



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 44

Mathematics

1. If α, β and γ are the roots of the equation $x^3 + x + 2 = 0$, then the equation whose roots are $(\alpha - \beta)(\alpha - \gamma), (\beta - \gamma)(\beta - \gamma)$ and $(\gamma - \alpha)(\gamma - \alpha)$ is A. $x^3 - 6x^2 + 216 = 0$

B.
$$x^3 - 3x^2 + 112 = 0$$

$$\mathsf{C.}\,x^3 + 6x^2 - 216 = 0$$

D.
$$x^3 + 3x^2 - 112 = 0$$

Answer: D

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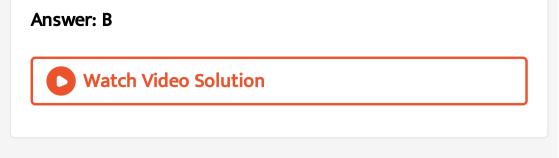
2. (A) Number of values of a for which the common chord of the circles $x^2 + y^2 = 8$ and $(x - a)^2 + y^2 = 8$ subtends a right angle at the origin is

A. 0

B. 2

C. 5

D. 3



3. If λ is the remainder when 2^{2021} is divided by 17, then the value of λ must be equal to

A. 3

B. 7

C. 13

D. 15



4. Number of ways in which 5 boys and 4 girls can be arranged on a circular table such that no two girls sit together and two particular boys are always together: (A) 276 (B) 288 (C) 296 (D) 304

A. 288

B.44

C. 720

D. 540

Answer: A



5. Let $f(n, x) = \int n \cos(nx) dx$, with f(n, 0) = 0. If the expression $\sum_{x=1}^{89} f(1, x)$ simplifies to $\frac{\sin a \sin b}{\sin c}$, then the value of $\frac{b}{ac}$ is (where a > b)

A. 45

B. 89

C.
$$\frac{89}{45}$$

89

Answer: C

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6. Consider
$$A=\int_{0}^{rac{\pi}{4}}rac{\sin(2x)}{x}dx,$$
 then

A.
$$A > rac{\pi}{2}$$

B. $A = rac{\pi}{2}$
C. $A < rac{\pi}{2}$
D. $A > \pi$

Answer: C



7. The locus of the mid - points of the chords of the hyperbola $3x^2 - 2y^2 + 4x - 6y = 0$ which are parallel to the line y = 2x + 4 is

A.
$$3x - 2y = 4$$

 $\mathsf{B.}\,4x-4y=3$

C.
$$3y - 4x + 4 = 0$$

D.
$$3x - 4y = 2$$

Answer: A

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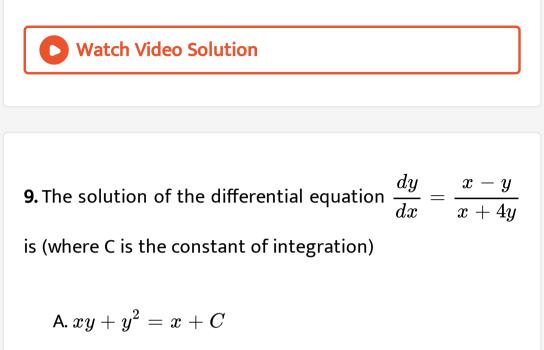
8. The difference between the maximum and minimum values of the function $f(x)=\sin^3x-3\sin x,\ orall x\in\left[0,rac{\pi}{6}
ight]$ is

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

C. $\frac{11}{8}$
D. $\frac{7}{6}$

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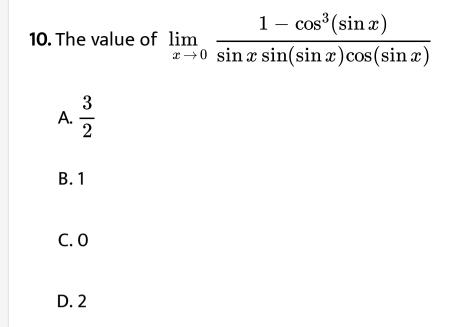
Answer: C



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

D.
$$2xy+4y^2=x^2+C$$





Answer: A



11. Let the normals at points $A(4a,\,-4a)$ and $B(9a,\,-6a)$ on the parabola $y^2=4ax$ meet at the point

P. The equation of the nornal from P on $y^2 = 4ax$ (other than PA and PB) is

A.
$$5x + y - 135a = 0$$

B.
$$5x - y + 115a = 0$$

$$\mathsf{C.}\,5x + y + 115 = 0$$

D.
$$5x-y-115a=0$$

Answer: A

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12. The number of real solution(s) of the equation $\sin^{-1}\sqrt{x^2-5x+5}+\cos^{-1}\sqrt{4x-x^2-3}=\pi$ is/are

B. two

C. zero

D. infinite

Answer: A

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13. ABC is an acute angled triangle with circumcenter O and orthocentre H. If AO=AH, then find the angle A.

A. $30^{\,\circ}$

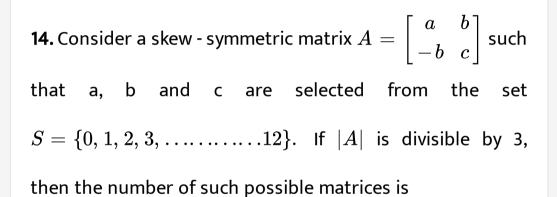
B. 60°

C. 75°

D. 90°

Answer: B





A. 4

B. 5

C. 6

D. 12

Answer: B



15. Let
$$A = |a_{ij}|$$
 be a 3×3 matrix where
 $a_{ij} = \begin{cases} (i^j - j^i + 2ij)x & i < j \\ 1 & i > j, , \end{cases}$ then the minimum $i = j$

value of $\left|A\right|$ is equal to (where x is a real number)

A.
$$\frac{1}{4}$$

B. $-\frac{8}{33}$
C. 7
D. $-\frac{4}{33}$



16. Consider on experiment of a single throw of a pair of unbiased normal dice. Let three events ε_1 , ε_2 and ε_3 are defined as follows ε_1 : getting prime numbered face on each dice

 ε_2 : getting the same number on each dice

 ε_3 : getting the sum of 4 on two dice which of the following is not true?

A. The probabilities $P(\varepsilon_1), P(\varepsilon_2), P(\varepsilon_3)$ are arithmetic

progression.

B. The events εg_1 and ε_2 are dependent

C.
$$P\!\left(rac{arepsilon_3}{arepsilon_1}
ight) = rac{2}{9}$$

D.
$$P\!\left(rac{arepsilon_3}{arepsilon_1}
ight) = rac{1}{9}$$

Answer: C



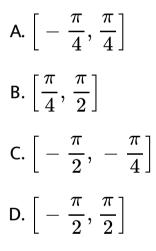
17. Which of the following statements is false when p is true and q is false?

A.
$$(p \Rightarrow q) \Leftrightarrow r$$

- $\texttt{B.}\,(\,\Leftrightarrow q) \Rightarrow r$
- $\mathsf{C.}\left(q \Rightarrow r
 ight) \Rightarrow p$
- $\mathsf{D}.\,(r \Rightarrow p) \Rightarrow q$



18. For a comple number Z, if |Z - 1 + i| + |Z + i| = 1, then the range of the principle argument of Z is (where principle arg $(Z) \in (-\pi, \pi]$)



Answer: C

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19. Let $f: A \to B$ is a function defined by $f(x) = \frac{2x}{1+x^2}$. If the function f(x) is a bijective function, than the correct statement can be

A.
$$A = B = [-1, 1]$$

B. $A = B = [-2, 2]$
C. $A = [-1, 1], B = [-2, 2]$
D. $A = [-2, 2], B = [-1, 1]$

Answer: A



20. Two data sets each of size 10 has the variance as 4 and k and the corresponding means as 2 and 4 respectively. If

the variance of the combined data set is 5.5, then the value

of k is equal to

A. 5 B. 6 C. 4

D. 3

Answer: A



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$$S = 1(25) + 2(24) + 3(23) + \dots + 24(2) + 25(1)$$

then the value of
$$\frac{S}{900}$$
 is equal to

22. The area (in sq. units) bounded by the curve $f(x) = \max \left(|x| - 1, 1 - |x| \right)$ with the x- axis from x = -1 to x = 1 is

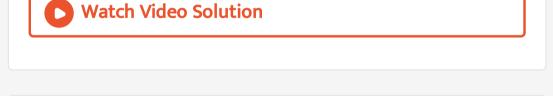
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23. Let
$$f(x) = an^{-1} igg(rac{x^3-1}{x^2+x} igg)$$
, then the value of

17f'(2) is equal to

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24. Let P(1, 2, 3) be a point in space and Q be a point on the line $\frac{x-1}{2} = \frac{y-3}{5} = \frac{z-1}{3}$ such that PQ is parallel to 5x - 4y + 3z = 1. If the length of PQ is equal to k units, then the value of k^2 is equal to



25. Let the lengths of the altitudes from the vertices A(-1,1), B(5,2), C(3, -1) of ΔABC are p_1, p_2, p_3 units respectively then the value of $\frac{\left(\frac{1}{p_1}\right)^2 + \left(\frac{1}{p_3}\right)^2}{\left(\frac{1}{p_2}\right)^2}$ is

equal to

