



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 48

Mathematics

1. Given that $a_4 + a_8 + a_{12} + a_{16} = 224$, the sum of the first nineteen terms of the arithmetic progression a_1, a_2, a_3, \dots is equal to

- A. 1540
- B. 1064
- C. 3125
- D. 1980

Answer: B



Watch Video Solution

2. If $z = \frac{\pi}{4}(1+i)^4 \left(\frac{1-\sqrt{\pi}i}{\sqrt{\pi}+i} + \frac{\sqrt{\pi}-i}{1+\sqrt{\pi}i} \right)$, then $\left(\frac{|z|}{\text{amp}(z)} \right)$ equals

A. π

B. 4

C. 1

D. 3π

Answer: B



Watch Video Solution

3. The value of $\lim_{n \rightarrow \infty} \left(\frac{1}{2n} + \frac{1}{2n+1} + \frac{1}{2n+2} + \dots + \frac{1}{4n} \right)$ is equal to

A. e^2

B. $\ln 2$

C. $\ln 4$

D. $3 \ln 2$

Answer: B



Watch Video Solution

4. If α and β are the solution of $\cot x = -\sqrt{3}$ in $[0, 2\pi]$ and α and γ are the roots of $\operatorname{cosec} x = -2$ in $[0, 2\pi]$, then the value of $\frac{|\alpha - \beta|}{\beta + \gamma}$ is equal to

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

B. 2

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

D. 3

Answer: A



[Watch Video Solution](#)

5. If $f: R \rightarrow R$ be a function such that $f(x) = x^3 + x^2 + 3x + \sin x$, then discuss the nature of the function.

- A. one - one and onto
- B. one -one and into
- C. many - one and onto
- D. many - one and into

Answer: A



[Watch Video Solution](#)

6. If $y = x + c$ touches the ellipse $3x^2 + 4y^2 = 12$ at the point P, then the value of the length OP (where O is the origin) is equal to

A. $\sqrt{3}$ units

B. $\sqrt{7}$ units

C. $\frac{5}{\sqrt{7}}$ units

D. $\sqrt{\frac{7}{5}}$ units

Answer: C



Watch Video Solution

7. If $f(x) = \begin{cases} a + \cos^{-1}(x + b) & : x \geq 1 \\ -x & : x < 1 \end{cases}$ is differentiable at $x = 1$, then

the value of $b - a$ is equal to

A. 0

B. 1

C. -1

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

Answer: D



Watch Video Solution

8. If $x \in \left(0, \frac{\pi}{2}\right)$, then show that

$$\cos^{-1}\left(\frac{7}{2}(1 + \cos 2x) + \sqrt{(\sin^2 x - 48 \cos^2 x) \sin x}\right) = x - \cos^{-1}(7 \cos x)$$

A. 1

B. 5

C. 7

D. 14

Answer: C



Watch Video Solution

9. Two cyclists start from the junction of two perpendicular roads, their velocities being $3m/s$ and $4m/s$, respectively. Find the rate at which the two cyclists separate.

A. 5m/sec

B. 25m/sec

C. 4m/sec

D. 3m/sec

Answer: A



Watch Video Solution

10. The value of $\int \frac{(\tan^{-1}(\sin x + 1)) \cos x}{(3 + 2 \sin x - \cos^2 x)} dx$ is (where c is the constant of integration)

A. $\tan^{-1}(\sin x) + c$

B. $(\tan^{-1}(\sin x))^2 + c$

C. $\frac{(\tan^{-1}(\sin x + 1))^2}{2} + c$

D. $\frac{(\tan^{-1}(\sin x))^2}{2} + c$

Answer: C



Watch Video Solution

11. The number of polynomials of the form $x^3 + ax^2 + bx + c$ that are divisible by $x^2 + 1$, where $a, b, c \in \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, is

A. 5

B. 10

C. 20

D. 100

Answer: B



Watch Video Solution

12. If the circle $x^2 + y^2 - 10x + 16y + 89 - r^2 = 0$ and $x^2 + y^2 + 6x - 14y + 42 = 0$ have common points, then the number of

possible integral values of r is equal to

A. 13

B. 14

C. 15

D. 18

Answer: D



[Watch Video Solution](#)

13. The differential equation of the family of curves whose tangent at any point makes an angle of $\frac{\pi}{4}$ with the ellipse $\frac{x^2}{4} + y^2 = 1$ is

A. $\frac{dy}{dx} = \frac{x + y}{x - y}$

B. $\frac{dy}{dx} = \frac{x + 4y}{x - 4y}$

C. $\frac{dy}{dx} = \frac{x}{4y}$

D. $\frac{dy}{dx} = \frac{4y}{x}$

Answer: B



Watch Video Solution

14. The length of two opposite edges of a tetrahedron are 12 and 15 units and the shortest distance between them is 10 units. If the volume of the tetrahedron is 200 cubic units, then the angle between the 2 edges is

A. $\sin^{-1} \cdot \frac{1}{2}$

B. $\sin^{-1} \cdot \frac{2}{3}$

C. $\sin^{-1} \cdot \frac{3}{4}$

D. $\sin^{-1} \cdot \frac{4}{5}$

Answer: B



Watch Video Solution

15. If 4 distinct numbers are chosen randomly from the first 100 natural numbers, then the probability that all 4 of them are either divisible by 3 or divisible by 5 is

A. $\frac{{}^{100}C_4}{{}^{100}C_4}$

B. $\frac{{}^{33}C_4}{{}^{100}C_4}$

C. $\frac{{}^{20}C_4}{{}^{100}C_4}$

D. $\frac{{}^{47}C_4}{{}^{100}C_4}$

Answer: D



Watch Video Solution

16. If the system of equations

$$x - ky + 3z = 0,$$

$2x + ky - 2z = 0$ and $3x - 4y + 2z = 0$ has non-trivial solutions, then

the value of $\frac{10y}{x}$ is equal to

A. 3

B. $-\frac{15}{2}$

C. $\frac{5}{7}$

D. $-\frac{5}{7}$

Answer: B



Watch Video Solution

17. The statement $(\neg(p \Leftrightarrow q)) \wedge p$ is equivalent to

A. $p \wedge q$

B. $q \Leftrightarrow p$

C. $p \wedge \neg q$

D. $\neg p \wedge q$

Answer: C



Watch Video Solution

18. Mid point of $A(0, 0)$ and $B(1024, 2048)$ is A_1 . mid point of A_1 and B is A_2 and so on. Coordinates of A_{10} are.

- A. (1025, 2050)
- B. (1022, 2044)
- C. (1023, 2046)
- D. None of these

Answer: C



[Watch Video Solution](#)

19. In ten observation, the mean of all 10 numbers is 15, the mean of the first six observation is 16 and the mean of the last five observation is 12.

The sixth number is

- A. 6

B. 9

C. 12

D. 3

Answer: A



[Watch Video Solution](#)

20. If A is a non - null diagonal matrix of order 3 such that $A^4 = A^2$, then the possible number of matrices A are

A. 27

B. 26

C. 8

D. 7

Answer: B



[Watch Video Solution](#)

21. If $53^{53} - 33^3$ is divided by 10, then the remainder obtained is



[Watch Video Solution](#)

22. Let tangent PQ and PR are drawn from the point $P(-2, 4)$ to the parabola $y^2 = 4x$. If S is the focus of the parabola $y^2 = 4x$, then the value (in units) of $RS + SQ$ is equal to



[Watch Video Solution](#)

23. The value of $\lim_{x \rightarrow \frac{\pi}{3}} \frac{2 - \sqrt{3} \sin x - \cos x}{(3x - \pi)^2}$ is equal to the reciprocal of the number



[Watch Video Solution](#)

24. Consider $f(x) = \text{minimum}(x + 2, \sqrt{4 - x})$, $\forall x \leq 4$. If the area bounded by $y = f(x)$ and the x - axis is $\frac{22}{k}$ square units, then the value of k is

 [Watch Video Solution](#)

25. If the length of the projection of the line segment joining the points $(1, 2, -1)$ and $(3, 5, 5)$ on the plane $3x - 4y + 12z = 5$ is equal to d units, then the value of $169d^2$ equal to

 [Watch Video Solution](#)