MATHS

BOOKS - KVPY PREVIOUS YEAR

MOCK TEST 7

Exercise

1. $x^3 + 5x^2 + px + q = 0$ and $x^3 + 7x^2 + px + r = 0$ have two roots in common. If their third roots are γ_1 and γ_2, respectively, then $|\gamma_1 + \gamma_2|$=

A. 12

B. -12

C. 2

D. -2

Answer:

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2. If $f(x) = x^3 + 3x^2 + 4x + a\sin x + b\cos x,\ \forall x \in R$ is a one-one fuction, then the greatestn value of $\left(a^2 + b^2\right)$ is

A. 1

B. 2

C. $\sqrt{2}$

D. None

Answer:

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3. If $x \equiv 2 +^{2/3}$ then the value $\left(x^3 - 6x^2 + 6x\right) is$

A. 3

B. 2

C. 1

D. None of these

Answer:

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4. Let C_1 and C_2 be two circles with C_2 lying inside C_1 circle C lying inside C_1 touches C_1 internally andexternally. Identify the locus of the centre of C

A. Parabola

B. Cirlce

C. Ellipse

D. None of these

Answer:

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5. The locus of the orthocentre of the triangle formed by the lines

$(1+p)x - py + p(1+p) = 0, (1+q)x - qy + q(1+q) = 0$

and y = 0, where $p \neq \cdot q$, is (A) a hyperbola (B) a parabola

(C) an ellipse (D) a straight line

A. a hyperbola

B. a parabola

C. an ellipse

D. a straight line

Answer:

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6. The point (4, 1) undergoes the following three transformations successively: (a) Reflection about the line y

= x (b) Translation through a distance 2 units along the positive direction of the x-axis. (c) Rotation through an angle $\frac{\pi}{4}$ about the origin in the anti clockwise direction. The final position of the point is given by the co-ordinates.

A. $\left(\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$

B. $\left(-\sqrt{2}, 7\sqrt{2}\right)$

C. $\left(-\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$

D. $\left(\sqrt{2}, 7\sqrt{2}\right)$

Answer:

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7. Let the altitudes from the vertices A, B and Cof the triangle e ABCmeet its circumcircle at D, E and F respectively and z_1, z_2 and z_3 represent the points D, E and F respectively. If $\frac{z_3 - z_1}{z_2 - z_1}$ is purely real then the triangle ABC is

A. obtuse angled

B. right angled

C. right angled isosceles

D. equilateral

Answer:

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8. Minimum distance between $y^2 - 4x - 8y + 40 = 0$ and $x^2 - 8x - 4y + 40 = 0$ is

A. 0

B. $\sqrt{3}$

C. $2\sqrt{2}$

D. $\sqrt{2}$

Answer:

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9. Entries of a 2×2 determinant are chosen from the set $\{-1, 1\}$. The probability that determinant has zero value is

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. None of these

Answer:

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10. Find the area bounded by the curve $f(x) = x + \sin x$ and its inverse function between the ordinates $x = 0$ to $x = 2\pi$.

A. 4π square units

B. 8π square units

C. 4 square units

D. 8 square units

Answer:

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11. The set of values of 'c' so that the equations $y = |x| + c$ and $x^2 + y^2 - 8|x| - 9 = 0$ have no solution is

A. $(-\infty, -3) \cup (3, \infty)$

B. (-3,3)

C. $(-\infty, -\sqrt{2}) \cup (5\sqrt{2}, \infty)$

D. $(5\sqrt{2} - 4, \infty)$

Answer:

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12. Fifteen coupons are numbered 1, 2, 3,..., 15 respectively. Seven coupons are selected random one at a time with replacement. The probability that the largest number appearing on the selected coupons is atmost 9, is :

A. $9^7 - 8^7$

B. $10^7 - 8^7$

C. $8^7 - 7^7$

D. None of these

Answer:

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13. The point $\begin{pmatrix} P+1 \\ P \end{pmatrix}$ (where [.] denotes the greatest integer function), lying inside the region bounded by the circle

$x^2 + y^2 - 2x - 15 = 0$ and $x^2 + y^2 - 2x - 7 = 0$, then :

A. $P \in [-1, 0) \cup (0, 1) \cup (1, 2)$

B. $P \in (0, 1)$

C. $P \in (-1, 2)$

D. None of these

Answer:

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14. If $A = \{x : x^2 = 1\}$ and $B = \{x : x^4 = 1\}$, then $A \Delta B$ is equal to

A. {i,-i}

B. {-1,1}

C. {-1,1,i,-i}

D. None of these

Answer:

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15. Domain of definition of the functioni $f(x) = \frac{3}{4 - x^2} + \log_{10}\left(x^3 - x\right)$, is:

A. $(-1, 0) \cup (1, 2) \cup (2, \infty)$

B. (a,2)

C. $(-1, 0) \cup (a, 2)$

D. $(1, 2) \cup (2, \infty)$.

Answer:

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16. If {x} represents the fractional part of x, then $\int_0^{100} \{\sqrt{x}\} dx$ =

A. 615

B. $\frac{155}{3}$

C. $\frac{2000}{3}$

D. 100

Answer:

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