



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 94

Mathematics

1. Consider the cubic $f(x) = x^3 - 3x + a$ where $a \in (0,2).$ Then, the equation f(x) = 0 has

- A. 3 real solutions
- B. 2 real solutions
- C. 1 real solutions
- D. no real solutions

Answer: A

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2. The integral
$$I = \int \frac{\sin^3 \theta \cos \theta}{\left(1 + \sin^2 \theta\right)^2} d\theta$$

simplifies to (where, c is the constant of

integration)

$$\begin{aligned} &\mathsf{A}.\,\frac{1}{2}\mathrm{ln}(\sin\theta) + \frac{1}{1+\sin^2\theta} + c \\ &\mathsf{B}.\,\frac{1}{2}\mathrm{ln}\big(1+\sin^2\theta\big) + \frac{1}{1+\sin^2\theta} + c \\ &\mathsf{C}.\,\mathrm{ln}(\sin\theta) + \frac{1}{1+\sin^2\theta} + c \\ &\mathsf{D}.\,\mathrm{ln}\big(\sin^2\theta + 1\big) + \frac{1}{\sin^2\theta + 2} + c \end{aligned}$$

Answer: B



3. For how many values of 'x' in the closed

interval $\begin{bmatrix} -4, -1 \end{bmatrix}$ is the matrix $\begin{bmatrix} 3 & -1+x & 2 \\ 3 & -1 & x+2 \\ x+3 & -1 & 2 \end{bmatrix}$ singular ?

A. 1

B. 3

C. 4

D. 5

Answer: A

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4. Consider the function $f(x) = \cos^{-1}([2^x]) + \sin^{-1}([2^x] - 1)$, then (where [.] represents the greatest integer part function)

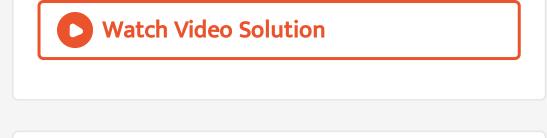
A. the domain of f(x) is $x \in (-\infty, 0]$

B. the range of f(x) is singleton

C. f(x) is an even function

D. f(x) is an odd function

Answer: B



- 5. Consider three statements
- p : person 'A' passed in mathematics exam
- q : Person 'A' passed in physics exam
- r : Person 'A' passed in chemistry exam,

Then the statement

 $-\left(\left(\ - (p \Rightarrow q)
ight) \Rightarrow r
ight)$ is equivalent to

A. Person A passed only in mathematics among mathematics, physics and chemistry. B. Person B failed only in physics among

mathematics, physcis and chemistry.

C. Person A passed in all the three subjects

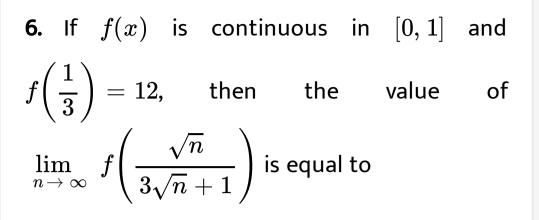
mathematics and physics and chemistry.

D. Person A passed in chemistry but failed

in mathematics and physics.

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A. 2

B. 3

C. 12

D. None of these

Answer: C



7. For
$$x \in \left(rac{-\pi}{2}, rac{\pi}{2}
ight)$$
, the range of values of

of

values

 $f(x)=2+\sin x+\sin^3 x+\sin^5 x.\ldots\infty$

A. (0, 1)

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

C.
$$(-2, 2)$$

D. None of these

Answer: B



8. A biased coin is tossed 10 times. The head is 2 times more likely to appear than the tail. The probability that 2^{nd} tail and 4^{th} tail occur at 4^{th} and 10^{th} tosses respectively is

A.
$$\frac{16}{3^9}$$

B. $\frac{320}{3^{10}}$
C. $\frac{320}{3^9}$
D. $\frac{160}{3^{10}}$

Answer: C



9. If the line
$$rac{x-4}{1}=rac{y-2}{1}=rac{z-m}{2}$$
 lies in the plane $2x+ly+z=$ 7, then the value of $m+2l$ is equal to

A. 1

B. 2

 $\mathsf{C}.-1$

 $\mathsf{D.}-2$

Answer: C



10. The least positive integral value of k for

which
$$\begin{bmatrix} \cos. \frac{2\pi}{7} & -\sin. \frac{2\pi}{7} \\ \sin. \frac{2\pi}{7} & \cos. \frac{2\pi}{7} \end{bmatrix}^k = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$
 is

A. 0

B. 3

C. 7

D. 14

Answer: C



11. The solution of the differential equation $xdx + y\sin^2 xdy = ydy + x\sin^2 ydx$ is (where, c is an arbitrary constant)

A. $x \tan x = \sec y + c$

 $\mathsf{B.} x \tan y = \sec x + c$

C.

 $|x an x - \ln| ec x| = y an y - \ln| ec x| + c$

D. $x \tan x = \ln |\sec y| + c$

Answer: C

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12. There are fifty persons among whom 2 are brothers. The number of ways they can be arranged in a circle, if there is exactly one person between the two brothers, is

A. 2 imes 48!

B. 12

C. 360

 ${\sf D.7 imes8!}$

Answer: A

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13. The product of the roots of the equation whose roots are greater by unity than the equation $x^3 - 5x^2 + 6x - 3 = 0$ is equal to A. 3

B. 12

C. 15

D. 18

Answer: C

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14. The focal chord of $y^2 = 64x$ is tangent to

 $\left(x-4
ight)^2+\left(y-2
ight)^2=4$, then the square

root of the length of this focal chord is equal

to

A.
$$\frac{74}{9}$$

B. $\frac{37}{3}$
C. $\frac{74}{3}$
D. $\frac{37}{9}$

Answer: C

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15.

$$rac{(1+\cos 2x)}{\sin 2x}+3\Big(1+(\tan x) an.\ rac{x}{2}\Big) ext{sin}\ x=4$$

then the value of an x can be equal to

A. 2 B. $\frac{1}{2}$ C. 3 D. $\frac{1}{3}$

Answer: D



lf

16. Let $0 < \theta_1 < \theta_2 < \theta_3 < \dots$ denotes the positive solutions of the equation $3 + 3\cos\theta = 2\sin^2\theta$. If $\theta_3 + \theta_7 = a\pi$, where a is an integer, then the value of a is equal to

A. 6

B. 7

C. 8

D. 4

Answer: A



17. If the point $P\left(\frac{3a}{2},1\right)$ lies between the two different lines x + y = a and x + y = 2a, then the least integral value of |a| is equal to

A. 1

B. 2

C. 3

D. 4

Answer: C





18. 50th term of the sequence 3 + 12 + 25 + 42 + is 5145 b. 5148 c. 5142 d. 5195

A. 5145

B. 5148

C. 5142

D. 5195

Answer: B

19. A hyperbola having the transverse axis of length $\sqrt{2}$ units has the same focii as that of ellipse $3x^2 + 4y^2 = 12$, then its equation is

A.
$$2x^2-2y^2=1$$

$$\mathsf{B}.\,2x^2-2y^2=3$$

$${\sf C}.\,x^2-y^2=\,-\,2$$

D.
$$x^2-y^2=2$$

Answer: A

20. An insect starts from the origin in the argand plane and goes 4 km $(N45^{\circ}E)$ then it moves 3 km $(N45^{\circ}W)$ and then takes an angular movement of $\frac{\pi}{3}$ about origin in the anticlockwise direction. The final position of the insect is

A.
$$(4-3i)e^{rac{-5\pi}{6}}$$

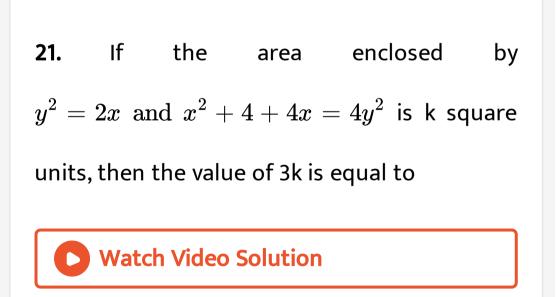
B.
$$(4+3i)e^{rac{-5\pi}{6}}$$

C.
$$(4-3i)e^{rac{i3\pi}{4}}$$

D.
$$(4+3i)e^{rac{-7\pi}{12}}$$

Answer: D





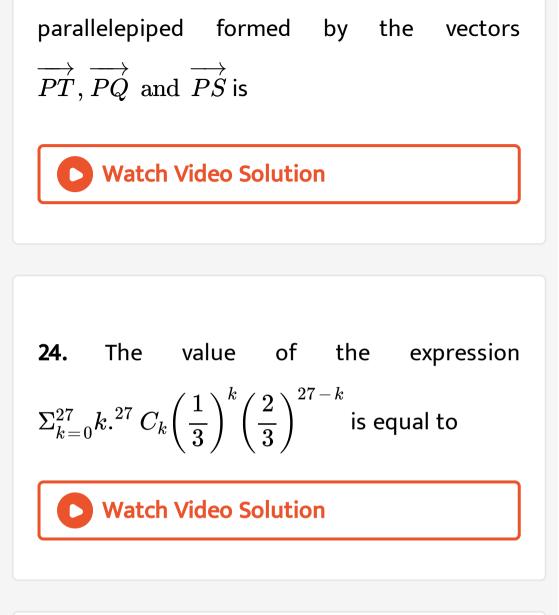
22. If $\lim_{x
ightarrow 0}\left(1+px+qx^2
ight)^{\mathrm{cosec}\ x}=2048,$ then the value of $rac{p}{11}$ is equal to (take $\ln 2=0.69$)

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$$\overrightarrow{PR} = 3\hat{i} + \hat{j} - 2\hat{k}$$
 and $\overrightarrow{SQ} = \hat{i} - 3\hat{j} - 4\hat{k}$
represent the diagonals of the parallelogram
PQRS. If $\overrightarrow{PT} = 2\hat{i} - \hat{j} + \hat{k}$ is another vector,
then the volume (in cubic units) of the

I ot



25. Let P and Q be 2 circles externally touhing each other at point X. Line segment AB is a

direct common tangent to circle P and Q at points A and B respectively. Another common tangent to P and Q at X intersects line AB at a point Y. If BY = 10 units and the radius of P is 9 units, then the value of the reciprocal of the radius of the radius of the circle Q is equal to

