



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 85

Mathematics

1. The area (in sq. units) of the locus of the point at which the two circles $x^2 + y^2 = 1$ and $(x - 4)^2 + y^2 = 4$ subtend equal angles is

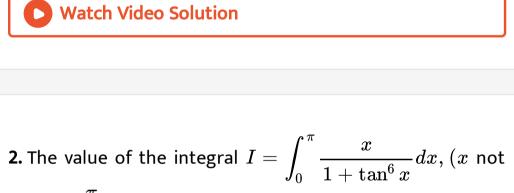
A. $(32/9)\pi$

B. $(32/3)\pi$

C. $(64/3)\pi$

D. $(64/9)\pi$

Answer: D



equal to $\frac{\pi}{2}$) is equal to

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

B. $\frac{\pi^2}{4}$
C. $\frac{\pi}{4}$
D. $\frac{\pi^2}{2}$

Answer: B

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3. Let form a point A(h, k) chords of contact are drawn to the ellipse $x^2 + 2y^2 = 6$ where all these chords touch the ellipse $x^2 + 4y^2 = 4$. Then, the perimeter (in units) of the locus of point A is

A. 2π

B. 3π

C. 4π

D. 6π

Answer: D

4. If the origin and the non - real roots of the equation $3z^2 + 3z + \lambda = 0$, $\forall \lambda \in R$ are the vertices of an equilateral triangle in the argand plane, then $\sqrt{3}$ times the length of the triangle is

A. 2 units

B.1 units

C. 3 units

D. 4 units

Answer: B

5. The area bounded by $y=rac{1}{x} \; ext{and} \; y=rac{1}{2x-1}$ from x = 1

to x = 2 is ln (a) sq. units, then $3a^2$ is equal to

A. $\frac{1}{2}$ B. 4 C. 1 D. $\frac{1}{4}$

Answer: B



6. The point of intersection of the tangent to the parabola $y^2 = 4x$ which also touches $x^2 + y^2 = rac{1}{2}$ is

A.
$$(-1, 0)$$

B. $\left(-\frac{1}{2}, 0\right)$
C. $(-2, 0)$
D. $\left(\frac{-3}{2}, 0\right)$

Answer: A



7. The solution of the differential equation
$$rac{dy}{dx} = rac{x-y}{x-3y}$$

is (where, c is an arbitrary constant)

A.
$$2xy = x^2 + 3y + c$$

$$\mathsf{B.}\, xy = x^2 + y^2 + c$$

C.
$$2xy = x^2 + 3y^2 + c$$

D.
$$xy = x^2 + x$$

Answer: C

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8. The integral
$$I=\int \Bigl[xe^{x^2}ig(\sin x^2+\cos x^2ig)\Bigr]dx=f(x)+c$$
, (where, c is

the constant of integration). Then, f(x) can be

A.
$$e^x \sin(x^2)$$

B. $e^{x^2} \sin(x)$
C. $e^{x^2} \left(\frac{x^2}{2}\right)$
D. $\frac{1}{2} e^{x^2} \sin(x^2)$

Answer: D



9. If \overrightarrow{a} and \overrightarrow{b} are unit vectors making an angle α with each other, such that $\alpha \in (0, \pi)$ and $\left|\overrightarrow{a} + 2\overrightarrow{b}\right| < 5$, then α lies in the interval

A.
$$(0, \pi)$$

B. $\left(0, \frac{\pi}{2}\right)$
C. $\left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$
D. $\left(\frac{\pi}{6}, \frac{5\pi}{6}\right)$

Answer: A

10. If A and B are two matrices of order 3 imes 3 satisfying AB = A and BA = B, then $(A + B)^5$ is equal to

A. 5(A + B)

 $\mathsf{B.}\,5I$

C. 16(A + B)

D. 32I

Answer: D

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11. Consider the line $L: \frac{x-1}{2} = \frac{y-1}{-3} = \frac{z+10}{8}$ and a family of planes P containing the line L. The member of the

family of planes P which is situated at a maximum distance from A(1,0,0) will be

A.
$$x - 2y - z = 13$$

B. $x + 2y - z = 7$
C. $2x + y - z = 7$

D.
$$x + 2y - 2z = 13$$

Answer: A



12. A purse contains three 10 paise, three 50 paise and ten 1 rupee coins. If three coins are selected at random, then the probability that the total amount is 2 rupee is

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

B. $\frac{3}{56}$
C. $\frac{1}{4}$
D. $\frac{1}{8}$

Answer: B



13. The number of solutions to x+y+z=10, where

 $1 \leq x,y,z \leq 6$ and $x,y,z \in N$, is equal to

A. 35

B. 36

C. 27

D. 66

Answer: C

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14. The number of values of the parameter $lpha \in [0,2\pi]$ for

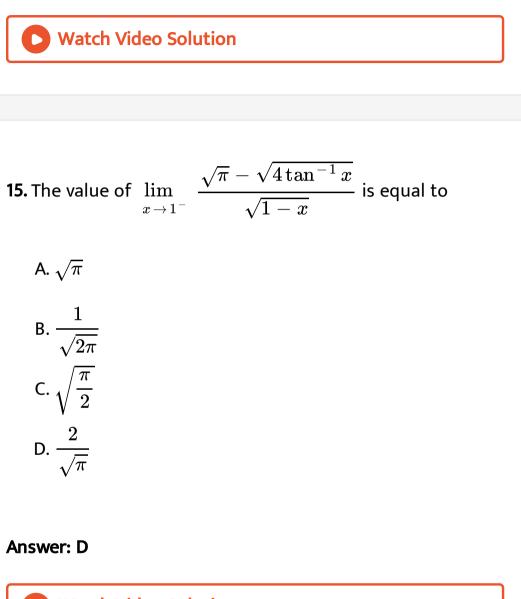
which the quadratic function $(\sin \alpha)x^2 + (2\cos \alpha)x + \frac{1}{2}(\cos \alpha + \sin \alpha)$ is the square of a linear function is

A. 2

B. 4

C. 6

Answer: B



16. Three positive acute angles α, β and γ satisfy the relation

 $\tan. \frac{\beta}{2} = \frac{1}{3} \text{cot.} \frac{\alpha}{2} \text{ and } \text{ cot.} \frac{\gamma}{2} = \frac{1}{2} \left(3 \tan. \frac{\alpha}{2} + \text{cot.} \frac{\alpha}{2} \right)$

. Then, the value of $lpha+eta+\gamma$ is equal to

Α. π

 $\mathsf{B.}\,2\pi$

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

D. $\frac{3\pi}{2}$

Answer: A



17. If $p,q,r,s\in R$, then equaton $ig(x^2+px+3qig)ig(-x^2+rx+qig)ig(-x^2+sx-2qig)=0$ has

A. 6 real roots

B. at least two real roots

C. 2 real and 4 imaginary roots

D. 4 real and 2 imaginary roots

Answer: B



18. Let
$$f: R \to R$$
 be a function defined as $f(x) = \begin{cases} 5 & \text{if } x \leq 1 \\ a + bx & \text{if } 1 < x < 3 \\ b + 5x & \text{if } 3 \leq x < 3 \\ 30 & \text{if } x \geq 5 \end{cases}$ Then f is :

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19. If $S_n = n^2 a + rac{n}{4}(n-1)d$ is the sum of the first n terms of an arithmetic progression, then the common difference is

A.
$$a + 2d$$

B. $2a + d$
C. $\frac{a+d}{2}$
D. $2a + \frac{d}{2}$

Answer: D



20. Which of the statements is not a fallacy?

A.
$$p \wedge (\operatorname{\hspace{0.3mm}\text{\circle*{-}}}(\operatorname{\hspace{0.3mm}\text{\circle*{-}}} p \Rightarrow \operatorname{\hspace{0.3mm}\text{\circle*{-}}} q))$$

B. ~
$$((p \land ~q) \Rightarrow p)$$

C. ~
$$(p \Rightarrow (p \lor ~q))$$

D. ~
$$p \lor (~p \Rightarrow ~q)$$

Answer: D

21. The product of all the values of $|\lambda|$, such that the lines

x+2y-3=0, 3x-y-1=0 and $\lambda x+y-2=0$

cannot form a triangle, is equal to

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22. Let
$$f(x) = 2\tan^3 x - 6\tan^2 x + 1 + sgn(e^x), \ \forall x \in \left[-\frac{\pi}{4}, \frac{\pi}{4}\right]$$
. Then the positive difference between the least value and the local maximum value of the function is (where sgn (f(x)) represents the signum function)

23. Let $|A|=ig|a_{ij}ig|_{3 imes3}
eq 0$ Each element a_{ij} is multiplied by by k^{i-j} Let |B| the resulting determinant, where $k_1|A|+k_2|B|=a$ then $k_1+k_2=$

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24. If

$$(1+x)^n = C_0 + C_1 x + C_2 x^2 + \dots + C_n x^n \, \forall n \in N$$

and
 $\frac{C_0^2}{1} + \frac{C_1^2}{2} + \frac{C_2^2}{3} + \dots + \frac{C_n^2}{n+1} = \frac{\lambda(2n+1)!}{((n+1)!)^2},$

then the vlaue of λ is equal to

25. The tops of two poles of height 40 m and 25 m are connected by a wire of length $\frac{30\sqrt{2}}{\left(\sqrt{3}-1\right)}m$. If the wire

makes an angle α with the horizontal, then the value of

 $\sqrt{2}\sinlpha$ is equal to $\left(ake, \ \sqrt{3}=1.7
ight)$