MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 87

Mathematics

1. In the expansion of $\left(3\sqrt{\frac{a}{b}}+3\sqrt{\frac{b}{\sqrt{a}}}\right)^{21}$, the term containing same powers of a & b is

A. 11^{th}

B. 13^{th}

C. 12^{th}

D. 6^{th}

Answer: B

Watch Video Solution

2. The least value of $n(n \in N)$, such that the function $f(n, x) = \int n\cos(nx)dx$ satisfies $f\left(n, \frac{\pi}{2}\right) = -1$, is (given, $f(n, 0) = 0$)

A. 3

B. 4

C. 5

D. 6

Answer: A

Watch Video Solution

3. Find the set of all possible real value of a such that the inequality $(x-(a-1))\left(x-\left(a^2+2\right)\right)<0$ holds for all $x \in (-1, 3)$.

A. $(1, \infty)$

B. $(-\infty, -1)$

C. $(-\infty, 1)$

D. $(0, 1)$

Answer: B

Watch Video Solution

4. The area (in sq. units) of the circle touching the line $x + y = 4$ at (1, 3) and intersecting $x^2 + y^2 = 4$ orthogonally is equal to

A. $\frac{9\pi}{8}$

B. $\frac{7\pi}{8}$

C. $\frac{5\pi}{4}$

D. $\frac{4\pi}{3}$

Answer: A

Watch Video Solution

5. Consider a function $f: R \to R$ defined by $f(x) = x^3 + 4x + 5$, then

A. f is one - one but not onto

B. f is onto but not one - one

C. f is one - one and onto

D. f is neither one - one nor onto

Answer: C

Watch Video Solution

6. Let $A = \begin{bmatrix} -4 & -3 & -3 \\ 1 & a & 1 \\ 4 & b & 3 \end{bmatrix}$ and $A = A^{-1}$, then $a + 2b$ is equal to

A. 0

B. 4

C. 8

D. 5

Answer: C

Watch Video Solution

7. An unbiased die is rolled n times. Let P(A), P(B) and P(C) be the probability of occurrence of an odd number exactly one, two and three times respectively in n trials. If P(A), P(B), P(C) are in arithmetic progression, then n is equal to

A. 4

B. 5

C. 6

D. 7

Answer: D

Watch Video Solution

8. Let $A = [a_{ij}]_{3\times 3}$ be a square matrix such that $AA^T = 4I, |A| < 0.$ If $\begin{vmatrix} a_{11}+4 & a_{12} & a_{13} \\ a_{21} & a_{22}+4 & a_{23} \\ a_{31} & a_{32} & a_{33}+4 \end{vmatrix} = 5\lambda|A+I|.$ Then λ is equal to

A. $\frac{4}{5}$

B. $-\frac{4}{5}$

C. $\frac{8}{5}$

D. $-\frac{8}{5}$

Answer: D

Watch Video Solution

9. If the lines $\frac{x-3}{2}=\frac{y-5}{2}=\frac{z-4}{\lambda}$ and $\frac{x-2}{\lambda}=\frac{y-6}{4}=\frac{z-5}{2}$ intersect at a point (α, β, γ), then the greatest value of λ is equal to

A. 0

B. 2

C. -2

D. 4

Answer: A

Watch Video Solution

10. Let $f:(-1,1) \to R$ be a function defind by f(x) =max. $\left\{-|x|, -\sqrt{1-x^2}\right\}$. If K is the set of all points at which f is not differentiable, then K has set of all points at which f is not differentible, then K has exactly

A. one element

B. two elements

C. five elements

D. three elements

Answer: C

Watch Video Solution

11. Number of ordered pairs (a, x) satisfying the equation

$\sec^2(a+2)x + a^2 - 1 = 0; \ -\pi < x < \pi$ is

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

12. Which of the following option is incorrect?

A. $\sim(p \Leftrightarrow \sim q) \equiv p \Leftrightarrow q$

B. $\sim(p \Leftrightarrow q) \equiv (p \rightarrow \sim q) \wedge (\sim q \rightarrow p)$

C. $\sim(p \Leftrightarrow q) \equiv \sim p \Rightarrow q$

D. $\sim(p \Rightarrow q) \equiv p \wedge \sim q$

Answer: C

Watch Video Solution

13. The value of $2\cos^{-1}\sqrt{\frac{2}{3}} - 2\cos^{-1}.\frac{\sqrt{6}+1}{2\sqrt{3}}$ is equal to

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

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

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

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

Answer: A

Watch Video Solution

14. If a tangent drawn at $P(\alpha, \alpha^3)$ to the curve $y = x^3$ meets it again at $Q(\beta, \beta^3)$, then $2\beta + \alpha$ is equal to

A. 0

B. -3α

C. 3α

D. 4α

Answer: B

Watch Video Solution

15. The slope of normal at any point P of a curve (lying in the first quadrant) is reciprocal of twice the product of the abscissa and the ordinate of point P. Then, the equation of the curve is (where, c is an arbitrary constant)

A. $y^2 = x + c$

B. $y = ce^{-x^2}$

C. $y = ce^{-x}$

D. $y^2 = \ln x + c$

Answer: B

Watch Video Solution

16. A shopkeeper has 11 copies each of nine different books, then the number of ways in which atleast one book can be selected is

A. $9^{11} - 1$

B. $10^{10} - 1$

C. $11^9 - 1$

D. 10^9

Answer: C

Watch Video Solution

17. Let $|z_1| = 3, |z_2| = 2$ and $z_1 + z_2 + z_3 = 3 + 4i$. If the real part of $(z_1\overline{z_2} + z_2\overline{z_3} + z_3\overline{z_1})$ is equal to 4, then $|z_3|$ is equal to (where, $i^2 = -1$)

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

18. From a point P, two tangents PA and PB are drawn to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. If the product of the slopes of these tangents is 1, then the locus of P is a conic whose eccentricity is equal to

A. 1

B. 2

C. $\sqrt{2}$

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

Answer: C

Watch Video Solution

19. If $\sin 2A = \frac{1}{2}$ and $\sin 2B = -\frac{1}{2}$, then which of the following is false?

A. $\sin(A+B)$ may be 0

B. $\cos(A-B)$ may be 0

C. $\sin(A+B)$ or $\cos(A-B)$ is zero

D. $\sin(A+B) = 0$

Answer: D

Watch Video Solution

20. Let B and C are the points of intersection of the parabola $x = y^2$ and the circle $y^2 + (x-2)^2 = 8$. The

perimeter (in units) of the triangle OBC, where O is the origin, is

A. 8

B. $4\sqrt{5}$

C. $4\sqrt{5}+2$

D. $4\left(\sqrt{5}+1\right)$

Answer: D

Watch Video Solution

21. If the tenth term of the sequence $S=1+5+13+29+\ldots\ldots$ is k, then $\frac{k}{500}$ is equal to

Watch Video Solution

Watch Video Solution

22. In a ΔABC, the sides BC, CA and AB are consecutive positive integers in increasing order. Let $\vec{a}$, $\vec{b}$ and $\vec{c}$ are position vectors of the vertices A, B and C respectively. If $\left(\vec{c}-\vec{a}\right).\left(\vec{b}-\vec{c}\right)=0$, then the value of $\left|\vec{a}\times\vec{b}+\vec{b}\times\vec{c}+\vec{c}\times\vec{a}\right|$ is equal to

Watch Video Solution

23. The value of $\lim\limits_{x\to\frac{5\pi}{4}}\dfrac{\cot^3 x-\tan x}{\cos\left(x-\frac{5\pi}{4}\right)}$ is equal to

Watch Video Solution

24. The area bounded by $f(x) = \begin{cases} \sin(2x) & x \geq 0 \\ \cos(2x) & x < 0 \end{cases}$ with the x - axis, $x = -\frac{\pi}{4}$ and $x = \frac{\pi}{4}$ is k square units. Then, the value of 4k is equal to

Watch Video Solution

25. Let in ΔABC the coordinates of A are (0, 0). Internal angle bisector of $\angle ABC$ is $x - y + 1 = 0$ and mid - point of BC is $(-1, 3)$. Then, the ordinate of C is

Watch Video Solution