MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 55

Mathematics

1. If $n > 2$ and $\alpha, \beta, \gamma \in R$, then the value of $S = \alpha C_0 - (\alpha + \beta)C_1 + (\alpha + 2\beta + 2^2\gamma)C_2 - (\alpha + 3\beta + 3^2\gamma)C_3 + \ldots.$ terms is equal to

(where, C_r denotes $.^n C_r$)

A. 0

B. $2^{n-2}\gamma$

C. $n^2 2^{n-2}\gamma$

D. ngamma`

Answer: D

Watch Video Solution

2. If $A = \begin{bmatrix} 1 & -2 & 1 \\ 2 & \lambda & -2 \\ 1 & 3 & -3 \end{bmatrix}$ be the adjoint matrix of matrix B such that $|B| = 9$, then the value of λ is equal to

A. 1

B. $\frac{-77}{4}$

C. $\frac{23}{2}$

D. $\frac{-39}{2}$

Answer: B

Watch Video Solution

3. Evaluate: $\int \frac{e^x}{\sqrt{4-e^{2x}}}dx$

A. 0

B. 1

C. 2

D. 4

Answer: C

Watch Video Solution

4. Let α and β are two positive roots of $x^2-2ax+ab=0$ where $0<b<a$, then the value of $S_n=1+2\left(\frac{b}{a}\right)+3\left(\frac{b}{a}\right)^2+\ldots\ldots+(n)\left(\frac{b}{a}\right)^{n-1}, \forall n \in N$ cannot exceed

A. $\frac{\alpha}{\beta}$

B. $\left|\frac{\alpha+\beta}{\alpha-\beta}\right|$

C. $\left|\frac{\beta}{\alpha}\right|$

D. $\left(\frac{\alpha+\beta}{\alpha-\beta}\right)^4$

Answer: D

Watch Video Solution

5. If $\left(x^4+2xi\right)-\left(3x^2+yi\right)=(3-5i)+(1+2yi)$

then the number of ordered pairs (x, y) is/are equal to

$\{\forall x, y \in R \text{ and } i^2=-1\}$

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

6. A stationary balloon is observed from three points A, B and C on the plane ground and is found point is 60°. If $\angle ABC = 30^\circ$ and AC = 5 meters, then the height of the balloon from the ground is

A. $5\sqrt{2}$ meters

B. $\frac{5}{4}\sqrt{3}$ meters

C. $\frac{5}{\sqrt{3}}$ meters

D. $\frac{5}{4\sqrt{3}}$ meters

Answer: A

Watch Video Solution

7. The number of solutions of the equation $\sin^{-1} x = (\sin x)^{-1}$ is/are

A. one

B. two

C. three

D. zero

Answer: B

Watch Video Solution

8. The mean of n observation is $\overline{X}$. If the first observation is increased by 1^2, second by 2^2 and so on, then the new mean is

A. $\overline{X} + n\frac{(n+1)(2n+1)}{6}$

B. $\overline{X} + \frac{(n+1)(2n+1)}{6}$

C. $\overline{X} + \frac{n+1}{2}$

D. $\overline{X} + \frac{(n+1)}{(4)}$

Answer: B

Watch Video Solution

9. If the normal at P(18, 12) to the parabola $y^2 = 8x$ cuts it again at Q, then the equation of the normal at point Q on the parabola $y^2 = 8x$ is

A. $27y = 99x - 2058$

B. $27y = 99x + 3058$

C. $27y = -99x - 3058$

D. None of these

Answer: A

Watch Video Solution

10. If $f: R \to R$ is a function, then f is

A. continuous for every real x

B. discontinuous only at x = 0

C. discontinuous only at integral values of x

D. continuous only at x = 0

Answer: C

Watch Video Solution

11. The possible value of the ordered triplet (a, b, c) such that the function $f(x) = x^3 + ax^2 + bx + c$ is a monotonic function is

A. $(2, 1, 3)$

B. $(1, -1, 3)$

C. $(2, 2, 4)$

D. $(2, -2, 1)$

Answer: C

Watch Video Solution

12. If the line $y = x + c$ touches the hyperbola $\frac{x^2}{9} - \frac{y^2}{5} = 1$ at the point $P(h, k)$, then (h, k) can be equal to

A. $\left(\frac{9}{2}, -\frac{5}{2}\right)$

B. $\left(\frac{9}{2}, \frac{5}{2}\right)$

C. $\left(-\frac{5}{2}, -\frac{9}{2}\right)$

D. $\left(\frac{5}{2}, -\frac{9}{2}\right)$

Answer: B

Watch Video Solution

13. The solution of the differential equation $\frac{dy}{dx} = \frac{y^2 + x \ln x}{2xy}$ is (where, c is the constant of integration)

A. $2x^2 = y(\ln x)^2 + 2cy$

B. $2y^2 = x(\ln x)^2 + 2cx$

C. $x^2 = y(\ln m)^2 + c$

D. $2y^2 = \frac{x}{y}(\ln x)^2 + cx$

Answer: B

Watch Video Solution

14. The value of $\int \sin^3 x \sqrt{\cos x} dx$ is equal to (where, c is the constant of integration)

A. $\frac{2}{3}(\cos x)^{\frac{3}{2}} + \frac{2}{7}(\cos x)^{\frac{7}{2}} + c$

B. $-\frac{2}{3}(\cos x)^{\frac{3}{2}} + \frac{2}{7}(\cos x)^{\frac{7}{2}} + c$

C. $\left(-\frac{2}{3}\right)(\cos x)^3 + \frac{2}{5}\left(\cos x^{\frac{5}{2}}\right) + c$

D. $\frac{3}{2}(\cos x)^{\frac{3}{2}} + \frac{5}{2}(\cos x)^{\frac{7}{2}} + c$

Answer: B

Watch Video Solution

15. A random variable X follows binomial probability distribution with probability P(X), with mean as 2, probability of success as p and probability of failure as q such that $p + q = 1$. If $\Sigma X^2 P(X) = \frac{28}{5}$, then the probability of exactly 2 success is

A. $\frac{3 \times 2^{14}}{5^{10}}$

B. $\frac{3^2 \times 2^{18}}{5^9}$

C. $3 \times \left(\frac{2}{5}\right)^{10}$

D. $45 \times \left(\frac{2}{5}\right)^{9}$

Answer: B

Watch Video Solution

16. Equation of the plane passing through the point $(1, -1, 3)$, parallel to the vector $\hat{i} + 2\hat{j} + 4\hat{k}$ and perependicular to the plane $x - 2y + z = 6$ is given by $ax + by + cz + 8 = 0$, then the value of $2a - 5b + 7c$ is equal to

A. 32

B. 31

C. $-\frac{184}{5}$

D. $\frac{72}{5}$

Answer: C

Watch Video Solution

17. If the system of equations $x + y + z = 6, x + 2y + \lambda z = 10$ and $x + 2y + 3z = \mu$ has infinite solutions, then the value of $\lambda + 2\mu$ is equal to

A. 20

B. 22

C. 23

D. 25

Answer: C

Watch Video Solution

18. The number of five digit numbers that contains 7 exactly once is equal to

A. $41\left(9^3\right)$

B. $37\left(9^3\right)$

C. $7\left(9^4\right)$

D. $41\left(9^4\right)$

Answer: A

Watch Video Solution

19. The points $(-2, -1), (1, 0), (4, 3)$ and $(1, 2)$ are

A. collinear

B. concyclic

C. the vertices of a parallelogram

D. the vertices of a rectangle

Answer: C

Watch Video Solution

20. The value of a such that the area bounded by the curve $y = x^2 + 2ax + 3a^2$, the coordinate axes and the line $x = 1$. The coordinate axes and the line $x = 1$. Attains its least value is equal to

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

B. $-\frac{1}{6}$

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

D. $-\frac{1}{3}$

Answer: B

Watch Video Solution

21. Number of common points to the curves $C_1\{(-1+2\cos\alpha, 2\sin\alpha)\}$ and $C_2(4+3\sin\theta, 3\cos\theta)$ is/are equal to

Watch Video Solution

22. If the magnitude of the projection of the vector $\hat{i}-\hat{j}+2\hat{k}$ on the vector perpendicular to the plane containing the vectors $2\hat{i}0\hat{j}+3\hat{k}$ and $\hat{i}-\hat{j}-2\hat{k}$ is k, then the value of $\frac{1}{k^2}$ is equal to

Watch Video Solution

23. The value of $\int_0^2 \frac{(x^2-2x+4)\sin(x-1)}{2x^2-4x+5}dx$ is equal to

Watch Video Solution

24. If $f: R \to R$ is a function such that $f(5x)+f(5x+1)+f(5x+2)=0,\ \forall x \in R$, then the period of f(x) is

Watch Video Solution

25. If $0 < \alpha, \beta < \pi$ and $\cos\alpha + \cos\beta - \cos(\alpha + \beta) = \frac{3}{2}$, then the value of $\sqrt{3}\sin\alpha + \cos\alpha$ is equal to

Watch Video Solution