



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 $S = \alpha C_0 - (\alpha + \beta)C_1 + (\alpha + 2\beta + 2^2\gamma)C_2 - (\alpha + 3\beta + 3^2\gamma)C_3 + \dots$ 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



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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



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

A. 0

B. 1

C. 2

D. 4

Answer: C



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4. Let α and β are two positive roots of $x^2 - 2ax + ab = 0$ where

$0 < b < a$, then the value of

$$S_n = 1 + 2\left(\frac{b}{a}\right) + 3\left(\frac{b}{a}\right)^2 + \dots + (n)\left(\frac{b}{a}\right)^{n-1}, \forall n \in N$$

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



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

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



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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



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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

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

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

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

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

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

Answer: B

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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



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10. If $f: R \rightarrow R$ 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



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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



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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



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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



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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



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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 $\sum X^2 P(X) = \frac{28}{5}$, 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



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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 perpendicular 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



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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



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

A. $41(9^3)$

B. $37(9^3)$

C. $7(9^4)$

D. $41(9^4)$

Answer: A



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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



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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



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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

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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

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

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24. If $f: R \rightarrow R$ 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



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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



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