MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 98

Mathematics

1. The value of a for which twice the sum of the cubes of the roots of the equation $a = \frac{x^2 - 3}{x - 2}$ attains its minimum value is (where, $a \in [0, \pi]$)

A. greater than 4

B. less than 2

C. greater than $\frac{7}{4}$

D. less than 1

Answer: C

Watch Video Solution

2. If $\int f(x)dx = 3[f(x)]^2 + c$ (where c is the constant of integration) and $f(1) = \frac{1}{6}$, then $f(6\pi)$ is equal to

A. $\frac{\pi}{2}$

B. π

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

D. $\frac{\pi}{6}$

Answer: B

Watch Video Solution

3. The equation of a circle with the origin as the centre and passing through the vertices of an equilateral triangle whose altitude is of length 3 units is

A. $x^2 + y^2 = 9$

B. $x^2 + y^2 = 16$

C. $x^2 + y^2 = 4$

D. $x^2 + y^2 = 1$

Answer: C

Watch Video Solution

4. Let A and B are 3×3 matrices with real number entries, where A is symmetric, B is skew - symmetric and $(A+B)(A-B)=(A-B)(A+B)$. If $(AB)^T=(-1)^k AB$, then the sum of all possible integral value of k in $[2,10]$ is equal to (where A^T represent transpose of matrix A)

A. 20

B. 24

C. 28

D. 45

Answer: B

Watch Video Solution

5. Coefficient of x^{48} in $\sum_{r=0}^{50} .^{50} C_r . (x-2)^x .3^{50-r}$ is

A. $.^{50} C_2$

B. $.^{48} C_2$

C. 3^{48}

D. 2^{48}

Answer: A

Watch Video Solution

Watch Video Solution

6. If α is a root of the equation $4x^2 + 2x - 1 = 0$ and $f(x) = 4x^2 - 3x + 1$, then $2(f(\alpha) + (\alpha))$ is equal to

A. -1

B. 0

C. 1

D. 2

Answer: C

Watch Video Solution

7. A trapezium is formed by the pair of tangents of parabola $P: y = \frac{x^2}{4} + 1$ drawn from the centre of the ellipse $E: \frac{x^2}{4} + y^2 = \frac{1}{4}$, tangent at the vertex of P and the tangent at end point of the minor axis of E. The area (in sq. units) of trapezium is

A. $\frac{3}{4}$

B. $\frac{3}{2}$

C. $\frac{3}{16}$

D. $\frac{3}{8}$

Answer: A

Watch Video Solution

8. If $A = \{\theta : 2\cos^2\theta + \sin\theta \leq 2\}$, and $B = \left\{\theta : \frac{\pi}{2} \leq \theta \leq 3\frac{\pi}{2}\right\}$, then the region for $(A \cap B)$ is

A. $\left\{\theta : \frac{\pi}{2} \leq \theta \leq \frac{5\pi}{6}\right\}$

B. $\left\{\theta : \pi \leq \theta \leq \frac{3\pi}{2}\right\}$

C. $\left\{\theta : \frac{\pi}{2} \leq \theta \leq \frac{5\pi}{6}\right\}$ or $\left\{\theta : \pi \leq \theta \leq \frac{3\pi}{2}\right\}$

D. $\left\{\theta : \frac{3\pi}{4} \leq \theta \leq \frac{7\pi}{4}\right\}$

Answer: C

Watch Video Solution

9. If the function $f(x) = \frac{(1-x)}{2}\tan.\frac{\pi x}{2}$ is continuous at x = 1, then $f(1)$ is equal to

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

B. $\frac{\pi}{2}$

C. 0

D. π

Answer: A

Watch Video Solution

10. Consider the statement p : If slope of a straight line is 1 then it is equally inclined to both the axes.

Then, the contrapositive of the statement p is

A. If a straight line is equally inclined to both the axes then its slope is 1

B. If a straight line is equally inclined to both the axes then its slope is not 1

C. If a straight line is not equally inclined to both the axes then its slope is not 1

D. If a straight line is not equally inclined to both the axes then its slope is 1

Answer: C

Watch Video Solution

11. The valueof $2\sin^{-1}.\frac{4}{5}+2\sin^{-1}.\frac{5}{13}+2\sin^{-1}.\frac{16}{65}$ is equal to

A. $\frac{3\pi}{2}$

B. $\frac{\pi}{2}$

C. π

D. 2π

Answer: C

Watch Video Solution

12. A balloon moving in a straight line passes vertically above two points A and B on a horizontal plane 10ft apart. When above A the balloon has an angle of elevation of 60° as seen from B. When above B it has an angle of

elevation of 45° as seen from A. The distance of B from the point C where it will touch the plane is

A. $5\left(\sqrt{3}+1\right)$ ft

B. 15 ft

C. $5\left(3+\sqrt{3}\right)ft$

D. None of these

Answer: A

Watch Video Solution

13. A line with gradient 2 intersects a line with gradient 6 at the point (40, 30). The distance between y - intercepts of these lines is

A. 160

B. 180

C. 108

D. 120

Answer: A

Watch Video Solution

14. If $f(x)$ is a continuous function satisfying $f(x) = f(2-x)$, then the value of the integral $I = \int_{-3}^{3} f(1+x)\ln\left(\frac{2+x}{2-x}\right)dx$ is equal to

A. 3π

B. 6π

C. 0

D. 9π

Answer: C

Watch Video Solution

15. The focus of the conic represented parametrically by the equation $y = t^2 + 3, x = 2t - 1$is

Watch Video Solution

16. The sum of infinite terms of the sequence whose r^{th} term is given by $t_r = \dfrac{1}{(r+1)(r+3)}$ is equal to

A. 1

B. 2

C. $\dfrac{3}{4}$

D. $\dfrac{5}{12}$

Answer: D

Watch Video Solution

17. If the lines $\dfrac{x-1}{2} = \dfrac{y}{-1} = \dfrac{z}{2}$ and $x - y + z - 2 = 0 = \lambda x + 3z + 5$

are coplanar, then the value of 7λ is equal to

A. 31

B. -52

C. -39

D. -31

Answer: D

Watch Video Solution

18. Five numbers are selected from 1, 2, 3, 4, 5, 6, 7, 8 and 9.

The probability that their product is divisible by 5 or 7 is

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

B. $\frac{3}{4}$

C. $\frac{5}{6}$

D. $\frac{1}{6}$

Answer: C

Watch Video Solution

19. A curve is such that the slope of the tangent to it at any point P is the product of ordinate of P and abscissa increased by 2. If it passes through $(-4, e)$, then its equation is

Watch Video Solution

20. If A is an invertible square matrix of the order n such that $|A| \neq 1$ and $|adj(adjA)| = |A|^{(2n^2-7n+7)}$ then the sum of all possible values of n is

A. 3

B. 4

C. 6

D. 5

Answer: D

Watch Video Solution

21. Let f(x) be a continuous and positive function, such that the area bounded by$y = f(x)$, x - axis and the lines

$x^2 = 2ax$ is $6a^2 + \sin a (\forall a > 0)$ sq. units. If $f(\pi) = k\pi$, then the value of k is equal to

Watch Video Solution

22. A committee of ten is to be formed from eight teachers and twelve students of whom four are girls. The number of committees which contains atleast four of either group (teachers and students) and atleast two girls and atleast two boys is equal to m. The number of prime factors of m is n, then (n) is equal to

Watch Video Solution

23. The value of $\lim_{x \to 0^-} \frac{4^{\frac{3}{x}} + 15\left(2^{\frac{1}{x}}\right)}{2^{1+\frac{6}{x}} + 6\left(2^{\frac{1}{x}}\right)}$ is equal to

Watch Video Solution

24. If z_1 and z_2 are two distinct complex numbers satisfying the relation $|z_1^2 - z_2^2| = |\bar{z}_1^2 + \bar{z}_2^2 - 2\bar{z}_1\bar{z}_2|$ and $(argz_1 - argz_2) = \frac{a\pi}{b}$, then the least possible value of $|a - b|$ is equal to (where, a & b are integers)

Watch Video Solution

25. Consider two vectors $\vec{a} = 3\hat{i} - 2\hat{j} + 4\hat{k}$ and $\vec{b} = \hat{j} + 2\hat{k}$. If $\vec{c}$ is a unit vector and k be the maximum value of a. $\left(\vec{b} \times \vec{c}\right)$, then the value of $k^2 - 50$ is equal to

Watch Video Solution