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NDA 2 2022

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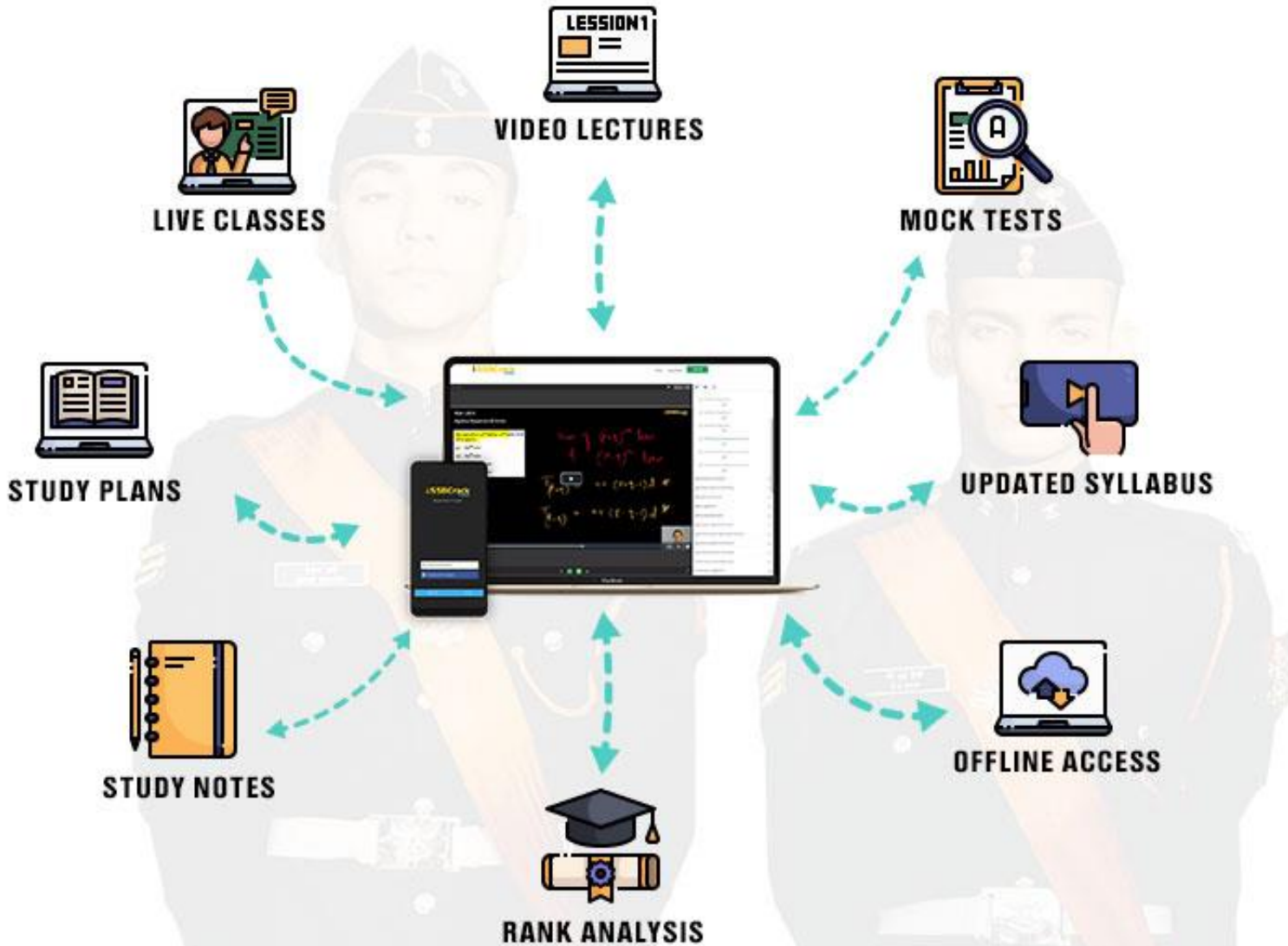

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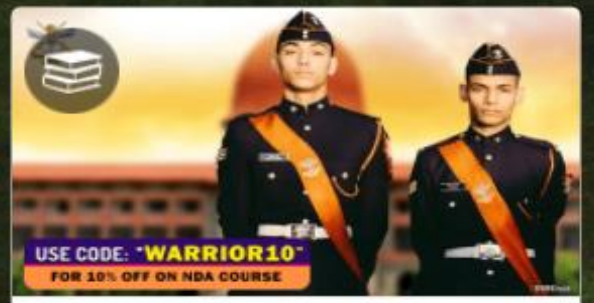

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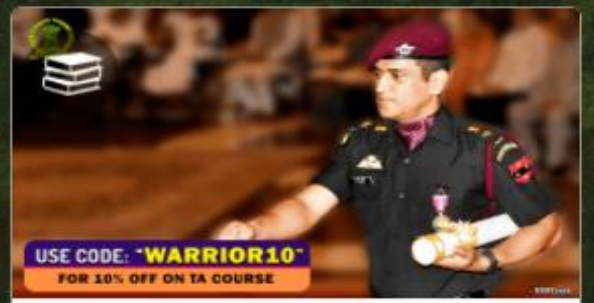

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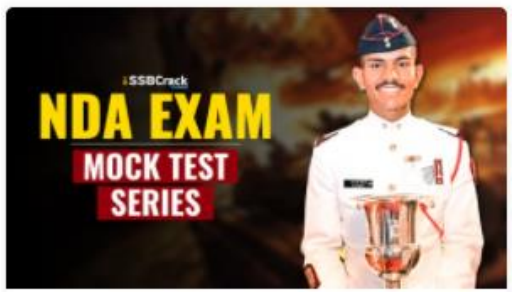

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NDA 2 2022

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TIME TABLE

DATE	TIME	SUBJECT
23 AUG 2022	6 PM TO 9 PM	Geography
29 AUG 2022	10 AM TO 1 PM	History
31 AUG 2022	10 AM TO 1 PM	Polity
31 AUG 2022	2 PM TO 5 PM	English Part 1
31 AUG 2022	6 PM TO 9 PM	Maths Part 1
01 SEP 2022	2 PM TO 5 PM	English Part 2
01 SEP 2022	6 PM to 9 PM	Maths Part 2
02 SEP 2022	10 AM TO 1 PM	Physics
02 SEP 2022	2 PM TO 5 PM	Maths Part 3
02 SEP 2022	6 PM TO 9 PM	Chemistry & Biology
03 SEP 2022	10 AM TO 1 PM	Current Affairs
03 SEP 2022	2 PM TO 5 PM	Defence Affairs

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Q) The value of

$$\sin^{-1}\left(\frac{3}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right) \text{ is equal to}$$

(a) 0

(b) $\frac{\pi}{4}$

(c) $\frac{\pi}{3}$

(d) $\frac{\pi}{2}$

Q) The value of

$$\sin^{-1}\left(\frac{3}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right) \text{ is equal to}$$

(a) 0

(b) $\frac{\pi}{4}$

(c) $\frac{\pi}{3}$

(d) $\frac{\pi}{2}$

Ans: (b)

Q) A committee of two persons is constituted from two men and two women. What is the probability that the committee will have only women?

(a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{3}$

Q) A committee of two persons is constituted from two men and two women. What is the probability that the committee will have only women?

(a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{3}$

Ans: (a)

Q) What is the value of the determinant

$$\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+xyz & 1 \\ 1 & 1 & 1+xyz \end{vmatrix} ?$$

(a) $1 + x + y + z$

(b) $2xyz$

(c) $x^2y^2z^2$

(d) $2x^2y^2z^2$

Q) What is the value of the determinant

$$\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+xyz & 1 \\ 1 & 1 & 1+xyz \end{vmatrix} ?$$

(a) $1 + x + y + z$

(b) $2xyz$

(c) $x^2y^2z^2$

(d) $2x^2y^2z^2$

Ans: (c)

Q) What is the sum of the series

$0.3 + 0.33 + 0.333 + \ldots n$ terms?

(a) $\frac{1}{3}\left[n - \frac{1}{9}\left(1 - \frac{1}{10^n}\right)\right]$

(b) $\frac{1}{3}\left[n - \frac{2}{9}\left(1 - \frac{1}{10^n}\right)\right]$

(c) $\frac{1}{3}\left[n - \frac{1}{3}\left(1 - \frac{1}{10^n}\right)\right]$

(d) $\frac{1}{3}\left[n - \frac{1}{9}\left(1 + \frac{1}{10^n}\right)\right]$

Q) What is the sum of the series

$0.3 + 0.33 + 0.333 + \ldots n$ terms?

(a) $\frac{1}{3}\left[n - \frac{1}{9}\left(1 - \frac{1}{10^n}\right)\right]$

(b) $\frac{1}{3}\left[n - \frac{2}{9}\left(1 - \frac{1}{10^n}\right)\right]$

(c) $\frac{1}{3}\left[n - \frac{1}{3}\left(1 - \frac{1}{10^n}\right)\right]$

(d) $\frac{1}{3}\left[n - \frac{1}{9}\left(1 + \frac{1}{10^n}\right)\right]$

Ans: (a)

Q) A straight line passes through the point of intersection of $x + 2y + 2 = 0$ and $2x - 3y - 3 = 0$. It cuts equal intercepts in the fourth quadrant. What is the sum of the absolute values of the intercepts ?

(a) 2

(b) 3

(c) 4

(d) 6

Q) A straight line passes through the point of intersection of $x + 2y + 2 = 0$ and $2x - 3y - 3 = 0$. It cuts equal intercepts in the fourth quadrant. What is the sum of the absolute values of the intercepts ?

(a) 2

(b) 3

(c) 4

(d) 6

Ans: (a)

Q) A question is given to three students A, B and C whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively. What is the probability that the question will be solved?

(a) $\frac{1}{24}$ (b) $\frac{1}{4}$ (c) $\frac{3}{4}$ (d) $\frac{23}{24}$

Q) A question is given to three students A, B and C whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively. What is the probability that the question will be solved?

(a) $\frac{1}{24}$ (b) $\frac{1}{4}$ (c) $\frac{3}{4}$ (d) $\frac{23}{24}$

Ans: (c)

Q) If $\tan^{-1}\left(\frac{1}{2}\right)+\tan^{-1}\left(\frac{x}{3}\right)=\frac{\pi}{4}$, where $0<x<6$, then what is x equal to ?

(a) 1

(b) 2

(c) 3

(d) 5

Q) If $\tan^{-1}\left(\frac{1}{2}\right)+\tan^{-1}\left(\frac{x}{3}\right)=\frac{\pi}{4}$, where $0<x<6$, then what is x equal to ?

(a) 1

(b) 2

(c) 3

(d) 5

Ans: (a)

Q) If $\tan\theta = -\frac{5}{12}$, then what can be the value of $\sin\theta$?

(a) $\frac{5}{13}$ but cannot be $-\frac{5}{13}$

(b) $-\frac{5}{13}$ but cannot be $\frac{5}{13}$

(c) $\frac{5}{13}$ or $-\frac{5}{13}$

(d) None of the above

Q) If $\tan\theta = -\frac{5}{12}$, then what can be the value of $\sin\theta$?

(a) $\frac{5}{13}$ but cannot be $-\frac{5}{13}$

(b) $-\frac{5}{13}$ but cannot be $\frac{5}{13}$

(c) $\frac{5}{13}$ or $-\frac{5}{13}$

(d) None of the above

Ans: (c)

Q) If B is a non-singular matrix and A is a square matrix, then the value of $\det(B^{-1}AB)$ is equal to

(a) $\det(B)$ (b) $\det(A)$ (c) $\det(B^{-1})$ (d) $\det(A^{-1})$

Q) If B is a non-singular matrix and A is a square matrix, then the value of $\det(B^{-1}AB)$ is equal to

(a) $\det(B)$ (b) $\det(A)$ (c) $\det(B^{-1})$ (d) $\det(A^{-1})$

Ans: (b)

Q) What are the degree and order respectively of the differential equation $y = x\left(\frac{dy}{dx}\right)^2 + \left(\frac{dx}{dy}\right)^2$?

(a) 1, 2 (b) 2, 1 (c) 1, 4 (d) 4, 1

Q) What are the degree and order respectively of the differential equation $y = x\left(\frac{dy}{dx}\right)^2 + \left(\frac{dx}{dy}\right)^2$?

(a) 1, 2 (b) 2, 1 (c) 1, 4 (d) 4, 1

Ans: (d)

Q) Under which one of the following conditions are the lines $ax + by + c = 0$ and $bx + ay + c = 0$ parallel $(a \neq 0, b \neq 0)$?

(a) $a - b = 0$ only

(b) $a + b = 0$ only

(c) $a^2 - b^2 = 0$

(d) $ab + 1 = 0$

Q) Under which one of the following conditions are the lines $ax + by + c = 0$ and $bx + ay + c = 0$ parallel $(a \neq 0, b \neq 0)$?

(a) $a - b = 0$ only

(b) $a + b = 0$ only

(c) $a^2 - b^2 = 0$

(d) $ab + 1 = 0$

Ans: (c)

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Q) The fifth term of an AP of n terms, whose sum is $n^2 - 2n$, is

(a) 5 (b) 7 (c) 8 (d) 15

Q) The fifth term of an AP of n terms, whose sum is $n^2 - 2n$, is

(a) 5 (b) 7 (c) 8 (d) 15

Ans: (b)

Q) For two dependent events A and B, it is given that $P(A) = 0.2$ and $P(B) = 0.5$. If $A \subseteq B$. Then the values of conditional probabilities $P(A|B)$ and $P(B|A)$ are respectively

(a) $\frac{2}{5}, \frac{3}{5}$

(b) $\frac{2}{5}, 1$

(c) $1, \frac{2}{5}$

(d) Information is insufficient

Q) For two dependent events A and B, it is given that $P(A) = 0.2$ and $P(B) = 0.5$. If $A \subseteq B$. Then the values of conditional probabilities $P(A|B)$ and $P(B|A)$ are respectively

(a) $\frac{2}{5}, \frac{3}{5}$

(b) $\frac{2}{5}, 1$

(c) $1, \frac{2}{5}$

(d) Information is insufficient

Ans: (b)

Q) In how many ways can a team of 5 players be selected out of 9 players so as to exclude two particular players ?

(a) 14

(b) 21

(c) 35

(d) 42

Q) In how many ways can a team of 5 players be selected out of 9 players so as to exclude two particular players ?

(a) 14

(b) 21

(c) 35

(d) 42

Ans: (b)

NDA 2 2022 – Mathematics - Part 1

Q) If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then the value of A^4 is

(a) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

Q) If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then the value of A^4 is

(a) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

Ans: (a)

Q) If $3\sin^{-1}x + \cos^{-1}x = \pi$, then what is x equal to ?

(a) 0

(b) $\frac{1}{2}$

(c) $\frac{1}{\sqrt{2}}$

(d) $\frac{1}{\sqrt{3}}$

Q) If $3\sin^{-1}x + \cos^{-1}x = \pi$, then what is x equal to ?

(a) 0

(b) $\frac{1}{2}$

(c) $\frac{1}{\sqrt{2}}$

(d) $\frac{1}{\sqrt{3}}$

Ans: (c)

Q) The equation of straight line which cuts off an intercept of 5 units on negative direction of Y-axis and makes and angle $120°$ with positive direction of X-axis is

(a) $y + \sqrt{3}x + 5 = 0$

(b) $y - \sqrt{3}x + 5 = 0$

(c) $y + \sqrt{3}x - 5 = 0$

(d) $y - \sqrt{3}x - 5 = 0$

Q) The equation of straight line which cuts off an intercept of 5 units on negative direction of Y-axis and makes and angle $120°$ with positive direction of X-axis is

(a) $y + \sqrt{3}x + 5 = 0$

(b) $y - \sqrt{3}x + 5 = 0$

(c) $y + \sqrt{3}x - 5 = 0$

(d) $y - \sqrt{3}x - 5 = 0$

Ans: (a)

Q) What is $\lim_{x \to 0} \frac{e^x - (1 + x)}{x^2}$ equal to?

(a) 0 (b) $\frac{1}{2}$ (c) 1 (d) 2

Q) What is $\lim_{x \to 0} \frac{e^x - (1 + x)}{x^2}$ equal to?

(a) 0 (b) $\frac{1}{2}$ (c) 1 (d) 2

Ans: (b)

Q) Three-digit numbers are formed from the digits 1, 2 and 3 in such a way that the digits are not repeated. What is the sum of such three-digit numbers?

(a) 1233 (b) 1322 (c) 1323 (d) 1332

Q) Three-digit numbers are formed from the digits 1, 2 and 3 in such a way that the digits are not repeated. What is the sum of such three-digit numbers?

(a) 1233 (b) 1322 (c) 1323 (d) 1332

Ans: (d)

Q) What is the value of

$2(2\times1)+3(3\times2\times1)+4(4\times3\times2\times1)+$
$5(5\times4\times3\times2\times1)+\ldots\ldots\ \ldots\ldots\ \ldots\ldots+$
$9(9\times8\times7\times6\times5\times4\times3\times2\times1)+2$?

(a) 11!

(b) 10!

(c) 10+10!

(d) 11+10!

Q) What is the value of

$2(2\times1)+3(3\times2\times1)+4(4\times3\times2\times1)+$
$5(5\times4\times3\times2\times1)+\ldots\ldots\ \ldots\ldots\ \ldots\ldots+$
$9(9\times8\times7\times6\times5\times4\times3\times2\times1)+2$?

(a) 11!

(b) 10!

(c) 10+10!

(d) 11+10!

Ans: (b)

Q) The position of the point $(1, 2)$ relative to the ellipse $2x^2 + 7y^2 = 20$ is

(a) outside the ellipse
(b) inside the ellipse but not at the focus
(c) on the ellipse
(d) at the focus

Q) The position of the point $(1, 2)$ relative to the ellipse $2x^2 + 7y^2 = 20$ is

(a) outside the ellipse
(b) inside the ellipse but not at the focus
(c) on the ellipse
(d) at the focus

Ans: (a)

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Q) The sum of all the two-digit odd numbers is

(a) 2475
(b) 2530
(c) 4905
(d) 5049

Q) The sum of all the two-digit odd numbers is

(a) 2475
(b) 2530
(c) 4905
(d) 5049

Ans: (a)

Q) The maximum value of $\frac{\ln x}{x}$ is

(a) e (b) $\frac{1}{e}$ (c) $\frac{2}{e}$ (d) 1

Q) The maximum value of $\frac{\ln x}{x}$ is

(a) e (b) $\frac{1}{e}$ (c) $\frac{2}{e}$ (d) 1

Ans: (b)

Q) What is the solution of the differential equation

$$\ln\left(\frac{dy}{dx}\right) - a = 0\,?$$

(a) $y = xe^a + C$

(b) $x = ye^a + C$

(c) $y = \ln x + C$

(d) $x = \ln y + C$

Q) What is the solution of the differential equation

$$\ln\left(\frac{dy}{dx}\right) - a = 0\,?$$

(a) $y = xe^a + C$

(b) $x = ye^a + C$

(c) $y = \ln x + C$

(d) $x = \ln y + C$

Ans: (a)

Q) If $1, \omega, \omega^2$ are the cube roots of unity, then $(1+\omega)(1+\omega^2)(1+\omega^3)(1+\omega+\omega^2)$ is equal to

(a) –2 (b) –1 (c) 0 (d) 2

Q) If $1, \omega, \omega^2$ are the cube roots of unity, then $(1+\omega)(1+\omega^2)(1+\omega^3)(1+\omega+\omega^2)$ is equal to

(a) –2 (b) –1 (c) 0 (d) 2

Ans: (c)

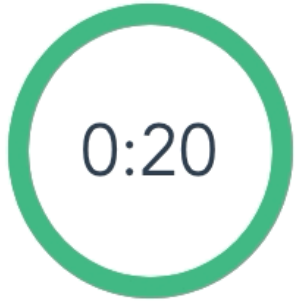
Q) Let S be the set of all persons living in Delhi. We say that x, y in S are related if they were born in Delhi on the same day. Which one of the following is correct?

(a) The relation is an equivalent relation

(b) The relation is not reflexive but it is symmetric and transitive

(c) The relation is not symmetric but it is reflexive and transitive

(d) The relation is not transitive but it is reflexive and symmetric



Q) Let S be the set of all persons living in Delhi. We say that x, y in S are related if they were born in Delhi on the same day. Which one of the following is correct?

(a) The relation is an equivalent relation

(b) The relation is not reflexive but it is symmetric and transitive

(c) The relation is not symmetric but it is reflexive and transitive

(d) The relation is not transitive but it is reflexive and symmetric

Ans: (a)

NDA 2 2022 – Mathematics - Part 1

Q) What is $\int \frac{(x^{e-1} + e^{x-1})\,dx}{x^e + e^x}$ equal to?

(a) $\frac{x^2}{2} + C$

(b) $\ln(x + e) + C$

(c) $\ln(x^e + e^x) + C$

(d) $\frac{1}{e}\ln(x^e + e^x) + C$

NDA 2 2022 – Mathematics - Part 1

Q) What is $\int \frac{(x^{e-1} + e^{x-1})\,dx}{x^e + e^x}$ equal to?

(a) $\frac{x^2}{2} + C$

(b) $\ln(x + e) + C$

(c) $\ln(x^e + e^x) + C$

(d) $\frac{1}{e}\ln(x^e + e^x) + C$

Ans: (d)

Q) What is the derivative of $\log_{10}(5x^2 + 3)$ with respect to x?

(a) $\dfrac{x\log_{10} e}{5x^2 + 3}$

(b) $\dfrac{2x\log_{10} e}{5x^2 + 3}$

(c) $\dfrac{10x\log_{10} e}{5x^2 + 3}$

(d) $\dfrac{x\log_{e} 10}{5x^2 + 3}$

Q) What is the derivative of $\log_{10}(5x^2 + 3)$ with respect to x?

(a) $\frac{x\log_{10} e}{5x^2 + 3}$

(b) $\frac{2x\log_{10} e}{5x^2 + 3}$

(c) $\frac{10x\log_{10} e}{5x^2 + 3}$

(d) $\frac{x\log_{e} 10}{5x^2 + 3}$

Ans: (c)

NDA 2 2022 – Mathematics - Part 1

Q) If $f(x) = \dfrac{4x + x^4}{1 + 4x^3}$ and $g(x) = \ln\left(\dfrac{1+x}{1-x}\right)$, then what is the value of $fg\left(\dfrac{e-1}{e+1}\right)$ equal to?

(a) 2 (b) 1 (c) 0 (d) $\frac{1}{2}$

Q) If $f(x) = \dfrac{4x + x^4}{1 + 4x^3}$ and $g(x) = \ln\left(\dfrac{1+x}{1-x}\right)$, then what is the value of $fg\left(\dfrac{e-1}{e+1}\right)$ equal to?

(a) 2 (b) 1 (c) 0 (d) $\dfrac{1}{2}$

Ans: (b)

Q) The inverse of the function $y = 5^{\ln x}$

(a) $x = y^{\frac{1}{\ln 5}}, y > 0$

(b) $x = y^{\ln 5}, y > 0$

(c) $x = y^{\frac{1}{\ln 5}}, y < 0$

(d) $x = 5 \ln y, y > 0$

Q) The inverse of the function $y = 5^{\ln x}$

(a) $x = y^{\frac{1}{\ln 5}}, y > 0$

(b) $x = y^{\ln 5}, y > 0$

(c) $x = y^{\frac{1}{\ln 5}}, y < 0$

(d) $x = 5 \ln y, y > 0$

Ans: (a)

Q) If $\vec{a} = 2\hat{i} + 3\hat{j} + 4\hat{k}$ and $\vec{a} = 3\hat{i} + 2\hat{j} - \lambda\hat{k}$ are perpendicular, then what is the value of λ?

(a) 2 (b) 3 (c) 4 (d) 5

Q) If $\vec{a} = 2\hat{i} + 3\hat{j} + 4\hat{k}$ and $\vec{a} = 3\hat{i} + 2\hat{j} - \lambda\hat{k}$ are perpendicular, then what is the value of λ?

(a) 2 (b) 3 (c) 4 (d) 5

Ans: (b)

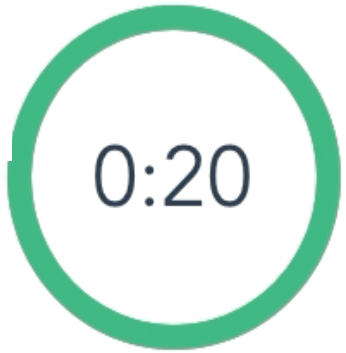
Q) What is the distance between the foci of the ellipse $x^2 + 2y^2 = 1$?

(a) 1

(b) $\sqrt{2}$

(c) 2

(d) $2\sqrt{2}$



Q) What is the distance between the foci of the ellipse $x^2 + 2y^2 = 1$?

(a) 1

(b) $\sqrt{2}$

(c) 2

(d) $2\sqrt{2}$

Ans: (b)

Q) A force $\vec{F} = \hat{i} + 3\hat{j} + 2\hat{k}$ acts on a particle to displace it from the point $A(\hat{i} + 2\hat{j} - 3\hat{k})$ to the point $B(3\hat{i} - \hat{j} + 5\hat{k})$. The work done by the force will be

(a) 5 units (b) 7 units (c) 9 units (d) 10 units

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(a) 5 units (b) 7 units (c) 9 units (d) 10 units

Ans: (c)

Q) The smallest positive integer n for which $\left(\frac{1+i}{1-i}\right)^n = 1$, is

(a) 1 (b) 4 (c) 8 (d) 16

Q) The smallest positive integer n for which $\left(\frac{1+i}{1-i}\right)^n = 1$, is

(a) 1 (b) 4 (c) 8 (d) 16

Ans: (b)

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Q) A point is chosen at random inside a circle. What is the probability that the point is closer to the centre of the circle than to its boundary?

(a) $\frac{1}{5}$ (b) $\frac{1}{4}$ (c) $\frac{1}{3}$ (d) $\frac{1}{2}$

Q) A point is chosen at random inside a circle. What is the probability that the point is closer to the centre of the circle than to its boundary?

(a) $\frac{1}{5}$ (b) $\frac{1}{4}$ (c) $\frac{1}{3}$ (d) $\frac{1}{2}$

Ans: (b)

Q) A tea party is arranged for 16 people along two sides of a long table with eight chairs on each side. Four particular men wish to sit on one particular side and two particular men on the other side. The number of ways they can be seated is

(a) $24 \times 8! \times 8!$ (b) $(8!)^3$ (c) $210 \times 8! \times 8!$ (d) $16!$

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(a) $24 \times 8! \times 8!$ (b) $(8!)^3$ (c) $210 \times 8! \times 8!$ (d) $16!$

Ans: (c)

Q) The matrix A has x rows and $x + 5$ columns. The matrix B has y rows and $11 - y$ columns. Both AB and BA exist. What are the values of x and y respectively?

(a) 8 and 3

(b) 3 and 4

(c) 3 and 8

(d) 8 and 8

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(a) 8 and 3

(b) 3 and 4

(c) 3 and 8

(d) 8 and 8

Ans: (c)

NDA 2 2022 – Mathematics - Part 1

Q) If $y = (\cos x)^{(\cos x)^{(\cos x)^{\infty}}}$, then $\frac{dy}{dx}$ is equal to

(a) $-\frac{y^2 \tan x}{1 - y \ln(\cos x)}$

(b) $\frac{y^2 \tan x}{1 + y \ln(\cos x)}$

(c) $\frac{y^2 \tan x}{1 - y \ln(\sin x)}$

(d) $\frac{y^2 \sin x}{1 + y \ln(\sin x)}$

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(c) $\frac{y^2 \tan x}{1 - y \ln(\sin x)}$

(d) $\frac{y^2 \sin x}{1 + y \ln(\sin x)}$

Ans: (a)

Q) Consider the following statements

1. $\frac{dy}{dx}$ at a point on the curve gives slope of the tangent at that point.
2. If $a(t)$ denotes acceleration of a particle, then $\int a(t)dt + c$ gives velocity of the particle.
3. If $s(t)$ gives displacement of a particle at time t, then $\frac{ds}{dt}$ gives its acceleration at that instant.

Which of the above statements is/are correct?

(a) 1 and 2 only

(b) 2 only

(c) 1 only

(d) 1, 2 and 3

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1. $\frac{dy}{dx}$ at a point on the curve gives slope of the tangent at that point.
2. If $a(t)$ denotes acceleration of a particle, then $\int a(t)dt + c$ gives velocity of the particle.
3. If $s(t)$ gives displacement of a particle at time t, then $\frac{ds}{dt}$ gives its acceleration at that instant.

Which of the above statements is/are correct?

(a) 1 and 2 only

(b) 2 only

(c) 1 only

(d) 1, 2 and 3

Ans: (a)

Q) If $\tan\alpha + \tan\beta = 1 - \tan\alpha.\tan\beta$, where $\tan\alpha.\tan\beta \neq 1$, then which of the following is one of the values of $(\alpha + \beta)$?

(a) $\frac{\pi}{6}$

(b) $\frac{\pi}{4}$

(c) $\frac{\pi}{3}$

(d) $\frac{\pi}{2}$

Q) If $\tan\alpha + \tan\beta = 1 - \tan\alpha.\tan\beta$, where $\tan\alpha.\tan\beta \neq 1$, then which of the following is one of the values of $(\alpha + \beta)$?

(a) $\frac{\pi}{6}$

(b) $\frac{\pi}{4}$

(c) $\frac{\pi}{3}$

(d) $\frac{\pi}{2}$

Ans: (b)

Q) The general solution of $\frac{dy}{dx} = \frac{ax + h}{by + k}$

represents a circle only when

(a) $a = b = 0$

(b) $a = -b \neq 0$

(c) $a = b \neq 0, h = k$

(d) $a = b \neq 0$

Q) The general solution of $\frac{dy}{dx} = \frac{ax + h}{by + k}$

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(a) $a = b = 0$

(b) $a = -b \neq 0$

(c) $a = b \neq 0, h = k$

(d) $a = b \neq 0$

Ans: (b)

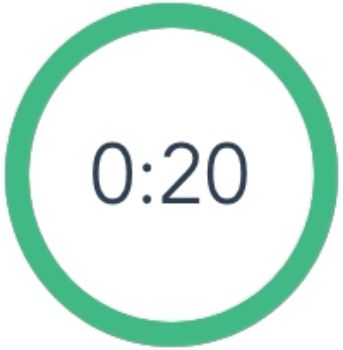
Q) $\int (\ln x)^{-1}\,dx - \int (\ln x)^{-2}\,dx$ is equal to

(a) $x(\ln x)^{-1} + C$

(b) $x(\ln x)^{-2} + C$

(c) $x(\ln x) + C$

(d) $x(\ln x)^{2} + C$



Q) $\int (\ln x)^{-1}\,dx - \int (\ln x)^{-2}\,dx$ is equal to

(a) $x(\ln x)^{-1} + C$

(b) $x(\ln x)^{-2} + C$

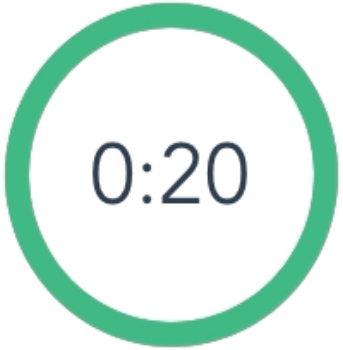
(c) $x(\ln x) + C$

(d) $x(\ln x)^{2} + C$

Ans: (a)

Q) If $y = x + x^2 + x^3 + \ldots$ up to infinite terms where $x < 1$, then which one of the following is correct?

(a) $x = \frac{y}{1+y}$ (b) $x = \frac{y}{1-y}$ (c) $x = \frac{1+y}{y}$ (d) $x = \frac{1-y}{y}$



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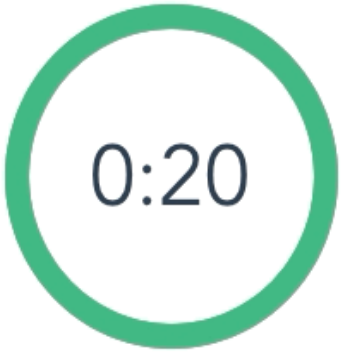
(a) $x = \frac{y}{1+y}$ (b) $x = \frac{y}{1-y}$ (c) $x = \frac{1+y}{y}$ (d) $x = \frac{1-y}{y}$

Ans: (a)

NDA 2 2022 – Mathematics - Part 1

Q) If $y = \sec^{-1}\left(\frac{x+1}{x-1}\right) + \sin^{-1}\left(\frac{x-1}{x+1}\right)$, then $\frac{dy}{dx}$ is equal to

(a) 0 (b) 1 (c) $\frac{x-1}{x+1}$ (d) $\frac{x+1}{x-1}$



NDA 2 2022 – Mathematics - Part 1

Q) If $y = \sec^{-1}\left(\frac{x+1}{x-1}\right) + \sin^{-1}\left(\frac{x-1}{x+1}\right)$, then $\frac{dy}{dx}$ is equal to

(a) 0 (b) 1 (c) $\frac{x-1}{x+1}$ (d) $\frac{x+1}{x-1}$

Ans: (a)

Q) The area of the region bounded by the parabola $y^2 = 4kx$, where $k > 0$ and its latus rectum is 24 square units. What is the value of k?

(a) 1

(b) 2

(c) 3

(d) 4

Q) The area of the region bounded by the parabola $y^2 = 4kx$, where $k > 0$ and its latus rectum is 24 square units. What is the value of k?

(a) 1

(b) 2

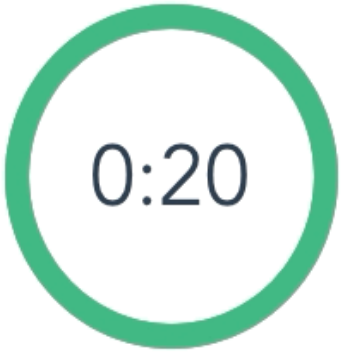
(c) 3

(d) 4

Ans: (c)

Q) For two events A and B, let $P(A) = \frac{1}{2}$, $P(A \cup B) = \frac{2}{3}$ and $P(A \cap B) = \frac{1}{6}$. What is $P(\overline{A} \cap B)$ equal to?

(a) $\frac{1}{6}$ (b) $\frac{1}{4}$ (c) $\frac{1}{3}$ (d) $\frac{1}{2}$



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Ans: (a)

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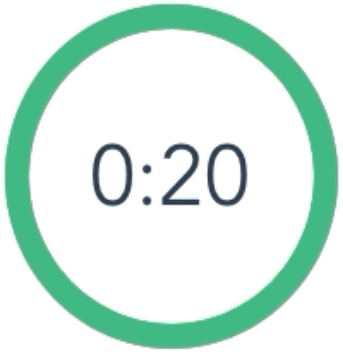
Q) The area bounded by the curve $|x| + |y| = 1$

(a) 1 square unit

(b) $2\sqrt{2}$ square units

(c) 2 square units

(d) $2\sqrt{3}$ square units



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(a) 1 square unit

(b) $2\sqrt{2}$ square units

(c) 2 square units

(d) $2\sqrt{3}$ square units

Ans: (c)

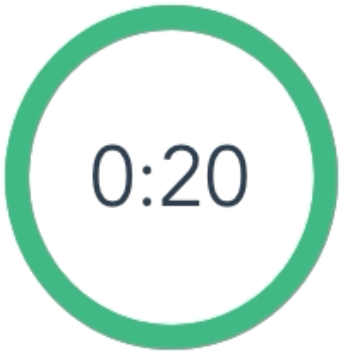
Q) What is $\int_{-2}^{-1} \frac{x}{|x|} dx$ equal to ?

(a) -2

(b) -1

(c) 1

(d) 2



Q) What is $\int_{-2}^{-1} \frac{x}{|x|} dx$ equal to ?

(a) -2

(b) -1

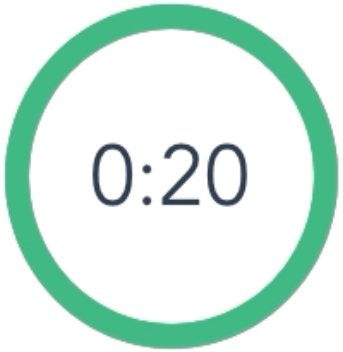
(c) 1

(d) 2

Ans: (b)

Q) The coefficient of correlation when coefficients of regression are 0.2 and 1.8 is

(a) 0.36 (b) 0.2 (c) 0.6 (d) 0.9



Q) The coefficient of correlation when coefficients of regression are 0.2 and 1.8 is

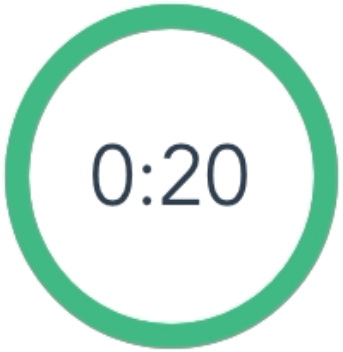
(a) 0.36 (b) 0.2 (c) 0.6 (d) 0.9

Ans: (c)

Q) The value of

$$\frac{1}{\log_3 e} + \frac{1}{\log_3 e^2} + \frac{1}{\log_3 e^4} + \ldots \text{up to infinite terms is}$$

(a) $\log_e 9$ (b) 0 (c) 1 (d) $\log_e 3$



Q) The value of

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(a) $\log_e 9$ (b) 0 (c) 1 (d) $\log_e 3$

Ans: (a)

NDA 2 2022 – Mathematics - Part 1

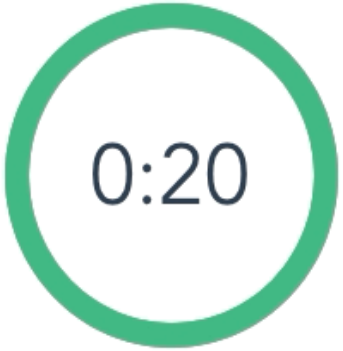
Q) If $y = \cos^{-1}\left(\frac{2x}{1+x^2}\right)$, then $\frac{dy}{dx}$ is equal to

(a) $-\frac{2}{1+x^2}$ for all $|x| < 1$

(b) $-\frac{2}{1+x^2}$ for all $|x| > 1$

(c) $\frac{2}{1+x^2}$ for all $|x| < 1$

(d) None of these



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(b) $-\frac{2}{1+x^2}$ for all $|x| > 1$

(c) $\frac{2}{1+x^2}$ for all $|x| < 1$

(d) None of these

Ans: (a)

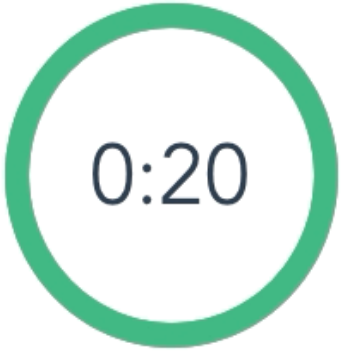
Q) The function $f(x) = |x| - x^3$ is

(a) odd

(b) even

(c) both even and odd

(d) neither even nor odd



Q) The function $f(x) = |x| - x^3$ is

(a) odd

(b) even

(c) both even and odd

(d) neither even nor odd

Ans: (d)

Q) If $y = (x^x)^x$, then what is the value of $\frac{dy}{dx}$ at $x = 1$?

(a) $\frac{1}{2}$

(b) 1

(c) 2

(d) 4

Q) If $y = (x^x)^x$, then what is the value of $\frac{dy}{dx}$ at $x = 1$?

(a) $\frac{1}{2}$

(b) 1

(c) 2

(d) 4

Ans: (b)

Q) Two digits out of 1, 2, 3, 4, 5 are chosen at random and multiplied together. What is the probability that the last digit in the product appears as 0 ?

(a) $\frac{1}{10}$

(b) $\frac{1}{5}$

(c) $\frac{2}{5}$

(d) $\frac{4}{5}$

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(a) $\frac{1}{10}$

(b) $\frac{1}{5}$

(c) $\frac{2}{5}$

(d) $\frac{4}{5}$

Ans: (b)

Q) The modulus and principal argument of the complex number $\frac{1+2i}{1-(1-i)^2}$ are respectively

(a) 1, 0 (b) 1, 1 (c) 2, 0 (d) 2, 1

Q) The modulus and principal argument of the complex number $\frac{1+2i}{1-(1-i)^2}$ are respectively

(a) 1, 0 (b) 1, 1 (c) 2, 0 (d) 2, 1

Ans: (a)

Q) If

$$4f(x)-f\left(\frac{1}{x}\right)=\left(2x+\frac{1}{x}\right)\left(2x-\frac{1}{x}\right),$$

then what is $f(2)$ equal to ?

(a) 0

(b) 1

(c) 2

(d) 4

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then what is $f(2)$ equal to ?

(a) 0

(b) 1

(c) 2

(d) 4

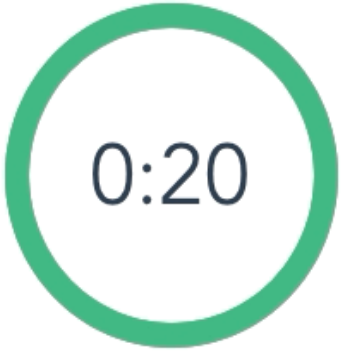
Ans: (d)

NDA 2 2022 – Mathematics - Part 1

Q) The value of the determinant $\begin{vmatrix} \cos^2\frac{\theta}{2} & \sin^2\frac{\theta}{2} \\ \sin^2\frac{\theta}{2} & \cos^2\frac{\theta}{2} \end{vmatrix}$

for all values of θ, is

(a) 1 (b) $\cos\theta$ (c) $\sin\theta$ (d) $\cos 2\theta$



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for all values of θ, is

(a) 1 (b) $\cos\theta$ (c) $\sin\theta$ (d) $\cos 2\theta$

Ans: (b)

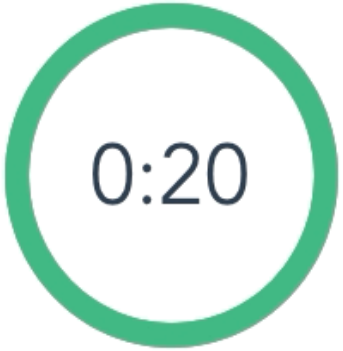
Q) If $\lim_{x \to \frac{\pi}{2}} \frac{\sin x}{x} = l$ and $\lim_{x \to \infty} \frac{\cos x}{x} = m$, then which one of the following is correct?

(a) $l = 1, m = 1$

(b) $l = \frac{2}{\pi}, m = \infty$

(c) $l = \frac{2}{\pi}, m = 0$

(d) $l = 1, m = \infty$



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(b) $l = \frac{2}{\pi}, m = \infty$

(c) $l = \frac{2}{\pi}, m = 0$

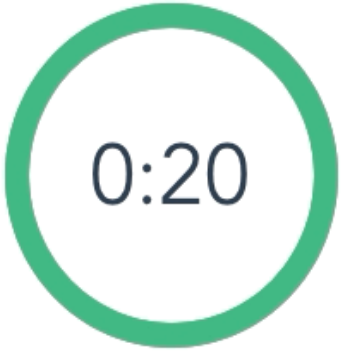
(d) $l = 1, m = \infty$

Ans: (c)

Q) The differential equation of minimum order by eliminating the arbitral constants A and C in the equation $y = A[\sin(x + C) + \cos(x + C)]$ is

(a) $y'' + (\sin x + \cos x)y' = 1$ (b) $y'' = (\sin x + \cos x)y'$

(c) $y'' = (y')^2 + \sin x \cos x$ (d) $y'' + y = 0$



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(c) $y'' = (y')^2 + \sin x \cos x$ (d) $y'' + y = 0$

Ans: (d)

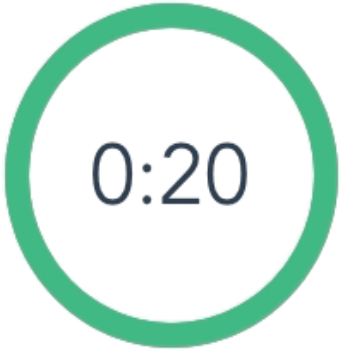
Q) The principal value of $\sin^{-1} x$ lies in the interval

(a) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

(b) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

(c) $\left[0, \frac{\pi}{2}\right]$

(d) $[0, \pi]$



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(b) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

(c) $\left[0, \frac{\pi}{2}\right]$

(d) $[0, \pi]$

Ans: (b)

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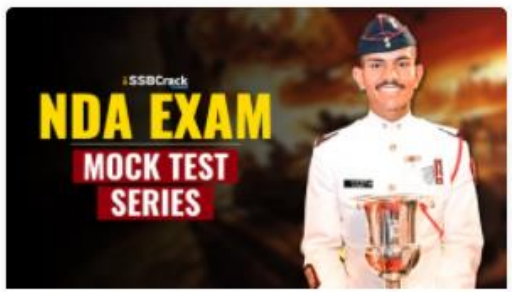

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