



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 88

Mathematics

$$\left(an^2 x - 1
ight)^{-1} = 1 + 2\cos 2x$$
 is

A.
$$x=n\pi-rac{\pi}{2}$$

B.
$$x=n\pi\pmrac{\pi}{4}$$

C.
$$x=n\pi\pmrac{\pi}{3}$$

D.
$$x=n\pi$$

Answer: C



2. Consider
$$f(x)=egin{cases} -2,&-1\leq x<0\ x^2-2,&0\leq x\leq 2 \end{bmatrix}$$
 and $g(x)=|f(x)|+f(|x|).$ Then, in the interval $(-2,2),g(x)$ is

A. not differentiable at one point

B. differentiable at all points

C. not continuous

D. not differentiable at two points

Answer: A

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3. The differential equation of the family of curves $y = k_1 x^2 + k_2$ is given by (where, k_1 and k_2 are arbitrary constants and $y_1 = \frac{dy}{dx}, y_2 = \frac{d^2 y}{dx^2}$)

A.
$$y_1=x^2y_2$$

$$\mathsf{B.}\left(y_{1}\right)^{2}=xy_{2}$$

$$\mathsf{C}.\, xy_2=y_1$$

D. $y_1y_2=x$

Answer: C



4. If
$$\sin^{-1}\left(rac{2a}{1+a^2}
ight) + \sin^{-1}\left(rac{2b}{1+b^2}
ight) = 2\cot^{-1}\left(rac{1}{x}
ight)$$
, then x is equal to $[orall a, b \in (0,1)]$

A.
$$\displaystyle rac{a-b}{1+ab}$$

$$\mathsf{B.} \ \frac{b}{1+ab}$$
$$\mathsf{C.} \ \frac{b}{1-ab}$$
$$\mathsf{D.} \ \frac{a+b}{1-ab}$$

Answer: D



5. Let the incentre of ΔABC is I(2,5). If A = (1,13) and B = (-4,1), then the sum of the slopes of sides AC and BC is

A.
$$\frac{3}{4}$$

B.
$$-\frac{4}{3}$$

C. $\frac{4}{3}$
D. $-\frac{3}{4}$

Answer: B



6. Let there are 4 sections of 25 students each in a coaching class. Now, out of 150 students 100 are to be selected randomly and entrolled in these sections. Then, the probability that the students A

and B (both present in 150 students) are selected and placed in the same section, is

A.
$$\frac{10}{13}$$

B. $\frac{16}{149}$
C. $\frac{2}{33}$
D. $\frac{5}{149}$



7. If the equation of the plane passing through (1, 2, 3) and situated at a maximum distance from point (2, 3, 4) is P = 0, then the distance (in units) of P = 0 from origin is

A. $\sqrt{3}$

B. $2\sqrt{3}$

C. $\sqrt{6}$

D. $3\sqrt{2}$



8. Consider the matrix $A = egin{bmatrix} x & 2y & z \ 2y & z & x \ z & x & 2y \end{bmatrix}$ and $AA^T = 9I$. If Tr(A) > 0 and $xyz = \frac{1}{\kappa}$, then the vlaue of $x^3+8y^3+z^3$ is equal to (where, $Tr(A), I \text{ and } A^T$ denote the trace of matrix A i.e. the sum of all the principal diagonal elements, the identity matrix of the same order of matrix A and the transpose of matrix A respectively)

A. 20

B. 22

C. 26

Answer: D



9. If
$$ig(1+x+x^2ig)^{25}=a_0+a_1x+a_2x^2+\ldots.+a_{50}.\,x^{50}$$

then $a_0 + a_2 + a_4 + ... + a_{50}$ is :

A. even

B. odd and the form 3n

C. odd and of the form (3n-1)

D. odd and of the form (3n+1)





10. A student has to answer 10 out of 13 questions in an examination. The number of ways in which he can answer if he must answer atleast 3 of the first five questions is 276 b. 267 c. 80 d. 1200

A. 276

B. 600

C. 840

D. 640

Answer: A



11. If $an heta = 3 an \phi$, then the maximum value of $an^2(heta - \phi)$ is



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

D. 4



12. Consider a relation R defined as aRb if 2 + ab > 0 where a, b are real numbers. Then, the relation R is

A. reflexive and symmetric

B. symmetric and transitive

C. transitive and reflexive

D. None of these

Answer: A



13. The length of the longest interval in which the function $f(x) = x^3 - 3a^2x + 4$ is decreasing is (orall a > 0)

A. a

B. 2a

C. 3a

D. 4a



14. The integral $I = \int \left(e^{(e^{\sin x} + \sin x)}\right) \cos x dx$ simpllifies to (where, c is the constant of integration)

A.
$$e^{\sin x} + c$$

 $\mathsf{B.}\,e^{\sin x + \cos x} + c$

$$\mathsf{C.}\, e^{e^{\cos x}} + c$$

$$\mathsf{D}.\,e^{e^{\sin x}}+c$$

Answer: D



15. The mean and variance of 7 observations are 7 and 22 respectively. If 5 of the observations are 2, 4, 10, 12, 14, then the remaining 2 observations are

A. 4, 3

B. 2, 5

C. 6, 1

D. 4, 2

Answer: C

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16. The maximum area (in sq. units) bounded by $y=\sin x, y=ax(\, orall a\in [1,4])$ and then line $\pi-2x=0$ is

A.
$$\pi^2$$

B. $rac{\pi^2}{2}-1$

$$\mathsf{C}.\,\pi+2$$

D.
$$\pi^2-4$$



17. If z_1, z_2, z_3 are 3 distinct complex such that

$$rac{3}{|z_1-z_2|}=rac{5}{|z_2-z_3|}=rac{7}{|z_3-z_1|},$$
 then the value of $rac{9ar{z}_3}{z_1-z_2}+rac{25ar{z}_1}{z_2-z_3}+rac{49ar{z}_2}{z_3-z_1}$ is equal to

A. 0

B. 1

C. -1

D. 15

Answer: A



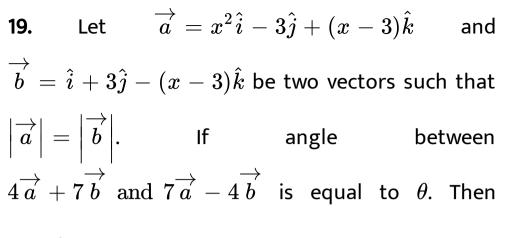
18. The line 2x + y = 3 cuts the ellipse $4x^2 + y^2 = 5$ at points P and Q. If θ is the acute angle between the normals at P and Q, then θ is equal to

A.
$$\tan^{-1}\left(\frac{4}{5}\right)$$

B. $\sin^{-1}\left(\frac{3}{\sqrt{34}}\right)$
C. $\cos^{-1}\left(\frac{3}{\sqrt{34}}\right)$
D. $\cot^{-1}\left(\frac{3}{4}\right)$

Answer: C

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 $\cos 2 heta$ is equal to

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

B. $\frac{\sqrt{3}}{2}$
C. -1
D. $\frac{1}{5}$

Answer: C

20. Let D is a point on the line $l_1: x + y - 2 = 0$, S(3, 3) is a fixed point and line l_2 is the perpendicular to DS and passing through S. If MK is another point on the line l_1 (other than D), then the locus of the point of intersection of l_2 and angle bisector of the angle MDS is a conic whose length of latus rectus rectum is equal to

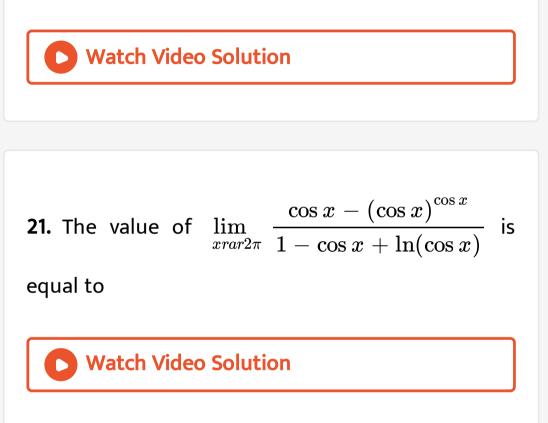
A.
$$4\sqrt{2}$$

B. 4

C. 8

D. $2\sqrt{2}$

Answer: A



22. Let A be a non - singular matrix of order 3 such that $Aadj(3A)=5AA^T$, then $\sqrt[3]{|A^{-1}|}$ is equal to

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23. If
$$f(n+1) = \frac{2f(n)+1}{2}$$
 for $n = 1, 2, 3...$ and $f(1) = 2$, then $\frac{f(101)}{10}$

is equal to

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24. If the integral
$$I=\int_0^{19\pi} {dx\over 1+e^{\cos^3 x}}$$
 has the value, ${k\pi\over 2},$ then ${k\over 2}$ is equal to

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25. The line $L_1 \equiv 3x - 4y + 1 = 0$ touches the circles C_1 and C_2 . Centers of C_1 and C_2 are $A_1(1, 2)$ and $A_2(3, 1)$ respectively Then, the length (in units) of the transverse common tangent of C_1 and C_2 is equal to

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