d. 5

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6. If $\alpha, \beta\gamma$ are the real roots of the equation $x^3 - 3px^2 + 3qx - 1 = 0$, then find the centroid of the triangle whose vertices are $\left(\alpha, \frac{1}{\alpha}\right), \left(\beta, \frac{1}{\beta}\right)$ and $\left(\gamma, \frac{1}{\gamma}\right)$.

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7. Find all values of p for which the roots of the equation $(p-3)x^2 - 2px + 5p = 0$are real and positive

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8. If z_1, z_2, z_3 are distinct nonzero complex numbers and $a, b, c \in R^+$ such that $\frac{a}{|z_1 - z_2|} = \frac{b}{|z_2 - z_3|} = \frac{c}{|z_3 - z_1|}$ Then find the value of $\frac{a^2}{|z_1 - z_2|} + \frac{b^2}{|z_2 - z_3|} + \frac{c^2}{|z_3 - z_1|}$

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9. Let z be a complex number satisfying $|z-1| \leq |z-3|, |z-3| \leq |z-5|, |z+i| \leq |z-i|$ and $|z-i| \leq |z-5i|$. Then the area of region in which z lies is A square units , where A

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10. If $a^3+b^3+6abc=8c^3 \& \omega$ is a cube root of unity then: (a)a, b, c are in $A.P.$ (b) $a, b, c,$ are in $H.P.$ (c) $a+b\omega-2c\omega^2=0$ (d) $a+b\omega^2-2c\omega=0$

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11. The image of a complex number z in the imaginary axis is (A) z (B) iz (C) $-z$ (D) $-iz$

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12. If z_1, z_2, z_3 are the vertices of the ABC on the complex plane and are also the roots of the equation $z^3 - 3az^2 + 3\beta z + \gamma = 0$ then the condition for the ABC to be equilateral triangle is: $\alpha^2 = \beta$ (b) $\alpha = \beta^2$ $\alpha^2 = 3\beta$ (d) $\alpha = 3\beta^2$

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13. If $2x = -1 + \sqrt{3}i,$ then the value of $(1 - x^2 + x)^6 - (1 - x + x^2)^6$ is 32 (b) -64 (c) 64 (d) 0

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14. if $iz^3 + z^2 - z + i = 0$, then show that |z| =1.

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15. Number of roots which are common to the equations $x^3 + 2x^2 + 2x + 1 = 0$ and $x^{2008} + x^{2009} + 1 = 0,$ are (A) 0 (B) 1 (C) 2 (D) 3

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16. If z_1, z_2, z_3, z_4 be the vertices of a parallelogram taken in anticlockwise direction and $|z_1 - z_2| = |z_1 - z_4|,$ then $\sum_{r=1}^{4} (-1)^r z_r = 0$ (b) $z_1 + z_2 - z_3 - z_4 = 0$ $ar\frac{g(z_4 - z_2)}{z_3 - z_1} = \frac{\pi}{2}$ (d) None of these

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17. about to only mathematics

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18. The greatest value of the modulus of the complex number $'z'$ satisfying the equality $\left|z+\frac{1}{z}\right|=1$ is: $\frac{-1+\sqrt{5}}{2}$ (b) $\sqrt{\frac{3+\sqrt{5}}{2}}$ $\sqrt{\frac{3-\sqrt{5}}{2}}$ (d) $\frac{\sqrt{5}+1}{2}$

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19. The set of points in an Argand diagram which satisfy both $|z| \leq 4$ and $0 \leq arg(z) \leq \frac{\pi}{3}$, is

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20. The number of solutions of $z^3+z=0$ is (a) 2 (b) 3 (c) 4 (d) 5

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21. If ω is an imaginary cube root of unity, then the value of $(p+q)^3+(p\omega+q\omega^2)^3+(p\omega^2+q\omega)^3$ is:

$(a) 3(p+q)(p+q\omega)(p+q\omega^2)$ (b) $3(p^3+q^3)$ (c) $3(p^3+q^3)-pq(p+q)$ (d) $3(p^3+q^3)pq(p+q)$

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22. If z_0, z_1 represent points P, Q on the locus $|z-1|=1$ and the line segment PQ subtends an angle $\frac{\pi}{2}$ at the point $z=1$ then z_1 is equal to (a)$1+i(z_0-1)$ (b) $\frac{i}{z_0-1}$ (c)$1-i(z_0-1)$ (d) $i(z_0-1)$

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23. If $z_1=a+ib$ and $z_2=c+id$ are two complex numbers where a,b,c,d $\in$ R and $|z_1|=|z_2|=1$ and Im $(z_1\bar{z}_2)=0$. If $w_1=a+ic$ and $w_2=b+id$, then :

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24. The centre of a square is at the point with complex number $z_0 = 1 + i$ and one of its vertices is at the points $z_1 = 1 - i$. The complex numbers which correspond to the other vertices are (a)$-1 + i$ (b) $1 + 3i$ (c)$3 + i$ (d) $3 - i$

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25. Intercept made by the circle $zz + a + az + r = 0$ on the real axis on complex plane is $\sqrt{(a + a) - r}$ b. $\sqrt{(a + a)^2 - r}$ c. $\sqrt{(a + a)^2 - 4r}$ d. $\sqrt{(a + a)^2 - 4r}$

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26. The triangle formed by the complex numbers z, iz , $i^2 z$ is :

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27. The $\omega \neq 1$ is nth root unity, then value of $\sum_{k=0}^{n-1} \left|z_1 + \omega^k z_2\right|^2$ is $n\left(|z_1|^2 + |z_2|^2\right)$ b. $|z_1|^2 + |z_2|^2$ c. $(|z_1| + |z_2|)^2$ d. $n(|z_1| + |z_2|)^2$

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28. If product of the roots of the equation $3x^2 - 4x + \left(\log a^2 - \log(-a) + 3\right) = 0$ is 1, then $'a'$ equal to a. not possible b. -1 c. 1 d. none of these

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29. The reflection of the complex number $\frac{2-i}{3+i}$, (where $i = \sqrt{-1}$ in the straight line $z(1+i) = \bar{z}(i-1)$ is $\frac{-1-i}{2}$ (b) $\frac{-1+i}{2}$ $\frac{i(i+1)}{2}$ (d) $\frac{-1}{1+i}$

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30. If $0 < a < b < c$ and the roots α, β of equation $ax^2 + bx + c = 0$ are imaginary, then $|\alpha| = |\beta|$ (b)$|\alpha| > 1$ $|\beta| < 1$ (d) None of these

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31. A,B and C are the points respectively the complex numbers z_1, z_2 and z_3 respectivley, on the complex plane and the circumcentre of $\triangle ABC$ lies at the origin. If the altitude of the triangle through the vertex. A meets the circumcircle again at P, prove that P represents the complex number $\left(-\frac{z_2 z_3}{z_1}\right)$.

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32.

$$\left(\frac{-1+i\sqrt{3}}{2}\right)^6 + \left(\frac{-1-i\sqrt{3}}{2}\right)^6 + \left(\frac{-1+i\sqrt{3}}{2}\right)^5 + \left(\frac{-1-i\sqrt{3}}{2}\right)^5$$

is equal to

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33. The statement $(a+ib) < (c+id)$ is true for $a^2+b^2=0$ (b) $b^2+d^2=0$ $b^2+c^2=0$ (d) None of these

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34. 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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35. If α, β and γ are the cube roots of $P(p < 0)$, then for any $x, y,$ and z, $\frac{x\alpha+y\beta+z\gamma}{x\beta+y\gamma+z\alpha}$ is equal to

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36. If z_1, z_2, z_3, z_4 are imaginary 5th roots of unity, then the value of $\sum_{r=1}^{16}(z1r + z2r + z3r + z4r), is$ 0 (b) -1 (c) 20 (d) 19

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37. If z and w are two complex number such that $|zw| = 1$ and $arg(z) - arg(w) = \frac{\pi}{2}$, then show that $\bar{z}w = -i$

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38. If $z \neq 0$ be a complex number and $arg(z) = \frac{\pi}{4}$, then $Re(z) = Im(z)only\ Re(z) = Im(z) > 0\ Re(z^2) = Im(z^2)$ (d) None of these

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39. The centre of a square ABCD is at z_0. If A is z_1, then the centroid of the ABC is $2z_0 - (z_1 - z_0)$ (b) $\left(z_0 + i\left(\frac{z_1 - z_0}{3}\right)\right.$ $\frac{z_0 + iz_1}{3}$ (d) $\frac{2}{3}(z_1 - z_0)$

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40. The continued product of all values of $(\cos\alpha + i\sin\alpha)^{\frac{3}{5}}$ is 1 (b) $\cos\alpha + i\sin\alpha$ $\cos 3\alpha + i\sin 3\alpha$ (d) $\cos 5\alpha + i\sin 5\alpha$

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41. The number of 15th roots of unity which are also the 25th root of unity is: 3 (b) 5 (c) 10 (d) None of these

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