



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 58

Mathematics

1. The value of the numerically greatest term in the expansion of $(4 - 3x)^7$ when $x = \frac{2}{3}$ is equal to

A. 71680

B. 35840

C. 10752

D. 86016

Answer: D



[Watch Video Solution](#)

2. Out of 10 white, 8 black and 6 red balls, the number of ways in which one or more balls can be selected is (assuming balls of the same colour are identical)

A. 681

B. 691

C. 679

D. 692

Answer: D



[Watch Video Solution](#)

3. If $\log_2(5 \cdot 2^x + 1)$, $\log_4(2^{1-x} + 1)$ and 1 are in A.P, then x equals

A. $\frac{\log 5}{\log 2}$

B. $\log_2 0.6$

C. $1 - \frac{\log 5}{\log 2}$

D. $\frac{\log 2}{\log 5}$

Answer: C



Watch Video Solution

4. Consider $I_1 = \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{e^{\sin x} + 1}{e^{\cos x} + 1} dx$ and $I_2 = \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{e^{\cos x} + 1}{e^{\sin x} + 1} dx$, then

A. $I_1 > I_2$

B. $I_1 < I_2$

C. $I_1 = I_2$

D. $I_1 + I_2 = 0$

Answer: A



Watch Video Solution

5. Let $f(x) = \lim_{n \rightarrow \infty} \frac{(x^2 + 2x + 4 + \sin \pi x^n) - 1}{(x^2 + 2x + 4 + \sin \pi x^n) + 1}$, then

- A. $f(x)$ is continuous and differentiable for all $x \in \mathbb{R}$.
- B. $f(x)$ is continuous but not differentiable for all $x \in \mathbb{R}$.
- C. $f(x)$ is discontinuous at infinite number of points.
- D. $f(x)$ is discontinuous at two points.

Answer: A



[Watch Video Solution](#)

6. The equation of the common tangent to the parabolas

$$y^2 = 2x \text{ and } x^2 = 16y \text{ is}$$

- A. $2x + y - 2 = 0$
- B. $x - 2y - 2 = 0$
- C. $x - 2y + 2 = 0$

$$D. x + 2y + 2 = 0$$

Answer: D



Watch Video Solution

7. If p , q and r are three logical statements then the truth value of the statement $(p \wedge \sim q) \vee (q \rightarrow r)$, where p is true, is

- A. True if q is true
- B. False if q is true
- C. True if q is false
- D. False if q is false

Answer: C



Watch Video Solution

8. The mean of five observations is 4 and their variance is 2.8. If three of these observations are 2, 2 and 5, then the other two are

- A. 2 and 9
- B. 3 and 8
- C. 4 and 7
- D. 5 and 6

Answer: D



[Watch Video Solution](#)

9. If the integral $\int \frac{\ln x}{x^3} dx = \frac{f(x)}{4x^2} + C$, where $f(e) = -3$ and C is the constant of integration, then the value of $f(e^2)$ is equal to

- A. 3
- B. -4
- C. -5

D. 5

Answer: C



Watch Video Solution

10. If $S_n = \sum_{r=1}^n t_r = \frac{1}{6}n(2n^2 + 9n + 13)$, then $\sum_{r=1}^n \sqrt{t_r}$ is equal to

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

B. $\frac{1}{2}n(n + 3)$

C. $(n + 1)^2$

D. n^2

Answer: B



Watch Video Solution

11. A cone having fixed volume has semi - vertical angle of $\frac{\pi}{4}$. At an instant when its height is decreasing at the rate of 2m/s, its radius increases at a rate equal to

A. 2m/s

B. 4m/s

C. 1m/s

D. 8m/s

Answer: C



[Watch Video Solution](#)

12. Let the lines $4x - 3y + 10 = 0$ and $4x - 3y - 30 = 0$ make equal intercepts of 6 units with a circle (C) whose centre lies on $2x + y = 0$, then the equation of the circle C is

A. $x^2 + y^2 - 2x + 4y - 20 = 0$

$$B. x^2 + y^2 - 4x + 8y - 20 = 0$$

$$C. x^2 + y^2 + 2x - 4y - 20 = 0$$

$$D. x^2 + y^2 - 4x + 8y - 5 = 0$$

Answer: A



Watch Video Solution

13. A biased coin is tossed repeatedly until a tail appears for the first time. Heads is 3 times as likely to appear as tails. Let x be the number of tosses required. Assume that all the trials of tossing a biased coin are independent. Then, the conditional probability that $x \geq 6$, gives that $x > 3$, is equal to

A. $\frac{9}{16}$

B. $\frac{1}{16}$

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

D. $\frac{3}{5}$

Answer: A

 [Watch Video Solution](#)

14. If $A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} -4 & -3 & -3 \\ 1 & 0 & 1 \\ 4 & 4 & 3 \end{bmatrix}$ are two matrices, then the value of the determinant $(A + A^2B^2 + A^3 + A^4B^4 + \dots \dots \dots 20 \text{ terms})$

- A. $(20)^3$
- B. $2(20)^3$
- C. $-(20)^3$
- D. 0

Answer: D

 [Watch Video Solution](#)

15. Consider three vectors

$$\vec{V}_1 = (\sin \theta)\hat{i} + (\cos \theta)\hat{j} + (a - 3)\hat{k}, \vec{V}_2 = (\sin \theta + \cos \theta)\hat{i} + (\cos \theta - \sin \theta)\hat{j} + (b - 4)\hat{k}$$

and $(b - 4)\hat{k}$

$$\vec{V}_3 = (\cos \theta)\hat{i} + (\sin \theta)\hat{j} + (c - 5)\hat{k}. \text{ If the resultant of } \vec{V}_1, \vec{V}_2 \text{ and } \vec{V}_3 \text{ is}$$

equal to $\lambda\hat{i}$, where $\theta \in [-\pi, \pi]$ and $a, b, c \in N$, then the number of

quadruplets (a, b, c, θ) are

A. 55

B. 110

C. 91

D. 182

Answer: B



Watch Video Solution

16. Let $Z = x + iy$ is a complex number, such that $x^2 + y^2 = 1$. In which

of the following cases $\frac{Z}{1 - Z}$ (for $x \neq 1$) lies in the IInd quadrant?

$$(\forall x, y \in R, i^2 = -1)$$

A. $x > 0$

B. $x < 0$

C. $y > 0$

D. $y < 0$

Answer: C



Watch Video Solution

17. The point $(a^2, a + 1)$ lies in the angle between the lines $3x + y + 1 = 0$ and $x + 2y - 5 = 0$ containing the origin. If a is an integer, then the sum of all possible values of a is

A. -2

B. -3

C. -1

D. 2

Answer: B



[Watch Video Solution](#)

18. The area (in sq. units) bounded by the curve $y = \max(x, \sin x), \forall x \in [0, 2\pi]$ is

A. π^2

B. $2\pi^2$

C. 2

D. 4

Answer: B



[Watch Video Solution](#)

19. The value of $\lim_{x \rightarrow 0} \frac{\cos(\tan x) - \cos x}{4x^4}$ is equal to

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

B. $-\frac{1}{12}$

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

D. 1

Answer: B



Watch Video Solution

20. The minimum value of x which satisfies the inequality

$$(\sin^{-1} x)^2 \geq (\cos^{-1} x)^2 \text{ is}$$

A. $\frac{1}{\sqrt{2}}$

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

C. $\frac{\sqrt{3}}{2}$

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

Answer: A

 [Watch Video Solution](#)

21. The number of solutions of the equation $\tan^2 x - \sec^{10} x + 1 = 0$ for $x \in (0, 2\pi)$ is equal to

 [Watch Video Solution](#)

22. If the solution of the differential equation $(1 + e^{\frac{x}{y}})dx + e^{\frac{x}{y}}\left(1 - \frac{x}{y}\right)dy = 0$ is $x + kye^{\frac{x}{y}} = C$ (where, C is an arbitrary constant), then the value of k is equal to

 [Watch Video Solution](#)

23. The equation of the plane passing through the point of intersection of the lines $\frac{x-1}{3} = \frac{y-2}{1} = \frac{z-3}{2}$, $\frac{x-3}{1} = \frac{y-1}{2} = \frac{z-2}{3}$ and perpendicular to the line $\frac{x-2}{2} = \frac{y-3}{3} = \frac{z-2}{1}$ is $P = 0$. If the distance of the point $(1, 1, 3)$ from $P = 0$ is k units, then the value of $\frac{k^2}{2}$ is equal to

 [Watch Video Solution](#)

24. Let $A = [a_{ij}]_{3 \times 3}$ be a matrix, where $a_{ij} = \begin{cases} x & \in e^j \\ 1 & i = j \end{cases}$ $A a_i, j \in N \& i, j \leq 2$. If C_{ij} be the cofactor of a_{ij} and $C_{12} + C_{23} + C_{32} = 6$, then the number of value(s) of $x (\forall x \in R)$ is (are)

 [Watch Video Solution](#)

25. Let the eccentricity of the hyperbola with the principal axes along the coordinate axes and passing through $(3, 0)$ and $(3\sqrt{2}, 2)$ is e , then the

value of $\left(\frac{e^2 + 1}{e^2 - 1}\right)$ is equal to



Watch Video Solution