DU BUDDY

REPEATED QUESTIONS

MATHS

FOR CUET 2026

Mathematics

1.

If order of matrix A is $m \times p$ and order of matrix B is $p \times n$, then what is the order of matrix AB ?

(1) $m \times p$

(2) $m \times n$

(3) $p \times n$

(4) $m \times 2$

[Shift 30/05/2023 3:30 PM - 6:30 PM, Qno: 2]

Similar Questions:

If A is any $m \times n$ matrix and B is a matrix such that AB and BA are both defined, then B is a matrix of order :

(1) $n \times m$

(2) $m \times m$

(3) $n \times n$

(4) $m \times n$

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 19]

If A and B are square matrices of the same order, then $AB' - B'A$ is :

(1) Symmetric

(2) Skew symmetric

(3) Scalar matrix

(4) Neither scalar nor square

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 71]

If A is any $m \times n$ matrix and B is a matrix such that AB and BA are both defined, then B is a matrix of order :

(1) $n \times m$

(2) $m \times m$

(3) $n \times n$

(4) $m \times n$

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 183]

If order of matrix A is m×p and order of matrix B is p×n, then what is the order of matrix AB ?

(1) m×p
(2) m×n
(3) p×n
(4) m×2

[Shift 23/05/2023 3:30 PM - 6:30 PM, Qno: 30]

If $P = \begin{bmatrix} 1 & x & 3 \\ 1 & 3 & 3 \\ 2 & 4 & 4 \end{bmatrix}$ is the adjoint of 3×3 matrix A and $|A|$ is 4, then x is equal to :

(1) 4

(2) 0

(3) 11

(4) 5

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 2]

If $P=\begin{bmatrix}1 & x & 3\\ 1 & 3 & 3\\ 2 & 4 & 4\end{bmatrix}$ is the adjoint of 3×3 matrix A and $|A|$ is 4, then x is equal to :

(1) 4

(2) 0

(3) 11

(4) 5

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 189]

If A and B are two matrices of order $4\times m$ and $4\times n$, respectively and $m=n$, then the order of matrix $(5A-2B)$ is:

(1) $4\times m$

(2) 4×4

(3) 3×3

(4) $m\times 4$

[Shift 30/05/2023 8:30 AM - 10:30 AM, Qno: 12]

If A and B are two matrices of order $4\times m$ and $4\times n$, respectively and $m=n$, then the order of matrix $(5A-2B)$ is:

(1) $4\times m$

(2) 4×4

(3) 3×3

(4) $m\times 4$

[Shift 30/05/2023 8:30 AM - 10:30 AM, Qno: 183]

For any two matrices A and B, AB + BA is a possible matrix, then :

(1) A, B are of same order

(2) A, B are square matrices of same order

(3) A, B are square matrices of any order

(4) A, B are symmetric matrices

[Shift 13/06/2023 8:30 AM - 10:30 AM, Qno: 24]

If A is a square matrix of order 3 and $|A|=-2$, then the value of $|-A^{-1}|$ is :

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

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

(3) 2

(4) -2

[Shift 17/06/2023 3:30 PM - 6:30 PM, Qno: 8]

If the order of matrix A is 4×3, order of matrix B is 4×5 and order of matrix C is 5×3, then the order of matrix $(B\cdot C)A'$ is :

(1) 4×3

(2) 4×4

(3) 3×4

(4) 5×3

[Shift 17/06/2023 3:30 PM - 6:30 PM, Qno: 13]

10. If A and B are \textbf{symmetric matrices} of the same order, then $AB - BA$ is :

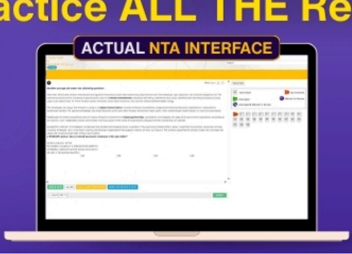
(1) symmetric matrix

(2) zero matrix

(3) skew symmetric matrix

(4) identity matrix

[16-05-2024 Shift-3 A, Qno: 10]



2.

$$\int \left(x+\frac{1}{x}\right)^2 dx \text{ equals :}$$

(1) $\frac{x^3}{3}+\frac{1}{x}-2x+c$

(2) $\frac{x^3}{3}-\frac{1}{x}+2x+c$

(3) $\frac{x^3}{3}-\frac{1}{x}-2x+c$

(4) $\frac{x^3}{3}+\frac{1}{x}+2x+c$

[Shift 30/05/2023 3:30 PM - 6:30 PM, Qno: 13]

Similar Questions:

$$\int e^x\left(\frac{1-x}{1+x^2}\right)^2 dx =$$

(1) $\frac{e^x}{1+x^2}+C$

(2) $-\frac{e^x}{1+x^2}+C$

(3) $\frac{e^x}{(1+x^2)^2}+C$

(4) $-\frac{e^x}{(1+x^2)^2}+C$

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 10]

$$\int e^x\left(\frac{1-x}{1+x^2}\right)^2 dx =$$

(1) $\frac{e^x}{1+x^2}+C$

(2) $-\frac{e^x}{1+x^2}+C$

(3) $\frac{e^x}{(1+x^2)^2}+C$

(4) $-\frac{e^x}{(1+x^2)^2}+C$

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 225]

$$\int_0^2 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{2-x}}\, dx \text{ is equal to:}$$

(1) 0

(2) 2

(3) $\frac{3}{2}$

(4) 1

[Shift 30/05/2023 12:00 PM - 2:00 PM, Qno: 14]

The value of the integral $\int_0^{\pi} 2x\sin^3 x\, dx$ is:

(1) $\frac{2\pi}{3}$

(2) π

(3) $\frac{4\pi}{3}$

(4) $\frac{5\pi}{3}$

[Shift 30/05/2023 12:00 PM - 2:00 PM, Qno: 48]

$\int_0^2 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{2-x}}\,dx$ is equal to:

(1) 0

(2) 2

(3) $\frac{3}{2}$

(4) 1

[Shift 30/05/2023 12:00 PM - 2:00 PM, Qno: 223]

The value of the integral $\int_0^{\pi} 2x\sin^3 x\,dx$ is:

(1) $\frac{2\pi}{3}$

(2) π

(3) $\frac{4\pi}{3}$

(4) $\frac{5\pi}{3}$

[Shift 30/05/2023 12:00 PM - 2:00 PM, Qno: 227]

$\int_0^2 |x-1|\,dx =$

(1) 1

(2) 2

(3) 3

(4) $\frac{3}{2}$

[Shift 13/06/2023 3:30 PM - 6:30 PM, Qno: 12]

$\int_0^2 |x-1|\,dx =$

(1) 1

(2) 2

(3) 3

(4) $\frac{3}{2}$

[Shift 13/06/2023 3:30 PM - 6:30 PM, Qno: 225]

The value of the integral $\int_2^4 \frac{x}{x^2+1}dx$ is :

(1) $\frac{1}{2}\log\left(\frac{5}{17}\right)$

(2) $\frac{1}{2}\log\left(\frac{17}{5}\right)$

(3) $2\log\left(\frac{5}{17}\right)$

(4) $2\log\left(\frac{17}{5}\right)$

[Shift 15/06/2023 12:00 PM - 2:00 PM, Qno: 15]

The integral $\int \frac{dx}{x^2(x^4+1)^{\frac{3}{4}}}$ equals ________.

(1) $\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}}+C$

(2) $(x^4+1)^{\frac{1}{4}}+C$

(3) $-(x^4+1)^{\frac{1}{4}}+C$

(4) $-\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}}+C$

[Shift 15/06/2023 12:00 PM - 2:00 PM, Qno: 20]

The value of the integral $\int_2^4 \frac{x}{x^2+1}dx$ is :

(1) $\frac{1}{2}\log\left(\frac{5}{17}\right)$

(2) $\frac{1}{2}\log\left(\frac{17}{5}\right)$

(3) $2\log\left(\frac{5}{17}\right)$

(4) $2\log\left(\frac{17}{5}\right)$

[Shift 15/06/2023 12:00 PM - 2:00 PM, Qno: 221]

The integral $\int \frac{dx}{x^2(x^4+1)^{\frac{3}{4}}}$ equals ________.

(1) $\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}}+C$

(2) $(x^4+1)^{\frac{1}{4}}+C$

(3) $-(x^4+1)^{\frac{1}{4}}+C$

(4) $-\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}}+C$

[Shift 15/06/2023 12:00 PM - 2:00 PM, Qno: 223]

The integral $\int \frac{dx}{x^2(x^4+1)^{\frac{3}{4}}}$ equals ________.

(1) $\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}}+C$

(2) $(x^4+1)^{\frac{1}{4}}+C$

(3) $-(x^4+1)^{\frac{1}{4}}+C$

(4) $-\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}}+C$

[Shift 15/06/2023 12:00 PM - 2:00 PM, Qno: 277]

$$\int \frac{x+\sqrt{x}}{2\sqrt{x}}\,dx =$$

(1) $2x\sqrt{x}+3x+C$ (Here C is an arbitrary constant)

(2) $2\sqrt{x}+C$ (Here C is an arbitrary constant)

(3) $x\sqrt{x}+x+C$ (Here C is an arbitrary constant)

(4) $\frac{x\sqrt{x}}{3}+\frac{x}{2}+C$ (Here C is an arbitrary constant)

[Shift 22/06/2023 8:30 AM - 10:30 AM, Qno: 13]

The integral $\int \frac{2x+x^3}{1+x^2}dx$ is equal to :

(1) $\log(1+x^2)+x+C$ where C is a constant of integration

(2) $\frac{1}{2}\log(1+x^2)+x^2+C$ where C is a constant of integration

(3) $\frac{1}{2}\log(1+x^2)+\frac{1}{2}x+C$ where C is a constant of integration

(4) $\frac{1}{2}\log(1+x^2)+\frac{x^2}{2}+C$ where C is a constant of integration

[Shift 13/06/2023 8:30 AM - 10:30 AM, Qno: 12]

The value of the integral $\int \frac{\log x^3}{x}dx$ is :

(1) $\frac{2}{3}(\log x)^2+C$, where C is a constant

(2) $\frac{3}{2}(\log x)^2+C$, where C is a constant

(3) $\log x^2+C$, where C is a constant

(4) $\log x^3+C$, where C is a constant

[Shift 17/06/2023 3:30 PM - 6:30 PM, Qno: 7]

Evaluate $\int_0^{\frac{\pi}{4}} \frac{\sin 2x}{\cos^4 x+\sin^4 x}\,dx =$

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

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

(3) π

(4) 0

[Shift 27/05/2023 8:30 AM - 11:30 AM, Qno: 38]

$$\int e^x \left(\frac{1-x}{1+x^2}\right)^2 dx \text{ is equal to:}$$

(1) $\dfrac{e^x}{1+x^2}+C$

(2) $-\dfrac{e^x}{1+x^2}+C$

(3) $\dfrac{e^x}{(1+x^2)^2}+C$

(4) $-\dfrac{e^x}{(1+x^2)^2}+C$

[Shift 31/05/2023 3:30 PM - 6:30 PM, Qno: 61]

19. The value of the integral $\displaystyle\int_{\log_e 2}^{\log_e 3} \frac{e^{2x}-1}{e^{2x}+1}dx$ is :

(1) $\log_e 3$

(2) $\log_e 4 - \log_e 3$

(3) $\log_e 9 - \log_e 4$

(4) $\log_e 3 - \log_e 2$

[16-05-2024 Shift-3 A, Qno: 19]

30. $\displaystyle\int e^x \left(\frac{2x+1}{2\sqrt{x}}\right) dx =$

(1) $\dfrac{1}{2\sqrt{x}}e^x+C$

(2) $-\sqrt{x}e^x+C$

(3) $-\dfrac{1}{2\sqrt{x}}e^x+C$

(4) $\sqrt{x}e^x+C$

[16-05-2024 Shift-3 A, Qno: 30]

$$\int_0^1 \frac{dx}{\sqrt{1+x}-\sqrt{x}} \text{ is equal to}$$

(1) $\dfrac{5\sqrt{2}}{3}$

(2) $\dfrac{4\sqrt{2}}{3}$

(3) $\dfrac{4\sqrt{3}}{3}$

(4) $\dfrac{\sqrt{2}}{3}$

[shift-02-06-2025-900AM-1200PM, Qno: 127]

3.

If the probability distribution of a random variable X is as given below :

X	-1	0	1	2	3
P(X)	K	$\frac{1}{5}$	2K	$\frac{3}{10}$	K

Then the value of K is :

(1) $\frac{3}{8}$

(2) $\frac{1}{4}$

(3) $\frac{5}{8}$

(4) $\frac{1}{8}$

[Shift 30/05/2023 3:30 PM - 6:30 PM, Qno: 15]

Similar Questions:

A random variable X has the following probability distribution

x	-2	-1	0	1	2	3
p	0.1	k	0.2	2k	0.3	k

Then the mean of X is :

(1) 0.3

(2) 0.8

(3) 0.6

(4) 0.7

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 52]

A random variable X has the following probability distribution where k is some number :

X	0	1	2
P(X)	k	2k	3k

Find the value of k.

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

(2) $\frac{1}{3}$

(3) $\frac{1}{6}$

(4) 1

[Shift 05/06/2023 8:30 AM - 10:30 AM, Qno: 10]

A random variable X has the following probability distribution where k is some number :

X	0	1	2
P(X)	k	2k	3k

Find the value of k.

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

(2) $\frac{1}{3}$

(3) $\frac{1}{6}$

(4) 1

[Shift 05/06/2023 8:30 AM - 10:30 AM, Qno: 261]

If a discrete random variable X has the following probability distribution:

X	$\frac{2}{3}$	1	$\frac{4}{3}$
P(X)	c^2	c^2	c

then c is:

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

(2) $\frac{1}{3}$

(3) $\frac{1}{4}$

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

[Shift 20/06/2023 3:30 PM - 6:30 PM, Qno: 14]

A random variable has the following probability distribution:

X = x_i	2	3	4	5
P(X = x_i)	4k	k	5k	2k

The value of $P(X < 3)$ is:

(1) $\frac{1}{12}$

(2) $\frac{1}{3}$

(3) $\frac{1}{4}$

(4) $\frac{5}{12}$

[Shift 20/06/2023 3:30 PM - 6:30 PM, Qno: 15]

If a discrete random variable X has the following probability distribution:

X	$\frac{2}{3}$	1	$\frac{4}{3}$
P(X)	c^2	c^2	c

then c is:

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

(2) $\frac{1}{3}$

(3) $\frac{1}{4}$

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

[Shift 20/06/2023 3:30 PM - 6:30 PM, Qno: 263]

A random variable has the following probability distribution:

X = x_i	2	3	4	5
P(X = x_i)	4k	k	5k	2k

The value of $P(X < 3)$ is:

(1) $\frac{1}{12}$

(2) $\frac{1}{3}$

(3) $\frac{1}{4}$

(4) $\frac{5}{12}$

[Shift 20/06/2023 3:30 PM - 6:30 PM, Qno: 265]

Probability distribution of random variable X is:

X	0	1	2	3	4	5
P(X)	3k	3k	2k	$2k^2$	$3k^2$	$4k^2$

The value of k is:

(1) $k = -1, \frac{1}{9}$

(2) $k = -1$

(3) $k = \frac{1}{9}$

(4) $k = 0, -9$

[Shift 22/06/2023 8:30 AM - 10:30 AM, Qno: 8]

A random variable X has the following probability distribution :

X	1	2	3	4	5	6	7
P(X)	C	2C	2C	3C	C^2	$2C^2$	$7C^2 + C$

Then the value of C is :

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

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

(3) $\frac{3}{10}$

(4) -1

[Shift 17/06/2023 3:30 PM - 6:30 PM, Qno: 9]

The probability distribution of a random variable X is given by

x	0	1	2	3	4
p(x)	0.1	k	2k	2k	k

The value of k is:

(1) 0

(2) 0.1

(3) 1

(4) $\frac{3}{20}$

[Shift 27/05/2023 8:30 AM - 11:30 AM, Qno: 15]

The probability distribution of a random variable X is given below:

X	0	1	2	3
P(X)	k	$\frac{k}{2}$	$\frac{k}{4}$	$\frac{k}{8}$

Then the value of $P(X \leq 2) + P(X > 2)$ is:

(1) 0

(2) $\frac{1}{4}$

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

(4) 1

[Shift 31/05/2023 3:30 PM - 6:30 PM, Qno: 44]

4.

If matrix $A = \begin{bmatrix} 3 & x \\ y & 0 \end{bmatrix}$ and $A' = A$, then :

(1) $x = y$

(2) $x = 0, y = 3$

(3) $x = 3, y = 0$

(4) $x + y = 3$

[Shift 30/05/2023 3:30 PM - 6:30 PM, Qno: 16]

Similar Questions:

If the matrix $\begin{bmatrix} 3 & 2a & -5 \\ -4 & 0 & b \\ -5 & 3 & 7 \end{bmatrix}$ is symmetric, then the value of $(a+b)$ is :

(1) 0

(2) 1

(3) 2

(4) 3

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 44]

If the matrix $\begin{bmatrix} -3 & x-y & 5 \\ 1 & 0 & z \\ x+y & 4 & 7 \end{bmatrix}$ is symmetric, then the correct option of the following, is :

(1) $x = 3,\ y = -1,\ z = 1$

(2) $x = 1,\ y = -1,\ z = 4$

(3) $x = 3,\ y = 2,\ z = 4$

(4) $x = 1,\ y = 2,\ z = 4$

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 58]

If $A = \begin{bmatrix} 0 & 2 & c \\ a & b & -1 \\ -5 & 1 & 0 \end{bmatrix}$ is a skew-symmetric matrix, then $(a+b+c)^3 =$

(1) -125

(2) 0

(3) 27

(4) 343

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 67]

If matrix $A = [a_{ij}]_{2\times 2}$ where $a_{ij} = \begin{cases} 1, & i \neq j \\ 0, & i = j \end{cases}$ then A^3 is equal to :

(1) A

(2) O

(3) I

(4) A^T

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 76]

If the matrix $\begin{bmatrix} 3 & 2a & -5 \\ -4 & 0 & b \\ -5 & 3 & 7 \end{bmatrix}$ is symmetric, then the value of $(a+b)$ is :

(1) 0

(2) 1

(3) 2

(4) 3

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 189]

If $\begin{vmatrix} 2 & 4 \\ 5 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 4 \\ 6 & x \end{vmatrix}$, then x is equal to:

(1) 1

(2) $2\sqrt{3}$

(3) $\pm\sqrt{3}$

(4) $\pm 2\sqrt{3}$

[Shift 07/06/2023 3:30 PM - 6:30 PM, Qno: 2]

If $\begin{vmatrix} 2 & 4 \\ 5 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 4 \\ 6 & x \end{vmatrix}$, then x is equal to:

(1) 1

(2) $2\sqrt{3}$

(3) $\pm\sqrt{3}$

(4) $\pm 2\sqrt{3}$

[Shift 07/06/2023 3:30 PM - 6:30 PM, Qno: 193]

For a 3×3 matrix A, if $A(\text{adj } A) = \begin{bmatrix} 99 & 0 & 0 \\ 0 & 99 & 0 \\ 0 & 0 & 99 \end{bmatrix}$ then $\det(A)$ is equal to:

(1) 3×99

(2) $(99)^3$

(3) $(99)^2$

(4) 99

[Shift 30/05/2023 12:00 PM - 2:00 PM, Qno: 23]

For a 3×3 matrix A, if $A(\text{adj } A) = \begin{bmatrix} 99 & 0 & 0 \\ 0 & 99 & 0 \\ 0 & 0 & 99 \end{bmatrix}$ then $\det(A)$ is equal to:

(1) 3×99

(2) $(99)^3$

(3) $(99)^2$

(4) 99

[Shift 30/05/2023 12:00 PM - 2:00 PM, Qno: 195]

If the matrix $\begin{bmatrix} x-y & 1 & -2 \\ 2x-y & 0 & 3 \\ 2 & -3 & 0 \end{bmatrix}$ is skew-symmetric, then the values of x and y are respectively:

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

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

(3) 1, 1

(4) $-1, -1$

[Shift 20/06/2023 3:30 PM - 6:30 PM, Qno: 27]

If the matrix $\begin{bmatrix} x-y & 1 & -2 \\ 2x-y & 0 & 3 \\ 2 & -3 & 0 \end{bmatrix}$ is skew-symmetric, then the values of x and y are respectively:

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

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

(3) 1, 1

(4) $-1, -1$

[Shift 20/06/2023 3:30 PM - 6:30 PM, Qno: 187]

If the matrix $A = \begin{bmatrix} 2-x & 3 \\ 2 & 1-x \end{bmatrix}$ is singular, then value(s) of x are :

(1) $1, 4$

(2) $-1, 4$

(3) $1, -4$

(4) $2, -2$

[Shift 13/06/2023 8:30 AM - 10:30 AM, Qno: 32]

If the matrix $A = \begin{bmatrix} 0 & -3 & x+y \\ 3 & x-2y & 5 \\ -6 & -5 & 0 \end{bmatrix}$ is skew-symmetric then values of x and y respectively are :

(1) $2, 2$

(2) $3, 3$

(3) $2, 4$

(4) $4, 2$

[Shift 13/06/2023 8:30 AM - 10:30 AM, Qno: 37]

If the matrix $\begin{bmatrix} 1 & 2 \\ 3 & x \end{bmatrix}$ is a singular matrix, then the value of x is :

(1) -6

(2) 0

(3) 6

(4) 2

[Shift 17/06/2023 3:30 PM - 6:30 PM, Qno: 4]

If the matrix $\begin{pmatrix} 2 & 4 & 5 \\ 4 & 2 & 3 \\ K & 3 & 2 \end{pmatrix}$ is a symmetric matrix, then the value of K is :

(1) -5

(2) 0

(3) 5

(4) 1

[Shift 17/06/2023 3:30 PM - 6:30 PM, Qno: 34]

If $A = \begin{bmatrix} -2 & 3 \\ k & 4 \end{bmatrix}$ is a singular matrix then value of k is :

(1) $k = \frac{8}{3}$

(2) $k = -\frac{8}{3}$

(3) $k = -\frac{3}{8}$

(4) $k = \frac{3}{8}$

[Shift 09/06/2023 3:30 PM - 6:30 PM, Qno: 12]

The inverse of the matrix $\begin{bmatrix} 2 & -1 \\ 1 & 0 \end{bmatrix}$ is:

(1) $\begin{bmatrix} 2 & -1 \\ 1 & 0 \end{bmatrix}$

(2) $\begin{bmatrix} -2 & 1 \\ -1 & 0 \end{bmatrix}$

(3) $\begin{bmatrix} 2 & 1 \\ -1 & 0 \end{bmatrix}$

(4) $\begin{bmatrix} 0 & 1 \\ -1 & 2 \end{bmatrix}$

[Shift 27/05/2023 8:30 AM - 11:30 AM, Qno: 8]

If the matrix $A = \begin{bmatrix} 0 & a & 3 \\ 2 & b & -1 \\ c & 1 & 0 \end{bmatrix}$ is skew-symmetric, then $a + b + c$ is equal to:

(1) 3

(2) -3

(3) 5

(4) -5

[Shift 31/05/2023 3:30 PM - 6:30 PM, Qno: 34]

The matrix $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ then A^{-1} is equal to:

(1) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 2 \end{bmatrix}$

(2) $\begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & -\frac{1}{6} & 0 \\ 0 & 0 & \frac{1}{2} \end{bmatrix}$

(3) $\begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & \frac{1}{3} \end{bmatrix}$

(4) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -3 \end{bmatrix}$

[Shift 31/05/2023 3:30 PM - 6:30 PM, Qno: 57]

If the matrix $\begin{bmatrix} -1 & x-y & 4 \\ 2 & 0 & 5 \\ x+y & z & 6 \end{bmatrix}$ is symmetric, then $x+3y+2z$ is equal to

(1) 16

(2) 18

(3) 14

(4) 10

[shift-03-06-2025-900AM-1200PM, Qno: 49]

If $A = \begin{bmatrix} a & 4 & -5 \\ d & b & -6 \\ 5 & e & c \end{bmatrix}$ is a skew symmetric matrix, then value of $a+b+c+d+e$ is equal to

(1) 10

(2) -10

(3) -2

(4) 2

[shift-13-05-2025-300PM-600PM, Qno: 15]

If A $= \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ and B $= \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ then the matrix AB is equal to

1. $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

2. $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$

3. $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$

4. $\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$

[shift-14-05-2025-900AM-1200PM, Qno: 1]

If $\begin{bmatrix} x-y & 0 \\ x+y & 1 \end{bmatrix}$ is an identity matrix and $\begin{bmatrix} x & y \\ z & x \end{bmatrix}$ is a singular matrix then:

1. $x > y = z$

2. $x = y > z$

3. $x = y < z$

4. $x \neq y \neq z$

[shift-21-05-2025-300PM-600PM, Qno: 163]

5.

The corner points of the feasible region determined by the system of linear constraints are $(0, 0), (0, 40), (20, 40), (60, 20)$.

The objective function is $z = 4x + 3y$.

Compare the quantity in \textbf{Column - A} and \textbf{Column - B}.

Column - A	**Column - B**
Maximum value of z	350

(1) The quantity in column A is greater

(2) The quantity in column B is greater

(3) The two quantities are equal

(4) The quantity in column B is greater than twice the quantity in column A

[Shift 30/05/2023 3:30 PM - 6:30 PM, Qno: 21]

Similar Questions:

The corner points of the feasible region determined by the system of linear constraints are $(0, 0)$, $(0, 40)$, $(20, 40)$, $(60, 20)$, $(60, 0)$.

The objective function is $Z = 4x + 3y$.

Compare the quantity in Column A and Column B

Column A	Column B
Maximum of Z	325

1. The quantity of column B is greater than quantity of column A
2. The quantity of column A is greater than quantity of column B
3. Both quantities are equal
4. The relationship cannot be determined on the basis of the information supplied

[Shift 14/06/2023 12:00 PM - 2:00 PM, Qno: 22]

The corner points of the feasible region determined by the system of linear constraints are $(0, 0)$, $(0, 40)$, $(20, 40)$, $(60, 20)$, $(60, 0)$.

The objective function is $Z = 4x + 3y$.

Compare the quantity in Column A and Column B

Column A	Column B
Maximum of Z	325

1. The quantity of column B is greater than quantity of column A
2. The quantity of column A is greater than quantity of column B
3. Both quantities are equal
4. The relationship cannot be determined on the basis of the information supplied

[Shift 14/06/2023 12:00 PM - 2:00 PM, Qno: 257]

6.

$$\int e^x \sec x(1+\tan x)dx \text{ equals :}$$

(1) $e^x \sec x + c$

(2) $e^x \tan x + c$

(3) $e^x \sin x + c$

(4) $e^x \cos x + c$

[Shift 30/05/2023 3:30 PM - 6:30 PM, Qno: 28]

Similar Questions:

$$\int e^x (\tan x + \log_e \sec x)\, dx =$$

(1) $e^x \log_e \sec x + C$

(2) $\log_e \sec x + C$

(3) $e^x \tan x + C$

(4) $e^x \sec x + C$

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 44]

$$\int e^x (\tan x + \log_e \sec x)\, dx =$$

(1) $e^x \log_e \sec x + C$

(2) $\log_e \sec x + C$

(3) $e^x \tan x + C$

(4) $e^x \sec x + C$

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 231]

$$\int e^x (\tan x + \log_e \sec x)\, dx =$$

(1) $e^x \log_e \sec x + C$

(2) $\log_e \sec x + C$

(3) $e^x \tan x + C$

(4) $e^x \sec x + C$

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 297]

7.

Area of the region bounded by the curve $y = \cos(x)$ and x-axis between $x = 0$ and $x = \pi$ is :

(1) 2 sq. units

(2) 3 sq. units

(3) 4 sq. units

(4) 1 sq. unit

[Shift 30/05/2023 3:30 PM - 6:30 PM, Qno: 29]

Similar Questions:

Area of the region bounded by the curve $y = \cos x$ between $x = 0,\ x = \pi$ and x-axis is :

(1) 1 sq. unit

(2) 2 sq. units

(3) 3 sq. units

(4) 4 sq. units

[Shift 26/05/2023 12:00 PM - 2:00 PM, Qno: 24]

Area of the region bounded by the curve $y = \cos x$ between $x = 0,\ x = \pi$ and x-axis is :

(1) 1 sq. unit

(2) 2 sq. units

(3) 3 sq. units

(4) 4 sq. units

[Shift 26/05/2023 12:00 PM - 2:00 PM, Qno: 233]

The area of region bounded by the curve $\mathrm{y} = \cos \mathrm{x}$ and x-axis between $\mathrm{x} = 0$ and $\mathrm{x} = \pi$ is

1. 1 sq.unit
2. 2 sq.units
3. 3 sq.units
4. 4 sq.units

[Shift 11/06/2023 12:00 PM - 2:00 PM, Qno: 16]

The area of region bounded by the curve $\mathrm{y} = \cos \mathrm{x}$ and x-axis between $\mathrm{x} = 0$ and $\mathrm{x} = \pi$ is

1. 1 sq.unit
2. 2 sq.units
3. 3 sq.units
4. 4 sq.units

[Shift 11/06/2023 12:00 PM - 2:00 PM, Qno: 231]

The area of region bounded by the curve $\mathrm{y} = \cos \mathrm{x}$ and x-axis between $\mathrm{x} = 0$ and $\mathrm{x} = \pi$ is

1. 1 sq.unit
2. 2 sq.units

3. 3 sq.units

4. 4 sq.units

[Shift 11/06/2023 12:00 PM - 2:00 PM, Qno: 277]

Area of the region bounded by the curve $y = \frac{1}{2}\cos x$ and x-axis between $x = 0$ and $x = 2\pi$ is:

(1) 2 sq. units

(2) 4 sq. units

(3) 3 sq. units

(4) 1 sq. unit

[Shift 27/05/2023 8:30 AM - 11:30 AM, Qno: 36]

The area bounded by the curve $y = 3\cos x$ and the x-axis between $x = 0$ and $x = 2\pi$ is:

(1) 4

(2) 8

(3) 0

(4) 12

[Shift 31/05/2023 3:30 PM - 6:30 PM, Qno: 65]

The area (in sq. units) of the region bounded by the curve $y = \cos x$ between $x = -\frac{\pi}{2}$, $x = \frac{\pi}{2}$ and the x-axis is

(1)0

(2)3

(3)2

(4)1

[shift-02-06-2025-900AM-1200PM, Qno: 135]

8.

If $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$, then the value of $\cos^{-1} x + \cos^{-1} y$ is :

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

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

(3) $\frac{2\pi}{3}$

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

[Shift 30/05/2023 3:30 PM - 6:30 PM, Qno: 30]

Similar Questions:

$\cos\left(\frac{\pi}{6} - \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right)$ is equal to:

(1) $-\frac{\sqrt{3}}{2}$

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

(3) $-\frac{1}{2}$

(4) $+\frac{1}{2}$

[Shift 11/06/2023 3:30 PM - 6:30 PM, Qno: 16]

$\cos\left(\frac{\pi}{6} - \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right)$ is equal to:

(1) $-\frac{\sqrt{3}}{2}$

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

(3) $-\frac{1}{2}$

(4) $+\frac{1}{2}$

[Shift 11/06/2023 3:30 PM - 6:30 PM, Qno: 175]

The value of $\sin^{-1}\left(\frac{8}{17}\right) + \sin^{-1}\left(\frac{3}{5}\right)$ is :

(1) $\sin^{-1}\left(\frac{77}{85}\right)$

(2) $\cos^{-1}\left(\frac{77}{85}\right)$

(3) $\tan^{-1}\left(\frac{77}{85}\right)$

(4) $\cot^{-1}\left(\frac{77}{85}\right)$

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 47]

The value of $\sin^{-1}\left(\frac{8}{17}\right) + \sin^{-1}\left(\frac{3}{5}\right)$ is :

(1) $\sin^{-1}\left(\frac{77}{85}\right)$

(2) $\cos^{-1}\left(\frac{77}{85}\right)$

(3) $\tan^{-1}\left(\frac{77}{85}\right)$

(4) $\cot^{-1}\left(\frac{77}{85}\right)$

[Shift 05/06/2023 3:30 PM - 6:30 PM, Qno: 181]

The derivative of $\cos^{-1}\left(\frac{\sin x + \cos x}{\sqrt{2}}\right)$, $-\frac{\pi}{4} < x < \frac{\pi}{4}$ with respect to x is :

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

(2) 1

(3) -1

(4) $\frac{-1}{\sqrt{2}}$

[Shift 07/06/2023 3:30 PM - 6:30 PM, Qno: 32]

The value of $\frac{9}{4}\sin^{-1}\left(\frac{2\sqrt{2}}{3}\right) + \frac{9}{4}\sin^{-1}\left(\frac{1}{3}\right)$ is :

(1) $\frac{9}{4}$

(2) $\frac{9\pi}{4}$

(3) $\frac{\pi}{8}$

(4) $\frac{9\pi}{8}$

[Shift 07/06/2023 3:30 PM - 6:30 PM, Qno: 39]

The value of $\frac{9}{4}\sin^{-1}\left(\frac{2\sqrt{2}}{3}\right) + \frac{9}{4}\sin^{-1}\left(\frac{1}{3}\right)$ is :

(1) $\frac{9}{4}$

(2) $\frac{9\pi}{4}$

(3) $\frac{\pi}{8}$

(4) $\frac{9\pi}{8}$

[Shift 07/06/2023 3:30 PM - 6:30 PM, Qno: 179]

The derivative of $\cos^{-1}\left(\frac{\sin x + \cos x}{\sqrt{2}}\right)$, $-\frac{\pi}{4} < x < \frac{\pi}{4}$ with respect to x is :

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

(2) 1

(3) -1

(4) $\frac{-1}{\sqrt{2}}$

[Shift 07/06/2023 3:30 PM - 6:30 PM, Qno: 203]

If $x = a\sin^2\theta, y = a\cos^2\theta$ then $\frac{dy}{dx} =$

(1) -1

(2) 3

(3) 2

(4) 4

[Shift 24/05/2023 3:30 PM - 6:30 PM, Qno: 19]

If $x = a\sin^2\theta, y = a\cos^2\theta$ then $\frac{dy}{dx} =$

(1) -1

(2) 3

(3) 2

(4) 4

[Shift 24/05/2023 3:30 PM - 6:30 PM, Qno: 203]

The value of C, in Rolle's theorem for the function $f(x) = e^x \sin x$, when $x \in [0, \pi]$ is :

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

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

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

(4) $\frac{3\pi}{4}$

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 32]

If $A = \begin{pmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{pmatrix}$, then $A^2 =$

(1) $\begin{pmatrix} \cos 4\theta & \sin 4\theta \\ -\sin 4\theta & \cos 4\theta \end{pmatrix}$

(2) $\begin{pmatrix} \cos^2 2\theta & \sin^2 2\theta \\ \sin^2 2\theta & \cos^2 2\theta \end{pmatrix}$

(3) $\begin{pmatrix} 1 & 0 \\ \sin 2\theta & \cos 2\theta \end{pmatrix}$

(4) $\begin{pmatrix} \cos 6\theta & \sin 6\theta \\ -\sin 6\theta & \cos 6\theta \end{pmatrix}$

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 43]

If $A = \begin{pmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{pmatrix}$, then $A^2 =$

(1) $\begin{pmatrix} \cos 4\theta & \sin 4\theta \\ -\sin 4\theta & \cos 4\theta \end{pmatrix}$

(2) $\begin{pmatrix} \cos^2 2\theta & \sin^2 2\theta \\ \sin^2 2\theta & \cos^2 2\theta \end{pmatrix}$

(3) $\begin{pmatrix} 1 & 0 \\ \sin 2\theta & \cos 2\theta \end{pmatrix}$

(4) $\begin{pmatrix} \cos 6\theta & \sin 6\theta \\ -\sin 6\theta & \cos 6\theta \end{pmatrix}$

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 187]

The value of C, in Rolle's theorem for the function $f(x) = e^x \sin x,$ when $x \in [0, \pi]$ is :

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

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

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

(4) $\frac{3\pi}{4}$

[Shift 22/05/2023 3:30 PM - 6:30 PM, Qno: 209]

The maximum value of $4\sin^2 x + 3\cos^2 x$ is:

(1) 3

(2) 4

(3) 5

(4) 7

[Shift 30/05/2023 8:30 AM - 10:30 AM, Qno: 33]

The maximum value of $4\sin^2 x + 3\cos^2 x$ is:

(1) 3

(2) 4

(3) 5

(4) 7

[Shift 30/05/2023 8:30 AM - 10:30 AM, Qno: 219]

The value of $\tan^{-1}\left[2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right]$ is :

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

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

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

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

[Shift 26/05/2023 12:00 PM - 2:00 PM, Qno: 37]

The value of $\tan^{-1}\left[2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right]$ is :

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

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

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

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

[Shift 26/05/2023 12:00 PM - 2:00 PM, Qno: 177]

If $x\cos(a+y)+\cos a\sin(a+y)=0$, then $\frac{dy}{dx}$ is equal to

(1) $\frac{\cos^2(a+y)}{\cos a}$

(2) $-\frac{\cos^2(a+y)}{\cos a}$

(3) $\frac{\sin(a+y)\cos(a+y)}{\cos a}$

(4) $-\frac{\sin(a+y)\cos(a+y)}{\cos a}$

[Shift 11/06/2023 12:00 PM - 2:00 PM, Qno: 47]

If $x\cos(a+y)+\cos a\sin(a+y)=0$, then $\frac{dy}{dx}$ is equal to

(1) $\frac{\cos^2(a+y)}{\cos a}$

(2) $-\frac{\cos^2(a+y)}{\cos a}$

(3) $\frac{\sin(a+y)\cos(a+y)}{\cos a}$

(4) $-\frac{\sin(a+y)\cos(a+y)}{\cos a}$

[Shift 11/06/2023 12:00 PM - 2:00 PM, Qno: 207]

If x is in the 1st Quadrant, then the value of $\tan^{-1}\left(\frac{\sqrt{1+\cos x}+\sqrt{1-\cos x}}{\sqrt{1+\cos x}-\sqrt{1-\cos x}}\right)$ is :

(1) $\frac{\pi}{4}-\frac{x}{2}$

(2) $\frac{\pi}{4}+2x$

(3) $\frac{\pi}{4}+\frac{x}{2}$

(4) $\frac{\pi}{4}-2x$

[Shift 05/06/2023 8:30 AM - 10:30 AM, Qno: 41]

If x is in the 1st Quadrant, then the value of $\tan^{-1}\left(\frac{\sqrt{1+\cos x}+\sqrt{1-\cos x}}{\sqrt{1+\cos x}-\sqrt{1-\cos x}}\right)$ is :

(1) $\frac{\pi}{4}-\frac{x}{2}$

(2) $\frac{\pi}{4}+2x$

(3) $\frac{\pi}{4}+\frac{x}{2}$

(4) $\frac{\pi}{4}-2x$

[Shift 05/06/2023 8:30 AM - 10:30 AM, Qno: 181]

If $y=\sin x+e^x$, then $\frac{d^2x}{dy^2}$ is equal to:

(1) $\frac{\sin x-e^x}{(\cos x+e^x)^2}$

(2) $\frac{\sin x-e^x}{(\cos x+e^x)^3}$

(3) $\frac{\sin x+e^x}{(\cos x-e^x)^2}$

(4) $(-\sin x+e^x)^{-1}$

[Shift 13/06/2023 3:30 PM - 6:30 PM, Qno: 30]

The value of $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$ is:

(1) $\frac{7\pi}{6}$

(2) $\frac{5\pi}{6}$

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

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

[Shift 13/06/2023 3:30 PM - 6:30 PM, Qno: 41]

The value of $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$ is:

(1) $\frac{7\pi}{6}$

(2) $\frac{5\pi}{6}$

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

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

[Shift 13/06/2023 3:30 PM - 6:30 PM, Qno: 179]

If $y = \sin x + e^x$, then $\dfrac{d^2x}{dy^2}$ is equal to:

(1) $\dfrac{\sin x - e^x}{(\cos x + e^x)^2}$

(2) $\dfrac{\sin x - e^x}{(\cos x + e^x)^3}$

(3) $\dfrac{\sin x + e^x}{(\cos x - e^x)^2}$

(4) $(-\sin x + e^x)^{-1}$

[redacted]

[redacted]

If $\sin^{-1} x + \sin^{-1} y = \dfrac{2\pi}{3}$, then the value of $\cos^{-1} x + \cos^{-1} y$ is:

(1) $\dfrac{2\pi}{3}$

(2) $-\dfrac{\pi}{3}$

(3) $\dfrac{\pi}{3}$

(4) $-\dfrac{2\pi}{3}$

[redacted]

[redacted]

The value of $\lim_{x \to 0} \dfrac{1 - \cos x}{2x^2}$ is :

(1) 1

(2) $\dfrac{1}{2}$

(3) $\dfrac{1}{4}$

(4) 0

[redacted]

[redacted]

If $\sin^{-1} x + \sin^{-1} y = \dfrac{2\pi}{3}$, then the value of $\cos^{-1} x + \cos^{-1} y$ is:

(1) $\dfrac{2\pi}{3}$

(2) $-\dfrac{\pi}{3}$

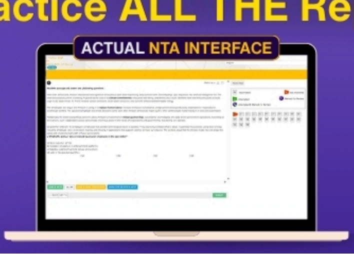
(3) $\dfrac{\pi}{3}$

(4) $-\dfrac{2\pi}{3}$

[redacted]

[redacted]

The value of $\lim_{x \to 0} \dfrac{1 - \cos x}{2x^2}$ is :



(1) 1

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

(3) $\frac{1}{4}$

(4) 0

[redacted]

[redacted]

The value of $\lim_{x \to 0} \frac{1 - \cos x}{2x^2}$ is :

(1) 1

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

(3) $\frac{1}{4}$

(4) 0

[redacted]

[redacted]

If $\sin^{-1}\left(\frac{x}{5}\right) + \text{cosec}^{-1}\left(\frac{5}{4}\right) = \frac{\pi}{2}$, then the value of x is:

1. 1
2. 3
3. 4
4. 5

[redacted]

If $\sin^{-1}\left(\frac{x}{5}\right) + \text{cosec}^{-1}\left(\frac{5}{4}\right) = \frac{\pi}{2}$, then the value of x is:

1. 1
2. 3
3. 4
4. 5

[redacted]

If $\sin^{-1}\left(\frac{x}{5}\right) + \text{cosec}^{-1}\left(\frac{5}{4}\right) = \frac{\pi}{2}$, then the value of x is:

1. 1
2. 3
3. 4
4. 5

[redacted]

If $\cos y = x\cos(a + y)$, then $\frac{dy}{dx} =$

(1) $\frac{\cos^2(a+y)}{\sin a}$

(2) $\frac{\sin^2(a+y)}{\sin a}$

(3) $\frac{\cos^2(a+y)}{\cos a}$

(4) $\dfrac{\sin^2(a+y)}{\cos a}$

[redacted]

The value of C which satisfies Rolle's Theorem for $f(x) = \sin^4 x + \cos^4 x$ in $\left[0, \frac{\pi}{2}\right]$. Then C is :

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

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

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

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

[redacted]

If $\cos y = x\cos(a+y)$, then $\dfrac{dy}{dx} =$

(1) $\dfrac{\cos^2(a+y)}{\sin a}$

(2) $\dfrac{\sin^2(a+y)}{\sin a}$

(3) $\dfrac{\cos^2(a+y)}{\cos a}$

(4) $\dfrac{\sin^2(a+y)}{\cos a}$

[redacted]

The value of C which satisfies Rolle's Theorem for $f(x) = \sin^4 x + \cos^4 x$ in $\left[0, \frac{\pi}{2}\right]$. Then C is :

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

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

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

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

[redacted]

If $a+b+c=\pi$, then the value of $\begin{vmatrix} \sin(a+b+c) & \sin(a+c) & \cos b \\ -\sin b & 0 & \tan a \\ \cos(a+c) & \tan(b+c) & 0 \end{vmatrix}$ is:

(1) 0

(2) 1

(3) -1

(4) 2

[redacted]

[redacted]

$\tan^{-1}\dfrac{1}{\sqrt{3}} - \sin^{-1}\dfrac{1}{2}$ is equal to :

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

(2) 0

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

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

[redacted]

If $A = \begin{bmatrix} \sin\alpha & -\cos\alpha \\ \cos\alpha & \sin\alpha \end{bmatrix}$, and $A + A' = I$, then the value of $'\alpha'$ is :

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

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

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

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

[redacted]

If $\cos^{-1}\sqrt{3}x + \cos^{-1}x = \frac{\pi}{2}$, then the value of x is :

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

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

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

(4) $-\frac{1}{\sqrt{2}}$

[redacted]

If $y = 5\cos x - 3\sin x$, then $\frac{d^2y}{dx^2}$ is equal to :

(1) y

(2) $-y$

(3) $2y$

(4) $-2y$

[redacted]

The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (\sin|x| - \cos|x|)dx$ is :

(1) -1

(2) 2

(3) 0

(4) 1

[redacted]

If $x + \frac{1}{x} = 2$, the principal value of $\sin^{-1}x$ is :

(1) π

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

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

(4) $\frac{3\pi}{2}$

[redacted]

The value of $\sin^{-1}\frac{3}{5} - \sin^{-1}\frac{8}{17}$ is :

(1) $\sin^{-1}\frac{84}{85}$

(2) $\cos^{-1}\frac{84}{85}$

(3) $\sin^{-1}\frac{24}{85}$

(4) $\cos^{-1}\frac{24}{85}$

[redacted]

If $y = A\sin x + B\cos x,$ then which of the following is correct?

(1) $\frac{d^2y}{dx^2} - y = 0$

(2) $\frac{d^2y}{dx^2} + y = 0$

(3) $\frac{d^2y}{dx^2} = \frac{dy}{dx}$

(4) $\frac{d^2y}{dx^2} = -\frac{dy}{dx}$

[redacted]

The principal value of \cosec$^{-1}\left(\frac{2}{\sqrt{3}}\right)$ is:

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

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

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

(4) $-\frac{\pi}{3}$

[redacted]

[redacted]

If $x = a(\cos t + \log\tan\frac{t}{2}),\ y = a\sin t,$ then value of $\frac{dy}{dx}$ at $t = \pi/4$ is

(1) 0

(2) 1

(3) -1

(4) 2

[redacted]

For $x \in [-1, 1],$ if $4\sin^{-1}x + \cos^{-1}x = \pi$ then x is equal to

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

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

3. $\frac{\sqrt{3}}{2}$

4. $-\frac{\sqrt{3}}{2}$

[redacted]

[redacted]

The derivative of $\sec(\tan\sqrt{x})$ with respect to x is :

(1) $\frac{\sec(\tan\sqrt{x})\tan(\tan\sqrt{x})\sec^2\sqrt{x}}{2\sqrt{x}}$

(2) $\sec^2(\tan\sqrt{x})$

(3) $\frac{\sec(\tan\sqrt{x})\tan(\tan\sqrt{x})\sec^2\sqrt{x}}{x}$

(4) $\sec^2(\tan x^{1/3})$

[redacted]

The derivative of $\sqrt{e^{\sqrt{x}}}$ with respect to x is :

(1) $\frac{\sqrt{e^{\sqrt{x}}}}{2\sqrt{x}}$

(2) $\frac{e^{\sqrt{x}}}{4\sqrt{x}}$

(3) $\frac{\sqrt{e^{\sqrt{x}}}}{4\sqrt{x}}$

(4) $\frac{e^{\sqrt{x}}}{2\sqrt{x}}$

[redacted]

[redacted]

The maximum value of $(\sin x)(\cos x)$ is :

(1) 1

(2) $1/2$

(3) $1/4$

(4) $\sqrt{2}$

[redacted]

Find the maximum value of the function $\sin x(1+\cos x)$ is:

(1) $\frac{3\sqrt{3}}{4}$

(2) $3\sqrt{3}$

(3) 4

(4) 3

[redacted]

[redacted]

Find the maximum value of the function $\sin x(1+\cos x)$ is:

(1) $\frac{3\sqrt{3}}{4}$

(2) $3\sqrt{3}$

(3) 4

(4) 3

[redacted]

[redacted]

Find the maximum value of the function $\sin x(1+\cos x)$ is:

(1) $\frac{3\sqrt{3}}{4}$

(2) $3\sqrt{3}$

(3) 4

(4) 3

[redacted]

[redacted]

[redacted]

If $f(x) = \begin{cases} \frac{k \cos x}{\pi - 2x}, & x \neq \frac{\pi}{2} \\ 3, & x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \dfrac{\pi}{2}$, then k is :

(1) 6

(2) 4

(3) 3

(4) 2

[redacted]

The function $f(x) = \begin{cases} \dfrac{\sin x}{x} + \cos x, & \text{if } x \neq 0 \\ k, & \text{if } x = 0 \end{cases}$ is continuous at $x = 0$, then the value of k is :

(1) 2

(2) 3

(3) 4

(4) 1

[redacted]

[redacted]

31. If $f(x)$, defined by $f(x) = \begin{cases} kx + 1 & \text{if } x \leq \pi \\ \cos x & \text{if } x > \pi \end{cases}$ is continuous at $x = \pi$, then the value of k is :

(1) 0

(2) π

(3) $\dfrac{2}{\pi}$

(4) $-\dfrac{2}{\pi}$

[redacted]

If the function $f(x) = \begin{cases} \frac{k \cos x}{\pi - 2x} & : x \neq \frac{\pi}{2} \\ 3 & : x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \dfrac{\pi}{2}$, then k is equal to

1. 6
2. 5
3. -6
4. 4

[redacted]

The function $f(x) = \begin{cases} \frac{\sin 2x}{x} + \cos x & , \text{if } x \neq 0 \\ K & , \text{if } x = 0 \end{cases}$ is continuous at $x = 0$, then the value of K is:

1. 1
2. 2
3. 0
4. 3

[redacted]

[redacted]

$$\int \frac{\sqrt{\tan x}}{\sin x \cos x} dx \text{ equals :}$$

(1) $2\sqrt{\tan x} + c$

(2) $2\sqrt{\cot x} + c$

(3) $\sqrt{\tan x} + c$

(4) $\dfrac{2}{\sqrt{\tan x}} + c$

[redacted]

$$\int_0^{\pi/2} \sqrt{1 - \sin 2x}\, dx \text{ is equal to :}$$

(1) $2\sqrt{2}$

(2) $2(\sqrt{2} + 1)$

(3) 2

(4) $2(\sqrt{2} - 1)$

[redacted]

$$\int_0^{\pi/2} \sqrt{1 - \sin 2x}\, dx \text{ is equal to :}$$

(1) $2\sqrt{2}$

(2) $2(\sqrt{2} + 1)$

(3) 2

(4) $2(\sqrt{2} - 1)$

[redacted]

The value of integral $\int \dfrac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha} dx$, where α is a constant is :

(1) $\sin 2x + \sin 2\alpha + C$

(2) $2x \sin x + \cos \alpha + C$

(3) $2 \sin x + 2x \sin \alpha + C$

(4) $2 \sin x + 2x \cos \alpha + C$

[redacted]

[redacted]

The value of integral $\int \dfrac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha} dx$, where α is a constant is :

(1) $\sin 2x + \sin 2\alpha + C$

(2) $2x \sin x + \cos \alpha + C$

(3) $2 \sin x + 2x \sin \alpha + C$

(4) $2 \sin x + 2x \cos \alpha + C$

[redacted]

[redacted]

The value of integral $\int \frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha}\, dx,$ where α is a constant is :

(1) $\sin 2x + \sin 2\alpha + C$

(2) $2x \sin x + \cos \alpha + C$

(3) $2 \sin x + 2x \sin \alpha + C$

(4) $2 \sin x + 2x \cos \alpha + C$

[redacted]

[redacted]

$\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt{\cot x}}\, dx$ is :

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

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

(3) $\frac{\pi}{12}$

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

[redacted]

[redacted]

If $x = a \sin^3 t$ and $y = a \cos^3 t,$ then $\frac{dy}{dx}$ is equal to :

(1) $\tan t$

(2) $-\tan t$

(3) $\cot t$

(4) $-\cot t$

[redacted]

[redacted]

If $x = a \sin^3 t$ and $y = a \cos^3 t,$ then $\frac{dy}{dx}$ is equal to :

(1) $\tan t$

(2) $-\tan t$

(3) $\cot t$

(4) $-\cot t$

[redacted]

[redacted]

$\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt{\cot x}}\, dx$ is :

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

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

(3) $\frac{\pi}{12}$

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

[redacted]

[redacted]

The value of $\int_1^2 \frac{\sqrt{x}}{\sqrt{3-x}+\sqrt{x}}\,dx$ is:

(1) 1

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

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

(4) $\frac{1}{4}$

[redacted]

[redacted]

The value of $\int_1^2 \frac{\sqrt{x}}{\sqrt{3-x}+\sqrt{x}}\,dx$ is:

(1) 1

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

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

(4) $\frac{1}{4}$

[redacted]

[redacted]

The value of $\int_1^2 \frac{\sqrt{x}}{\sqrt{3-x}+\sqrt{x}}\,dx$ is:

(1) 3

(2) $\frac{3}{2}$

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

(4) 2

[redacted]

[redacted]

$$\int_0^{\frac{\pi}{2}} \sin 2x \log(\tan x)\,dx =$$

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

(2) 1

(3) 0

(4) π

[redacted]

[redacted]

The value of $\int_1^2 \frac{\sqrt{x}}{\sqrt{3-x}+\sqrt{x}}\,dx$ is:

(1) 3

(2) $\frac{3}{2}$

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

(4) 2

[redacted]

[redacted]

$$\int_0^{\frac{\pi}{2}} \sin 2x \, \log(\tan x)\,dx =$$

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

(2) 1

(3) 0

(4) π

[redacted]

[redacted]

The value of $\int \frac{\cos x dx}{(1+\sin x)(2+\sin x)}$ is :

(1) $\log\left|\frac{1}{(1+\sin x)(2+\sin x)}\right|+C$

(2) $\log\left|\frac{2+\cos x}{1+\cos x}\right|+C$

(3) $\log\left|\frac{2+\sin x}{1+\sin x}\right|+C$

(4) $\log\left|\frac{1+\sin x}{2+\sin x}\right|+C$

[redacted]

The value of integral $\int_0^1 \sqrt{1-x^2}\,dx$ is :

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

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

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

(4) π

[redacted]

$$\int \frac{x\sin^{-1}x}{\sqrt{1-x^2}}\,dx =$$

(1) $\sqrt{1-x^2}\cos x + x + C$

(2) $\sqrt{1-x^2}\sin x + x + C$

(3) $\sqrt{1-x^2}\sin^{-1}x + x + C$

(4) $-\sqrt{1-x^2}\sin^{-1}x + x + C$

(where C is arbitrary constant)

[redacted]

$$\int_0^{\frac{\pi}{3}} \frac{\sin x}{(2-\cos x)^2}\,dx =$$

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

(2) 1

(3) $\frac{2}{3}$

(4) $\frac{1}{3}$

[redacted]

$\int \sin^3 x\,dx$ is equal to:

(1) $\frac{\cos^3 x}{3} + \cos x + C$

(2) $\frac{\cos^3 x}{3} - \cos x + C$

(3) $\frac{\cos^2 x}{3} - \cos x + C$

(4) $\frac{\sin^3 x}{3} + \sin x + C$

[redacted]

[redacted]

[redacted]

The equation of tangent to the curve given by $x = a\sin^3 t, y = b\cos^3 t$ at a point where $t = \frac{\pi}{2}$ is :

(1) $x = 0$

(2) $y = 0$

(3) $y = \frac{\pi}{2}$

(4) $x = \frac{\pi}{2}$

[redacted]

The equation of tangent to the curve $x = a\cos^3 t, y = a\sin^3 t$ at t is :

(1) $x \sec t + y$ cosect $= a$

(2) $x \sec t - y$ cosect $= a$

(3) x cosect $+ y \sec t = a$

(4) x cosect $- y \sec t = a$

[redacted]

The equation of tangent to the curve $x = a\cos^3 t, y = a\sin^3 t$ at t is :

(1) $x \sec t + y$ cosect $= a$

(2) $x \sec t - y$ cosect $= a$

(3) x cosect $+ y \sec t = a$

(4) x cosect $- y \sec t = a$

[redacted]

[redacted]

Corner points of the feasible region for LPP are : $(4, 0),\ (0, 5),\ (7, 0),\ (5, 2)$ and $(0, 3)$. Let $Z = 3x + 6y$ be the objective function. Then

(1) 12

(2) 9

(3) 18

(4) 6

[redacted]

[redacted]

The value of the integral $I = \int_{-3}^{3} (x^3 - x)dx$ is :

(1) 0

(2) $\frac{3}{2}$

(3) $-\frac{1}{2}$

(4) $\frac{x^4}{4} - \frac{x^2}{2} + C$

[redacted]

The value of the integral $\int_{-1}^{1} |x|\, dx$ is :

(1) 2

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

(3) 1

(4) 0

[redacted]

The value of the integral $\int_{-1}^{1} |x|\, dx$ is :

(1) 2

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

(3) 1

(4) 0

[redacted]

The value of $\int_{-3}^{2} x^2\, |2x|\, dx$ is:

(1) 65

(2) $\frac{65}{2}$

(3) 97

(4) $\frac{97}{2}$

[redacted]

The value of $\int_{-3}^{2} x^2\, |2x|\, dx$ is:

(1) 65

(2) $\frac{65}{2}$

(3) 97

(4) $\frac{97}{2}$

[redacted]

[redacted]

The value of the integral $I = \int_{-1}^{1} |x|\, dx$ is:

(1) 0

(2) 1

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

(4) 2

[redacted]

[redacted]

The value of the integral $I = \int_{-1}^{1} |x|\, dx$ is:

(1) 0

(2) 1

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

(4) 2

[redacted]

[redacted]

The value of $\int_{-1}^{1} x^2[x]\, dx$ is:

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

(2) $\frac{2}{3}$

(3) 1

(4) $-\frac{1}{3}$

[redacted]

[redacted]

The value of $\int_{-3}^{2} x^2\, |2x|\, dx$ is:

(1) 65

(2) $\frac{65}{2}$

(3) 97

(4) $\frac{97}{2}$

[redacted]

[redacted]

The value of $\int_{-1}^{1} x^2[x]\,dx$ is:

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

(2) $\frac{2}{3}$

(3) 1

(4) $-\frac{1}{3}$

[redacted]

[redacted]

The value of $\int_{-3}^{2} x^2\,|2x|\,dx$ is:

(1) 65

(2) $\frac{65}{2}$

(3) 97

(4) $\frac{97}{2}$

[redacted]

[redacted]

The value of $\int_{0}^{3} |2x-6|dx$ is :

(1) $-\frac{9}{4}$

(2) $\frac{19}{2}$

(3) 9

(4) -3

[redacted]

The value of $\int_{0}^{3} |2x-6|dx$ is :

(1) $-\frac{9}{4}$

(2) $\frac{19}{2}$

(3) 9

(4) -3

[redacted]

7. The value of $\int_{0}^{1} \frac{a-bx^2}{(a+bx^2)^2}dx$ is :

(1) $\frac{a-b}{a+b}$

(2) $\dfrac{1}{a-b}$

(3) $\dfrac{a+b}{2}$

(4) $\dfrac{1}{a+b}$

[redacted]

[redacted]

Let X and Y be any two invertible square matrices of order n. Then which of the statements are true ?

(A) $(AB)^{-1} = A^{-1}B^{-1}$

(B) $(AB)^{-1} = B^{-1}A^{-1}$

(C) $(AB)^T = A^TB^T$, where A^T denotes transpose of A

(D) $(AB)^T = B^TA^T$, where A^T denotes transpose of A

Choose the correct answer from the options given below :

(1) (A) and (C) Only

(2) (C) and (D) Only

(3) (B) and (D) Only

(4) (B) and (C) Only

[redacted]

If A and B are non singular square matrices of the same order, then which of the statements are true ?

(A) $(\text{adj } A)(\text{adj } B) = (\text{adj } B)(\text{adj } A)$

(B) $(AB)^T = A^TB^T$, if A^T denotes transpose of A

(C) $(AB)^{-1} = B^{-1}A^{-1}$

(D) Multiplication of matrices is not commutative

Choose the correct answer from the options given below :

(1) (A) and (C) Only

(2) (A) and (D) Only

(3) (B) and (C) Only

(4) (C) and (D) Only

[redacted]

If A and B are non singular square matrices of the same order, then which of the statements are true ?

(A) $(\text{adj } A)(\text{adj } B) = (\text{adj } B)(\text{adj } A)$

(B) $(AB)^T = A^TB^T$, if A^T denotes transpose of A

(C) $(AB)^{-1} = B^{-1}A^{-1}$

(D) Multiplication of matrices is not commutative

Choose the correct answer from the options given below :

(1) (A) and (C) Only

(2) (A) and (D) Only

(3) (B) and (C) Only

(4) (C) and (D) Only

[redacted]

[redacted]

$\int \log_e x \, dx$ is equal to :

(1) $x(\log_e x) + x + C$

(2) $x(\log_e x) - x + C$

(3) $x - x(\log_e x) + C$

(4) $-x - x(\log_e x) + C$

[redacted]

$I = \int a^{5x+3} \, dx$ is :

(1) $a^{5x+3} + C,$ where C is a constant

(2) $\frac{a^{5x+3}}{5 \log_e a} + C,$ where C is a constant

(3) $\frac{a^{5x+3}}{5} + C,$ where C is a constant

(4) $\frac{a^{5x+3}}{\log_e a} + C,$ where C is a constant

[redacted]

$I = \int a^{5x+3} \, dx$ is :

(1) $a^{5x+3} + C,$ where C is a constant

(2) $\frac{a^{5x+3}}{5 \log_e a} + C,$ where C is a constant

(3) $\frac{a^{5x+3}}{5} + C,$ where C is a constant

(4) $\frac{a^{5x+3}}{\log_e a} + C,$ where C is a constant

[redacted]

$I = \int a^{5x+3} \, dx$ is :

(1) $a^{5x+3} + C,$ where C is a constant

(2) $\frac{a^{5x+3}}{5 \log_e a} + C,$ where C is a constant

(3) $\frac{a^{5x+3}}{5} + C,$ where C is a constant

(4) $\frac{a^{5x+3}}{\log_e a} + C,$ where C is a constant

[redacted]

The integral $\int \log x dx$ is equal to :

(1) $x \log x + x + c$

(2) $-x \log x - x + c$

(3) $x \log x - x + c$

(4) $x \log x + x^2 + c$

[redacted]

The integral $\int \log x dx$ is equal to :

(1) $x \log x + x + c$

(2) $-x \log x - x + c$

(3) $x \log x - x + c$

(4) $x \log x + x^2 + c$

[redacted]

If $y = \log_2(\log_2 x)$, then $\frac{dy}{dx}$ is equal to :

(1) $\frac{\log_2 e}{\log_e x}$

(2) $\frac{\log_2 e}{x \log_e 2}$

(3) $\frac{\log_2 e}{x \log_e x}$

(4) $\frac{\log_e x}{x \log_2 e}$

[redacted]

[redacted]

If $y = \log_2(\log_2 x)$, then $\frac{dy}{dx}$ is equal to :

(1) $\frac{\log_2 e}{\log_e x}$

(2) $\frac{\log_2 e}{x \log_e 2}$

(3) $\frac{\log_2 e}{x \log_e x}$

(4) $\frac{\log_e x}{x \log_2 e}$

[redacted]

[redacted]

$$\int \frac{\log_e x}{(1+\log_e x)^2} dx \text{ is equal to}$$

(1) $\frac{1}{(1+\log_e x)^2} + C$, where C is constant of integration

(2) $\frac{x}{(1+\log_e x)} + C$, where C is constant of integration

(3) $\frac{x}{(1+\log_e x)^2} + C$, where C is constant of integration

(4) $\frac{1}{1+\log_e x} + C$, where C is constant of integration

[redacted]

[redacted]

The integrating factor of differential equation $[y(1-x\tan x)+x^2\cos x]dx - xdy = 0$ is :

(1) $x\cos x$

(2) $\log x\cos x$

(3) $\frac{1}{x\cos x}$

(4) $e^{x\cos x}$

[redacted]

Integrating factor of $(x\log_e x)\frac{dy}{dx}+y=2\log_e x$ is :

(1) x

(2) e^x

(3) $\log_e x$

(4) $\log_e(\log_e x)$

[redacted]

Integrating factor of $(x\log_e x)\frac{dy}{dx}+y=2\log_e x$ is :

(1) x

(2) e^x

(3) $\log_e x$

(4) $\log_e(\log_e x)$

[redacted]

The integrating factor of differential equation $\frac{dy}{dx}+y\tan x=\sec x$ is:

1. $e^{\cos x}$
2. $\sec x$
3. $e^{\sec x}$
4. $\cos x$

[redacted]

The integrating factor of differential equation $\frac{dy}{dx}+y\tan x=\sec x$ is:

1. $e^{\cos x}$
2. $\sec x$
3. $e^{\sec x}$
4. $\cos x$

[redacted]

Integrating factor of the differential equation $x\frac{dy}{dx}-y=3x^2$ is:

(1) $-x$

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

(3) $-\log x$

(4) e^{-x}

[redacted]

[redacted]

The integrating factor of the differential equation $x^2 \frac{dy}{dx} + xy = \log_e x$ is equal to:

(1) e^x

(2) $e^{x^2/2}$

(3) x

(4) $\log_e x$

[redacted]

[redacted]

$\int e^x \left(\tan^{-1} x + \frac{1}{1+x^2}\right) dx$ is equal to :

(1) $e^x \left(\frac{1}{1+x^2}\right) + C$

(2) $\tan^{-1} x + C$

(3) $e^x \tan^{-1} x + C$

(4) $e^x \cot^{-1} x + C$

[redacted]

The value of the integral $\int \left(e^x \tan^{-1} x + \frac{e^x}{1+x^2}\right) dx$ is :

(1) $e^x \tan^{-1} x + C$, where C is a constant

(2) $e^x \tan x + C$, where C is a constant

(3) $e^{-x} \tan x + C$, where C is a constant

(4) $e^{-x} \tan^{-1} x + C$, where C is a constant

[redacted]

The value of the integral $\int \left(e^x \tan^{-1} x + \frac{e^x}{1+x^2}\right) dx$ is :

(1) $e^x \tan^{-1} x + C$, where C is a constant

(2) $e^x \tan x + C$, where C is a constant

(3) $e^{-x} \tan x + C$, where C is a constant

(4) $e^{-x} \tan^{-1} x + C$, where C is a constant

[redacted]

The integral $\int \frac{dx}{\sqrt{\frac{1}{2} - 5x - x^2}}$ is equal to:

(1) $\sin^{-1}\left(\frac{2x+5}{3\sqrt{2}}\right) + C$

(2) $\sin^{-1}\left(\frac{2x+5}{3\sqrt{3}}\right) + C$

(3) $\sin^{-1}\left(\frac{2x-5}{3\sqrt{2}}\right) + C$

(4) $\sin^{-1}\left(\frac{2x-5}{3\sqrt{3}}\right) + C$

[redacted]

[redacted]

The integral $\int \frac{dx}{\sqrt{\frac{1}{2} - 5x - x^2}}$ is equal to:

(1) $\sin^{-1}\left(\frac{2x+5}{3\sqrt{2}}\right) + C$

(2) $\sin^{-1}\left(\frac{2x+5}{3\sqrt{3}}\right) + C$

(3) $\sin^{-1}\left(\frac{2x-5}{3\sqrt{2}}\right)+C$

(4) $\sin^{-1}\left(\frac{2x-5}{3\sqrt{3}}\right)+C$

[redacted]

[redacted]

The value of the integral $I=\int e^{x}\left(\tan^{-1}x+\frac{1}{1+x^{2}}\right)dx$ is :

1. $\frac{e^{x}}{1+x^{2}}+C,$ where C is a constant
2. $e^{x}\tan^{-1}x+C,$ where C is a constant
3. $\frac{1}{1+x^{2}}+C,$ where C is a constant
4. $\tan^{-1}x+C,$ where C is a constant

[redacted]

$\int_{0}^{1}\tan^{-1}\left(\frac{2x-1}{1+x-x^{2}}\right)dx$ is equal to:

(1) -1

(2) 0

(3) 1

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

[redacted]

[redacted]

[redacted]

Match List - I with List - II regarding the value of the following.

[redacted]

(A) $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$	(I) $\frac{\pi}{2}$
(B) $\cos^{-1}\left(\cos\frac{5\pi}{4}\right)$	(II) $\frac{\pi}{4}$
[redacted] (C) $\sin^{-1}\frac{4}{5}+2\tan^{-1}\frac{1}{3}$ [redacted]	(III) $\frac{5\pi}{6}$
[redacted] (D) $\tan^{-1}\frac{x}{y}-\tan^{-1}\frac{x-y}{x+y}$	(IV) $\frac{3\pi}{4}$

[redacted]

Choose the correct answer from the options given below :

(1) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

(2) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)

(3) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(4) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

[redacted]

Match \textbf{List - I} with \textbf{List - II}.

List - I		**List - II**	
(A)	$\int_{-1}^{1}\lvert x\rvert dx$	(I)	0
(B)	$\int_{-\pi/2}^{\pi/2}\sin x\,dx$	(II)	2
(C)	$\int_{-\pi/2}^{\pi/2}\cos x\,dx$	(III)	$\pi/4$
(D)	$\int_{0}^{\pi/2}\sin^2 x\,dx$	(IV)	1

Choose the \textbf{correct} option from the ones given below :

(1) $(A)-(II),(B)-(III),(C)-(IV),(D)-(I)$

(2) $(A)-(IV),(B)-(I),(C)-(II),(D)-(III)$

(3) $(A)-(I),(B)-(IV),(C)-(II),(D)-(III)$

(4) $(A)-(IV),(B)-(I),(C)-(III),(D)-(II)$

[redacted]

Match \textbf{List - I} with \textbf{List - II}.

List - I		**List - II**	
(A)	$\int_{-1}^{1}\lvert x\rvert dx$	(I)	0
(B)	$\int_{-\pi/2}^{\pi/2}\sin x\,dx$	(II)	2

(C)	$\int_{-\pi/2}^{\pi/2} \cos x \, dx$	(III)	$\pi/4$
(D)	$\int_{0}^{\pi/2} \sin^2 x \, dx$	(IV)	1

Choose the \textbf{correct} option from the ones given below :

(1) $(A)-(II),(B)-(III),(C)-(IV),(D)-(I)$

(2) $(A)-(IV),(B)-(I),(C)-(II),(D)-(III)$

(3) $(A)-(I),(B)-(IV),(C)-(II),(D)-(III)$

(4) $(A)-(IV),(B)-(I),(C)-(III),(D)-(II)$

[redacted]

Match List - I with List - II.

[redacted]

List - I	List - II
$(Function) y$	$(Derivative) \frac{dy}{dx}$
$(A)\ y = \cos\sqrt{x}$	$(I)\ \frac{\sec(\tan\sqrt{x})\tan(\tan\sqrt{x})\sec^2\sqrt{x}}{2\sqrt{x}}$
$(B)\ y = \sqrt{\sin x}$	$(II)\ -3x^2\cos(x^3)\sin(\sin(x^3))$
$(C)\ y = \sec(\tan\sqrt{x})$	$(III)\ \frac{\cos x}{2\sqrt{\sin x}}$
$(D)\ y = \cos(\sin(x^3))$	$(IV)\ -\frac{1}{2\sqrt{x}}\sin\sqrt{x}$

[redacted]

Choose the correct answer from the options given below:

(1) $(A)-(I),\ (B)-(IV),\ (C)-(II),\ (D)-(III)$

(2) $(A)-(IV),\ (B)-(III),\ (C)-(I),\ (D)-(II)$

(3) $(A)-(III),\ (B)-(II),\ (C)-(IV),\ (D)-(I)$

(4) $(A)-(II),\ (B)-(I),\ (C)-(III),\ (D)-(IV)$

[redacted]

[redacted]

Match List - I with List - II.

[redacted]

List - I	List - II
$(Function) y$	$(Derivative) \frac{dy}{dx}$
$(A)\ y = \cos\sqrt{x}$	$(I)\ \frac{\sec(\tan\sqrt{x})\tan(\tan\sqrt{x})\sec^2\sqrt{x}}{2\sqrt{x}}$
$(B)\ y = \sqrt{\sin x}$	$(II)\ -3x^2\cos(x^3)\sin(\sin(x^3))$

$(C)\ y = \sec(\tan\sqrt{x})$ $\qquad (III)\ \dfrac{\cos x}{2\sqrt{\sin x}}$

$(D)\ y = \cos(\sin(x^3))$ $\qquad (IV)\ -\dfrac{1}{2\sqrt{x}}\sin\sqrt{x}$

[redacted]

Choose the correct answer from the options given below:

(1) $(A)-(I),\ (B)-(IV),\ (C)-(II),\ (D)-(III)$

(2) $(A)-(IV),\ (B)-(III),\ (C)-(I),\ (D)-(II)$

(3) $(A)-(III),\ (B)-(II),\ (C)-(IV),\ (D)-(I)$

(4) $(A)-(II),\ (B)-(I),\ (C)-(III),\ (D)-(IV)$

[redacted]

[redacted]

\textbf{Match List - I with List - II.}

\textbf{List - I} \textbf{List - II}

$(A)\ \displaystyle\int \frac{dx}{a^2-x^2}$ $\quad (I)\ \dfrac{1}{2a}\log\left|\dfrac{x-a}{x+a}\right| + C$

[redacted]

$(B)\ \displaystyle\int \frac{dx}{x^2-a^2}$ $\quad (II)\ \dfrac{1}{2a}\log\left|\dfrac{a+x}{a-x}\right| + C$

$(C)\ \displaystyle\int \frac{dx}{x^2+a^2}$ $\quad (III)\ \sin^{-1}\left(\dfrac{x}{a}\right) + C$

$(D)\ \displaystyle\int \frac{dx}{\sqrt{a^2-x^2}}$ $\quad (IV)\ \dfrac{1}{a}\tan^{-1}\dfrac{x}{a} + C$

Choose the \textbf{correct} answer from the options given below :

(1) $(A)-(I),(B)-(III),(C)-(II),(D)-(IV)$

(2) $(A)-(II),(B)-(I),(C)-(IV),(D)-(III)$

(3) $(A)-(III),(B)-(II),(C)-(I),(D)-(IV)$

(4) $(A)-(IV),(B)-(III),(C)-(II),(D)-(I)$

[redacted]

\textbf{Match List - I with List - II.}

\textbf{List - I} \textbf{List - II}

$(A)\ \displaystyle\int_{-\pi/2}^{\pi/2} \sin^5 x\, dx$ $\qquad (I)\ \pi$

(B) $\int_{-\pi/2}^{\pi/2} (x^3 + \tan^3 x + 1)\, dx$ (II) $\frac{\pi}{12}$

(C) $\int_{0}^{\pi/2} \frac{\cos^5 x}{\cos^5 x + \sin^5 x}\, dx$ (III) $\frac{\pi}{4}$

(D) $\int_{1}^{\sqrt{3}} \frac{dx}{1+x^2}$ (IV) 0

Choose the \textbf{correct} answer from the options given below :

(1) $(A)-(IV), (B)-(I), (C)-(III), (D)-(II)$

(2) $(A)-(I), (B)-(II), (C)-(III), (D)-(IV)$

(3) $(A)-(II), (B)-(III), (C)-(IV), (D)-(I)$

(4) $(A)-(III), (B)-(IV), (C)-(I), (D)-(II)$

[redacted]

\textbf{Match List - I with List - II.}

\textbf{List - I} \textbf{List - II}

(A) $\int \frac{dx}{a^2 - x^2}$ (I) $\frac{1}{2a} \log\left|\frac{x-a}{x+a}\right| + C$

(B) $\int \frac{dx}{x^2 - a^2}$ (II) $\frac{1}{2a} \log\left|\frac{a+x}{a-x}\right| + C$

(C) $\int \frac{dx}{x^2 + a^2}$ (III) $\sin^{-1}\left(\frac{x}{a}\right) + C$

(D) $\int \frac{dx}{\sqrt{a^2 - x^2}}$ (IV) $\frac{1}{a} \tan^{-1} \frac{x}{a} + C$

Choose the \textbf{correct} answer from the options given below :

(1) $(A)-(I), (B)-(III), (C)-(II), (D)-(IV)$

(2) $(A)-(II), (B)-(I), (C)-(IV), (D)-(III)$

(3) $(A)-(III), (B)-(II), (C)-(I), (D)-(IV)$

(4) $(A)-(IV), (B)-(III), (C)-(II), (D)-(I)$

[redacted]

\textbf{Match List - I with List - II.}

\textbf{List - I} \textbf{List - II}

(A) $\int_{-\pi/2}^{\pi/2} \sin^5 x\, dx$ (I) π

(B) $\int_{-\pi/2}^{\pi/2}(x^3+\tan^3 x+1)\,dx$ (II) $\frac{\pi}{12}$

(C) $\int_0^{\pi/2}\frac{\cos^5 x}{\cos^5 x+\sin^5 x}\,dx$ (III) $\frac{\pi}{4}$

[redacted]

(D) $\int_1^{\sqrt{3}}\frac{dx}{1+x^2}$ (IV) 0

Choose the \textbf{correct} answer from the options given below :

(1) $(A)-(IV),(B)-(I),(C)-(III),(D)-(II)$

(2) $(A)-(I),(B)-(II),(C)-(III),(D)-(IV)$

(3) $(A)-(II),(B)-(III),(C)-(IV),(D)-(I)$

(4) $(A)-(III),(B)-(IV),(C)-(I),(D)-(II)$

[redacted]

Match List - I with List - II.

List - I	List - II
(A) $y=\log(\sin x)$	(I) $\frac{d^2y}{dx^2}=-\frac{1}{x^2}$
(B) $y=e^{(1+\log x)}$	(II) $\frac{d^2y}{dx^2}=2$
(C) $y=\log\lvert x\rvert$	(III) $\frac{d^2y}{dx^2}=0$
(D) $y=x^2+4x-1$	(IV) $\frac{d^2y}{dx^2}=-\text{cosec}^2 x$

Choose the \textbf{correct} answer from the options given below :

(1) $(A)-(I),(B)-(II),(C)-(III),(D)-(IV)$

(2) $(A)-(II),(B)-(I),(C)-(IV),(D)-(III)$

(3) $(A)-(III),(B)-(IV),(C)-(II),(D)-(I)$

(4) $(A)-(IV),(B)-(III),(C)-(I),(D)-(II)$

[redacted]

Match List - I with List - II.

List - I	List - II
(A) $y=\log(\sin x)$	(I) $\frac{d^2y}{dx^2}=-\frac{1}{x^2}$
(B) $y=e^{(1+\log x)}$	(II) $\frac{d^2y}{dx^2}=2$
(C) $y=\log\lvert x\rvert$	(III) $\frac{d^2y}{dx^2}=0$
(D) $y=x^2+4x-1$	(IV) $\frac{d^2y}{dx^2}=-\text{cosec}^2 x$

Choose the \textbf{correct} answer from the options given below :

(1) $(A)-(I),(B)-(II),(C)-(III),(D)-(IV)$

(2) $(A)-(II),(B)-(I),(C)-(IV),(D)-(III)$

(3) $(A)-(III),(B)-(IV),(C)-(II),(D)-(I)$

(4) $(A)-(IV),(B)-(III),(C)-(I),(D)-(II)$

[redacted]

Match List - I with List - II.

[redacted]

List - I	List - II
(A) Derivative of $\|x-1\|+\|x-3\|$ at $x=2$	(I) -1
(B) $y=\log_e \sqrt{\tan x}$ then $\frac{dy}{dx}$ at $x=\frac{\pi}{4}$	(II) 1
(C) $\sin(x+y)=\log_e(x+y)$ then $\frac{dy}{dx}$ is	(III) 2
(D) Value of C in Lagrange's Mean Value Theorem for $f(x)=x^2+x+1,\ x\in[0,4]$	(IV) 0

[redacted]

Choose the correct answer from the options given below:

(1) $(A)-(IV),\ (B)-(II),\ (C)-(I),\ (D)-(III)$

(2) $(A)-(II),\ (B)-(IV),\ (C)-(I),\ (D)-(III)$

(3) $(A)-(I),\ (B)-(IV),\ (C)-(III),\ (D)-(II)$

(4) $(A)-(IV),\ (B)-(III),\ (C)-(I),\ (D)-(II)$

[redacted]

Match List - I with List - II.

[redacted]

List - I	List - II
(A) Derivative of $\|x-1\|+\|x-3\|$ at $x=2$	(I) -1
(B) $y=\log_e \sqrt{\tan x}$ then $\frac{dy}{dx}$ at $x=\frac{\pi}{4}$	(II) 1
(C) $\sin(x+y)=\log_e(x+y)$ then $\frac{dy}{dx}$ is	(III) 2
(D) Value of C in Lagrange's Mean Value Theorem for $f(x)=x^2+x+1,\ x\in[0,4]$	(IV) 0

[redacted]

Choose the correct answer from the options given below:

(1) $(A)-(IV),\ (B)-(II),\ (C)-(I),\ (D)-(III)$

(2) $(A)-(II),\ (B)-(IV),\ (C)-(I),\ (D)-(III)$

(3) $(A)-(I),\ (B)-(IV),\ (C)-(III),\ (D)-(II)$

(4) $(A)-(IV),\ (B)-(III),\ (C)-(I),\ (D)-(II)$

[redacted]

[redacted]

Match List - I with List - II.

[redacted]

(A) $\frac{d}{dx}(\sin x^2)$	(I) $\frac{1}{5}$
(B) $\frac{d}{dx}(e^{\sin x})$	(II) 0
(C) $f(x)=\tan^{-1}x$ then $f'(2)$	(III) $2x\cos x^2$
(D) If $y=3\cos x-2\sin x,$ then $\frac{d^2y}{dx^2}+y$	(IV) $e^{\sin x}\cos x$

Choose the correct answer from the options given below:

(1) $(A)-(IV),\ (B)-(III),\ (C)-(II),\ (D)-(I)$

(2) $(A)-(IV),\ (B)-(III),\ (C)-(I),\ (D)-(II)$

(3) $(A)-(III),\ (B)-(IV),\ (C)-(I),\ (D)-(II)$

(4) $(A)-(III),\ (B)-(IV),\ (C)-(II),\ (D)-(I)$

[redacted]

[redacted]

Match List - I with List - II.

[redacted]

(A) $\frac{d}{dx}(\sin x^2)$	(I) $\frac{1}{5}$
(B) $\frac{d}{dx}(e^{\sin x})$	(II) 0
(C) $f(x)=\tan^{-1}x$ then $f'(2)$	(III) $2x\cos x^2$
(D) If $y=3\cos x-2\sin x,$ then $\frac{d^2y}{dx^2}+y$	(IV) $e^{\sin x}\cos x$

Choose the correct answer from the options given below:

(1) $(A)-(IV),\ (B)-(III),\ (C)-(II),\ (D)-(I)$

(2) $(A)-(IV),\ (B)-(III),\ (C)-(I),\ (D)-(II)$

(3) $(A)-(III),\ (B)-(IV),\ (C)-(I),\ (D)-(II)$

(4) $(A)-(III),\ (B)-(IV),\ (C)-(II),\ (D)-(I)$

[redacted]

[redacted]

Match List - I with List - II. Evaluate the integrals.

List - I　　　　List - II

(A) $\int_0^{\pi/2} \frac{\sin x - \cos x}{1 + \sin x \cos x} dx$ (I) 2π

(B) $\int_0^{1/2} \frac{dx}{\sqrt{x - x^2}}$ (II) $\frac{\pi}{4}$

(C) $\int_{-\pi}^{\pi} x \sin x \, dx$ (III) 0

(D) $\int_0^1 \frac{1}{1 + x^2} dx$ (IV) $\frac{\pi}{2}$

Choose the correct answer from the options given below :

(1) (A)-(I), (B)-(IV), (C)-(II), (D)-(III)

(2) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(3) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)

(4) (A)-(I), (B)-(III), (C)-(IV), (D)-(II)

[redacted]

[redacted]

Match List - I with List - II. Evaluate the integrals.

List - I	List - II
(A) $\int_0^{\pi/2} \frac{\sin x - \cos x}{1 + \sin x \cos x} dx$	(I) 2π
(B) $\int_0^{1/2} \frac{dx}{\sqrt{x - x^2}}$	(II) $\frac{\pi}{4}$
(C) $\int_{-\pi}^{\pi} x \sin x \, dx$	(III) 0
(D) $\int_0^1 \frac{1}{1 + x^2} dx$	(IV) $\frac{\pi}{2}$

Choose the correct answer from the options given below :

(1) (A)-(I), (B)-(IV), (C)-(II), (D)-(III)

(2) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(3) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)

(4) (A)-(I), (B)-(III), (C)-(IV), (D)-(II)

[redacted]

[redacted]

Match List–I with List–II. Find the derivatives from List–I.

List–I	**List–II**
$(A)\ y = \sqrt{\sin x + y}$	$(I)\ \frac{-\sin x}{1 + \cos y}$
$(B)\ \sin y = x \sin(a + y)$	$(II)\ \frac{\cos x}{2y - 1}$
$(C)\ y + \sin y = \cos x$	$(III)\ \frac{-1}{\sin^2(x + y)}$
$(D)\ y = \tan(x + y)$	$(IV)\ \frac{\sin^2(a + y)}{\sin a}$

Choose the correct answer from the options given below :

(1) $(A) - (IV),\ (B) - (II),\ (C) - (III),\ (D) - (I)$

(2) $(A) - (III),\ (B) - (I),\ (C) - (IV),\ (D) - (II)$

(3) $(A)-(I),\ (B)-(III),\ (C)-(II),\ (D)-(IV)$

(4) $(A)-(II),\ (B)-(IV),\ (C)-(I),\ (D)-(III)$

[redacted]

[redacted]

Match List–I with List–II. Find the derivatives from List–I.

List–I	List–II
$(A)\ y=\sqrt{\sin x+y}$	$(I)\ \frac{-\sin x}{1+\cos y}$
$(B)\ \sin y = x\sin(a+y)$	$(II)\ \frac{\cos x}{2y-1}$
$(C)\ y+\sin y=\cos x$	$(III)\ \frac{-1}{\sin^2(x+y)}$
$(D)\ y=\tan(x+y)$	$(IV)\ \frac{\sin^2(a+y)}{\sin a}$

Choose the correct answer from the options given below :

(1) $(A)-(IV),\ (B)-(II),\ (C)-(III),\ (D)-(I)$

(2) $(A)-(III),\ (B)-(I),\ (C)-(IV),\ (D)-(II)$

(3) $(A)-(I),\ (B)-(III),\ (C)-(II),\ (D)-(IV)$

(4) $(A)-(II),\ (B)-(IV),\ (C)-(I),\ (D)-(III)$

[redacted]

[redacted]

Match List I with List II

List I

(A) Angle between $\hat{i}-2\hat{j}+3\hat{k}$ and $2\hat{i}+\hat{j}$

(B) Angle between $\hat{i}+\hat{j}+2\hat{k}$ and $2\hat{i}+2\hat{j}+4\hat{k}$

(C) Angle between $2\hat{i}-\hat{j}+\hat{k}$ and $\hat{i}+\hat{j}+\hat{k}$

(D) Angle between $\hat{i}+\hat{j}-\hat{k}$ and $\hat{i}+\hat{j}+\hat{k}$

List II

(I) $\cos^{-1}\left(\frac{2}{\sqrt{18}}\right)$

(II) 0

(III) 90°

(IV) $\cos^{-1}\left(\frac{1}{3}\right)$

Choose the correct answer from the options given below:

(1) (A)-(I), (B)-(II), (C)-(IV), (D)-(III)

(2) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)

(3) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

(4) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)

[redacted]

[redacted]

Match List I with List II

List I

(A) Angle between $\hat{i}-2\hat{j}+3\hat{k}$ and $2\hat{i}+\hat{j}$

(B) Angle between $\hat{i}+\hat{j}+2\hat{k}$ and $2\hat{i}+2\hat{j}+4\hat{k}$

(C) Angle between $2\hat{i}-\hat{j}+\hat{k}$ and $\hat{i}+\hat{j}+\hat{k}$

(D) Angle between $\hat{i}+\hat{j}-\hat{k}$ and $\hat{i}+\hat{j}+\hat{k}$

List II

(I) $\cos^{-1}\left(\frac{2}{\sqrt{18}}\right)$

(II) 0

(III) 90°

(IV) $\cos^{-1}\left(\frac{1}{3}\right)$

Choose the correct answer from the options given below:

(1) (A)-(I), (B)-(II), (C)-(IV), (D)-(III)
(2) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)
(3) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
(4) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)

[redacted]

[redacted]

Match List - I with List - II.

List - I		List - II	
(A)	Range of $y=\operatorname{cosec}^{-1}x$	(I)	$R-(-1,1)$
(B)	Domain of $\sec^{-1}x$	(II)	$(0,\pi)$
(C)	Domain of $\sin^{-1}x$	(III)	$[-1,1]$
(D)	Range of $y=\cot^{-1}x$	(IV)	$\left[\frac{-\pi}{2},\frac{\pi}{2}\right]-\{0\}$

Choose the correct answer from the options given below :

(1) $(A)-(I),(B)-(II),(C)-(IV),(D)-(III)$
(2) $(A)-(IV),(B)-(I),(C)-(III),(D)-(II)$
(3) $(A)-(III),(B)-(IV),(C)-(II),(D)-(I)$
(4) $(A)-(II),(B)-(III),(C)-(I),(D)-(IV)$

[redacted]

Match List - I with List - II.

List - I		List - II	
(A)	Range of $y=\operatorname{cosec}^{-1}x$	(I)	$R-(-1,1)$
(B)	Domain of $\sec^{-1}x$	(II)	$(0,\pi)$
(C)	Domain of $\sin^{-1}x$	(III)	$[-1,1]$

(D) Range of $y = \cot^{-1} x$ (IV) $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right] - \{0\}$

Choose the correct answer from the options given below :

(1) $(A) - (I), (B) - (II), (C) - (IV), (D) - (III)$

(2) $(A) - (IV), (B) - (I), (C) - (III), (D) - (II)$

(3) $(A) - (III), (B) - (IV), (C) - (II), (D) - (I)$

(4) $(A) - (II), (B) - (III), (C) - (I), (D) - (IV)$

[redacted]

(A) $\sin^{-1}(-1)$ (I) $\frac{5\pi}{6}$

(B) $\cot^{-1}(-1)$ (II) $-\frac{\pi}{2}$

(C) $\sec^{-1}\left(-\frac{2}{\sqrt{3}}\right)$ (III) $\frac{\pi}{4}$

(D) $\tan^{-1}(1)$ (IV) $\frac{3\pi}{4}$

[redacted]

(1) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)

(2) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

(3) (A)-(I), (B)-(IV), (C)-(II), (D)-(III)

(4) (A)-(I), (B)-(III), (C)-(II), (D)-(IV)

[redacted]

(A) Point of minima of $f(x) = |x+1|$ (I) 1

(B) Minimum value of $f(x) = |x|$ (II) -1

(C) Maximum value of $f(x) = 1 - x^2$ (III) 2

(D) Minimum value of $f(x) = 2 + \sin^2 x$ (IV) 0

[redacted]

(1) $(A) - (IV), (B) - (II), (C) - (III), (D) - (I)$

(2) $(A) - (II), (B) - (IV), (C) - (I), (D) - (III)$

(3) $(A) - (I), (B) - (III), (C) - (II), (D) - (IV)$

(4) $(A) - (III), (B) - (I), (C) - (IV), (D) - (II)$

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

If A and B are symmetric matrices then $(AB + BA)$ is:

(1) Symmetric matrix

(2) Skew-symmetric matrix

(3) Diagonal matrix

(4) Scalar matrix

[redacted]

[redacted]

If A and B are symmetric matrices then $(AB + BA)$ is:

(1) Symmetric matrix

(2) Skew-symmetric matrix

(3) Diagonal matrix

(4) Scalar matrix

[redacted]

[redacted]

If a matrix P is both symmetric and skew-symmetric, then

1. P is a diagonal matrix

2. P is a square matrix

3. P is a zero matrix

4. P is an identity matrix

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

In a binomial distribution, the probability of getting a success is $\frac{1}{3}$ and the standard deviation is 2. Then its mean is :

(1) 12

(2) 8

(3) 24

(4) 6

[redacted]

[redacted]

Let R be the feasible region for a Linear Programming Problem and let $z = ax + by$ be the objective function. If R is bounded, then the objective function z has :

(1) Only maximum value on R

(2) Only minimum value on R

(3) Both maximum and minimum values on R

(4) Neither maximum nor minimum value on R

[redacted]

If the feasible region R for a linear programming problem is bounded, then the objective function $Z = Ax + By$ has

1. only maximum value on R
2. only minimum value of an R
3. Both maximum and minimum value on R
4. Neither maximum nor minimum value on R

[redacted]

If the feasible region R for a linear programming problem is bounded, then the objective function $Z = Ax + By$ has

1. only maximum value on R
2. only minimum value of an R
3. Both maximum and minimum value on R
4. Neither maximum nor minimum value on R

[redacted]

[redacted]

The value of the integral $I = \int \frac{(\log x)^3}{x} dx$ is :

(1) $\frac{1}{4}\log(x^4) + C$, where C is a constant

(2) $\frac{(\log x)^4}{4} + C$, where C is a constant

(3) $\frac{1}{2}\log(x^2) + C$, where C is a constant

(4) $\frac{1}{2}(\log x)^4 + C$, where C is a constant

[redacted]

$$\int \frac{dx}{\sqrt{5-x}} = \text{(where } C \text{ is arbitrary constant.)}$$

(1) $\sqrt{5-x} + C$

(2) $-\sqrt{5-x} + C$

(3) $2\sqrt{5-x} + C$

(4) $-2\sqrt{5-x} + C$

[redacted]

[redacted]

$$\int \frac{dx}{\sqrt{5-x}} = \text{(where } C \text{ is arbitrary constant.)}$$

(1) $\sqrt{5-x} + C$

(2) $-\sqrt{5-x} + C$

(3) $2\sqrt{5-x} + C$

(4) $-2\sqrt{5-x} + C$

[redacted]

[redacted]

[redacted]

If A is a square matrix of order 3 and A' is the transpose of A such that $|A'| = -5,$ then $|AA'| =$

(1) 25

(2) 5

(3) -5

(4) -25

[redacted]

If A is a square matrix and $|A| = 4,$ then the value of $|AA'|$ where A' is transpose of A is:

(1) 16

(2) 4

(3) 2

(4) 8

[redacted]

[redacted]

If A is a square matrix and $|A| = 4,$ then the value of $|AA'|$ where A' is transpose of A is:

(1) 16

(2) 4

(3) 2

(4) 8

[redacted]

[redacted]

If A is a square matrix of order 3 such that $|A| = 2,$ then the value of $|\text{adj}(\text{adj A})|$ is :

(1) 2

(2) 4

(3) 8

(4) 16

[redacted]

If A is a square matrix of order 3 such that $|A| = 2,$ then the value of $|\text{adj}(\text{adj A})|$ is :

(1) 2

(2) 4

(3) 8

(4) 16

[redacted]

If A is a square matrix and I is an identity matrix of same order such that $A^2 = A,$ then $(2I + A)^2 - 5A$ is:

(1) O

(2) $4I$

(3) $5A$

(4) $2I$

[redacted]

[redacted]

The corner points of the feasible region determined by the system of Linear Constraints are $(0, 3)$, $(1, 2)$ and $(3, 0)$. Let $z = px + qy$, where $p, q > 0$, be the objective function. Find the condition on p and q so that the minimum of z occurs at $(3, 0)$ and $(1, 2)$:

(1) $p = 2q$

(2) $p = 3q$

(3) $p = q$

(4) $p = q/2$

[redacted]

The corner points of the feasible region determined by the system of linear constraints are $(0,3)$, $(1,1)$ and $(3,0)$.

Let $Z = px + qy$, where $p, q > 0$, be the objective function.

Then the condition on p and q so that the minimum of Z

occurs at $(3,0)$ and $(1,1)$ is:

(1) $p = q$

(2) $p = 3q$

(3) $p = \frac{q}{2}$

(4) $p = \frac{q}{3}$

[redacted]

[redacted]

The corner points of the feasible region determined by the system of linear constraints are $(0,3)$, $(1,1)$ and $(3,0)$.

Let $Z = px + qy$, where $p, q > 0$, be the objective function.

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(3) $p = \frac{q}{2}$

(4) $p = \frac{q}{3}$

[redacted]

[redacted]

[redacted]

The probability that A speaks the truth is 4/5. A coin is tossed and A reports 'Heads'. The probability that it actually showed 'Heads' is :

(1) 1/5

(2) 4/5

(3) 3/5

(4) 2/5

[redacted]

The probability that A speaks the truth is $\frac{4}{5}$. He throws a die and reports that it is a five.

The probability that it is actually a five is:

(1) $\frac{4}{9}$

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

(3) $\frac{2}{9}$

(4) $\frac{5}{9}$

[redacted]

[redacted]

The probability that A speaks the truth is $\frac{4}{5}$. He throws a die and reports that it is a five.

The probability that it is actually a five is:

(1) $\frac{4}{9}$

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

(3) $\frac{2}{9}$

(4) $\frac{5}{9}$

[redacted]

[redacted]

The probability that A speaks the truth is $\frac{4}{5}$. He throws a die and reports that it is a five.

The probability that it is actually a five is:

(1) $\frac{4}{9}$

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

(3) $\frac{2}{9}$

(4) $\frac{5}{9}$

[redacted]

[redacted]

Probability that A speaks truth is $\frac{4}{5}$. A coin is tossed. A reports that a head appears. The probability that actually there was head is :

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

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

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

(4) $\frac{3}{5}$

[redacted]

Probability that A speaks truth is $\frac{4}{5}$. A coin is tossed. A reports that a head appears. The probability that actually there was head is :

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

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

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

(4) $\frac{3}{5}$

[redacted]

[redacted]

Derivative of $\sin(\cos(x^2))$ with respect to x^2 is :

(1) $-2x\cos(\sin(x^2))$

(2) $-2x\cos(\cos(x^2))\sin(x^2)$

(3) $-\cos(\cos(x^2))\sin(x^2)$

(4) $\cos(\cos(x^2))\sin(x^2)$

[redacted]

Derivative of $\cos(\sin(x^2))$ with respect to x is:

(1) $2x\sin(x^2)\cos(\cos(x^2))$

(2) $-2x\sin(x^2)\cos(\cos(x^2))$

(3) $-2x\cos(x^2)\sin(\sin(x^2))$

(4) $2x\cos(x^2)\sin(\cos(x^2))$

[redacted]

[redacted]

Derivative of $\cos(\sin(x^2))$ with respect to x is:

(1) $2x\sin(x^2)\cos(\cos(x^2))$

(2) $-2x\sin(x^2)\cos(\cos(x^2))$

(3) $-2x\cos(x^2)\sin(\sin(x^2))$

(4) $2x\cos(x^2)\sin(\cos(x^2))$

[redacted]

[redacted]

[redacted]

The equation of the normal to the curve $y = \sin x$ at $(0,0)$ is :

(1) $x - y = 0$

(2) $x + y = 0$

(3) $x = 0$

(4) $y = 0$

[redacted]

The equation of the normal to the curve $y = 2\sin x$ at $(0,0)$ is:

(1) $x + \frac{1}{2}y = 0$

(2) $x - 2y = 0$

(3) $x - \frac{1}{2}y = 0$

(4) $x + 2y = 0$

[redacted]

[redacted]

The equation of the normal to the curve $y = 2\sin x$ at $(0,0)$ is:

(1) $x + \frac{1}{2}y = 0$

(2) $x - 2y = 0$

(3) $x - \frac{1}{2}y = 0$

(4) $x + 2y = 0$

[redacted]

[redacted]

The equation of the normal to the curve $y = 4x^3 + 2\sin x$ at $(0,3)$ is :

(1) $x - 3y = 3$

(2) $x + 2y = 6$

(3) $2x - y = -3$

(4) $2x + y = 3$

[redacted]

The slope of the normal to the curve $y = x^3 - 4\sin x$ at $x = 0$ is:

(1) -4

(2) $\frac{1}{4}$

(3) 4

(4) $-\frac{1}{4}$

[redacted]

The slope of the normal to the curve $y = x^3 - 4\sin x$ at $x = 0$ is:

(1) -4

(2) $\frac{1}{4}$

(3) 4

(4) $-\frac{1}{4}$

[redacted]

[redacted]

Which of the following determinant has the correct value ?

(1) $\begin{vmatrix} x & a & x+a \\ y & b & y+b \\ z & c & z+c \end{vmatrix} = xyz$

(2) $\begin{vmatrix} x & x & a \\ y & y & b \\ z & z & c \end{vmatrix} = abc$

(3) $\begin{vmatrix} x & a & +x \\ y & b & +y \\ z & c & +z \end{vmatrix} = 0$

(4) $\begin{vmatrix} x+a & a & x \\ y+b & b & y \\ z+c & c & z \end{vmatrix} = abc$

[redacted]

The value of the determinant $\Delta = \begin{vmatrix} 1! & 2! & 3! \\ 2! & 3! & 4! \\ 3! & 4! & 5! \end{vmatrix}$ is :

(1) 2!

(2) 3!

(3) 4!

(4) 5!

[redacted]

The value of the determinant $\Delta = \begin{vmatrix} 1! & 2! & 3! \\ 2! & 3! & 4! \\ 3! & 4! & 5! \end{vmatrix}$ is :

(1) 2!

(2) 3!

(3) 4!

(4) 5!

[redacted]

[redacted]

The function $f(x) = \tan x - x$ for $x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ is :

(1) increasing function

(2) decreasing function

(3) neither increasing nor decreasing function

(4) decreasing in $\left(\frac{-\pi}{2}, 0\right)$ and increasing in $\left(0, \frac{\pi}{2}\right)$

[redacted]

The interval in which the function $f(x) = 10 - 6x - 2x^2$ is decreasing is :

(1) $\left(\frac{-3}{2}, \frac{3}{2}\right)$

(2) $\left(-\infty, \frac{-3}{2}\right)$

(3) $\left(\frac{-3}{2}, \infty\right)$

(4) $\left(-\infty, \frac{3}{2}\right)$

[redacted]

The interval in which the function $f(x) = 10 - 6x - 2x^2$ is decreasing is :

(1) $\left(\frac{-3}{2}, \frac{3}{2}\right)$

(2) $\left(-\infty, \frac{-3}{2}\right)$

(3) $\left(\frac{-3}{2}, \infty\right)$

(4) $\left(-\infty, \frac{3}{2}\right)$

[redacted]

The function $f(x) = \tan x - x$ for $x \in \left(0, \frac{\pi}{2}\right)$ is :

(1) increasing function

(2) decreasing function

(3) neither increasing nor decreasing function

(4) strictly decreasing function

[redacted]

[redacted]

For any square matrix A; $(A - A')$ is :

(1) Symmetric matrix

(2) Null matrix

(3) Identity matrix

(4) Skew - symmetric matrix

[redacted]

A matrix which is symmetric as well as skew symmetric is:

(1) Row matrix

(2) Column matrix

(3) Square matrix

(4) Square null matrix

[redacted]

[redacted]

A matrix which is symmetric as well as skew symmetric is:

(1) Row matrix

(2) Column matrix

(3) Square matrix

(4) Square null matrix

[redacted]

[redacted]

[redacted]

The integral $\int e^x \left(\frac{x-1}{2x^2}\right) dx$ is equal to:

1. $\frac{e^x}{x} + C,$ where C is constant of integration
2. $\frac{e^x}{2x} + C,$ where C is constant of integration
3. $e^x x + C,$ where C is constant of integration
4. $x^2 e^x + C,$ where C is constant of integration

[redacted]

[redacted]

The integral $\int e^x \left(\frac{x-1}{2x^2}\right) dx$ is equal to

1. $\frac{e^x}{2x} + C,$ where C is constant of integration.
2. $\frac{2e^x}{x} + C,$ where C is constant of integration.
3. $\frac{e^x}{x} + C,$ where C is constant of integration.
4. $\frac{e^x}{4x} + C,$ where C is constant of integration.

[redacted]

[redacted]

The inverse of the matrix $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ is:

1. $\begin{bmatrix} -2 & 3 \\ 1 & -2 \end{bmatrix}$
2. $\begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$
3. $\begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$
4. $\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$

[redacted]

[redacted]

The matrix $A = \begin{bmatrix} 0 & 1 & -3 \\ -1 & 0 & 0 \\ 3 & 0 & 0 \end{bmatrix}$ is a:

1. Diagonal matrix
2. Symmetric matrix
3. Skew-symmetric matrix
4. Scalar matrix

[redacted]

The matrix $A = \begin{bmatrix} 0 & 1 & -3 \\ -1 & 0 & 0 \\ 3 & 0 & 0 \end{bmatrix}$ is a:

1. Diagonal matrix
2. Symmetric matrix
3. Skew-symmetric matrix
4. Scalar matrix

[redacted]

The inverse of the matrix $\begin{bmatrix} 5 & 11 \\ 1 & 2 \end{bmatrix}$ is:

(1) $\begin{bmatrix} -2 & 11 \\ 1 & -5 \end{bmatrix}$

(2) $\begin{bmatrix} 2 & -11 \\ -1 & 5 \end{bmatrix}$

(3) $\begin{bmatrix} 5 & 1 \\ 11 & 2 \end{bmatrix}$

(4) $\begin{bmatrix} 5 & -1 \\ -11 & 2 \end{bmatrix}$

[redacted]

[redacted]

The inverse of the matrix $\begin{bmatrix} 5 & 11 \\ 1 & 2 \end{bmatrix}$ is:

(1) $\begin{bmatrix} -2 & 11 \\ 1 & -5 \end{bmatrix}$

(2) $\begin{bmatrix} 2 & -11 \\ -1 & 5 \end{bmatrix}$

(3) $\begin{bmatrix} 5 & 1 \\ 11 & 2 \end{bmatrix}$

(4) $\begin{bmatrix} 5 & -1 \\ -11 & 2 \end{bmatrix}$

[redacted]

[redacted]

For the matrix $A = \begin{bmatrix} 3 & 1 \\ 7 & 5 \end{bmatrix}, 8A^{-1} =$ ______.

1. $I - A$
2. $\frac{1}{8}(A - I)$
3. $(8I - A)$
4. $\frac{1}{8}(I + A)$

[redacted]

For the matrix $A = \begin{bmatrix} 3 & 1 \\ 7 & 5 \end{bmatrix}, 8A^{-1} =$ ______.

1. $I - A$
2. $\frac{1}{8}(A - I)$
3. $(8I - A)$
4. $\frac{1}{8}(I + A)$

[redacted]

The value of x for which the matrix $A = \begin{bmatrix} 1 & -2 & 3 \\ 1 & 2 & 1 \\ x & 2 & -3 \end{bmatrix}$ is singular is:

1. -1
2. 1
3. 0
4. 2

[redacted]

The value of x for which the matrix $A = \begin{bmatrix} 1 & -2 & 3 \\ 1 & 2 & 1 \\ x & 2 & -3 \end{bmatrix}$ is singular is:

1. -1
2. 1
3. 0
4. 2

[redacted]

$$\text{If } \begin{bmatrix} 3 & 1 \\ 2 & 1 \end{bmatrix} A \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix},$$

then matrix 'A' is

1. $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$
2. $\begin{bmatrix} -1 & 1 \\ 3 & -4 \end{bmatrix}$
3. $\begin{bmatrix} 1 & -1 \\ -3 & 4 \end{bmatrix}$
4. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

[redacted]

[redacted]

[redacted]

If $A = \begin{bmatrix} 0 & l & -3 \\ -2 & 0 & 1 \\ m & -1 & 0 \end{bmatrix}$ is a skew symmetric matrix, then

1. $l = 3,\ m = 2$
2. $l = -3,\ m = 2$
3. $l = 2,\ m = 3$
4. $l = 2,\ m = -3$

[redacted]

[redacted]

If $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$, then the matrix AB is equal to

1. $\begin{bmatrix} 0 & -2 \\ 2 & 0 \end{bmatrix}$
2. $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$
3. $\begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix}$
4. $\begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$

[redacted]

[redacted]

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{1+\sqrt{\tan x}} \text{ is equal to:}$$

1. $\frac{\pi}{6}$
2. $\frac{\pi}{12}$
3. $\frac{\pi}{4}$
4. $\frac{\pi}{3}$

[redacted]

[redacted]

The value of $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\cot x}}{\sqrt{\tan x}+\sqrt{\cot x}} dx$ is:

1. $\frac{\pi}{2}$
2. π
3. 2π
4. $\frac{\pi}{4}$

[redacted]

The value of $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\cot x}}{\sqrt{\tan x}+\sqrt{\cot x}} dx$ is:

1. $\frac{\pi}{2}$
2. π
3. 2π
4. $\frac{\pi}{4}$

[redacted]

$$\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \frac{dx}{1+\cos 2x} \text{ is equal to}$$

1. 1
2. 2
3. 3
4. 4

[redacted]

$$\int_0^{\frac{\pi}{2}} \sin^2 x \, dx \text{ is equal to :}$$

1. $\frac{\pi}{4}$
2. $\frac{\pi}{2}$

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

4. π

[redacted]

$$\int_0^a \frac{\sqrt{x}}{\sqrt{x}+\sqrt{a-x}}\,dx \text{ is equal to}$$

1. a

2. $\frac{a}{2}$

3. $\frac{a}{3}$

4. $2a$

[redacted]

[redacted]

$$\text{If } \int \frac{\sqrt{x}}{\left(\sqrt{3-x}+\sqrt{x}\right)}\,dx \text{ is equal to}$$

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

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

3. 1

4. 0

[redacted]

[redacted]

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{1+\sqrt{\tan x}} \text{ is equal to}$$

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

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

3. $\frac{\pi}{6}$

4. $\frac{\pi}{12}$

[redacted]

$$\int_{-\pi}^{\pi} \frac{e^{\sin x}}{e^{\sin x}+e^{-\sin x}}\,dx \text{ is equal to}$$

1. 0

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

3. π

4. $\frac{\pi}{4}$

[redacted]

$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\tan x}{\tan x + \cot x} dx$ is equal to

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

2. 0

3. $\frac{\pi}{6}$

4. $\frac{\pi}{12}$

[redacted]

$\int_{0}^{\frac{\pi}{2}} \sqrt{1 - \sin 2x} dx$ is equal to:

1. $2(\sqrt{2} - 1)$

2. $2(\sqrt{2} + 1)$

3. 2

4. $2\sqrt{2}$

[redacted]

Value of $\int_{2}^{3} \frac{\sqrt{x}}{\sqrt{x} + \sqrt{5 - x}} dx$ is

1. 0

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

3. 1

4. 5

[redacted]

$\int_{\sqrt{\log_e 2}}^{\sqrt{\log_e 4}} x e^{x^2} dx$ is equal to

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

2. 1

3. 2

4. 4

[redacted]

Evaluate $\int_1^{\sqrt{3}} \frac{1}{1+x^2} dx$

1. $\frac{\pi}{3}$
2. $\frac{2\pi}{3}$
3. $\frac{\pi}{6}$
4. $\frac{\pi}{12}$

[redacted]

Value of $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \log(\tan x) dx$ is

1. $\frac{\pi}{4}$
2. $\frac{\pi}{12}$
3. 0
4. π

[redacted]

[redacted]

The matrix $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is a

1. zero matrix
2. Identity matrix
3. Scalar matrix
4. Diagonal matrix

[redacted]

[redacted]

The matrix $A = \begin{bmatrix} 0 & 0 & 3 \\ 0 & 3 & 0 \\ 3 & 0 & 0 \end{bmatrix}$ is a

1. diagonal matrix
2. Square matrix
3. Unit matrix
4. Scalar matrix

[redacted]

[redacted]

If a fair coin is tossed 10 times the probability of atleast 6 heads is:

1. $\frac{105}{512}$
2. $\frac{53}{128}$
3. $\frac{53}{64}$
4. $\frac{193}{512}$

[redacted]

[redacted]

A fair coin is tossed 10 times. The probability of obtaining exactly six heads is:

1. $\frac{105}{512}$
2. $\frac{107}{512}$
3. $\frac{210}{512}$
4. $\frac{53}{64}$

[redacted]

A fair coin is tossed 10 times. The probability of obtaining exactly six heads is:

1. $\frac{105}{512}$
2. $\frac{107}{512}$
3. $\frac{210}{512}$
4. $\frac{53}{64}$

[redacted]

[redacted]

If $y = x^{x \sin x}$ then $\frac{dy}{dx}$ =?

1. $x^{x \sin x} \cos x$

2. $x^{x \sin x}\left[\sin x + \sin(\log x)\right]$

3. $x^{x \sin x}\left[\sin(1 + \log x) + x \log x \cos x\right]$

4. $x^{x \sin x}\left[\sin(\log x) + x \log x \cos x\right]$

[redacted]

[redacted]

If $y = x \sin y$, then $\frac{dy}{dx}$ is:

1. $\frac{\sin y}{x - \cos y}$

2. $\frac{\sin^2 y}{\sin y - y \cos y}$

3. $\frac{\sin^2 y}{\cos y - y \sin y}$

4. $\frac{\sin y}{x \cos y + y}$

[redacted]

If $x = e^{\cos 2t}, y = e^{\sin 2t}$, then $\frac{dy}{dx}$ equals to

1. $\frac{y \log_e x}{x \log_e y}$

2. $\frac{x \log_e x}{y \log_e y}$

3. $-\frac{y \log_e x}{x \log_e y}$

4. $-\frac{x \log_e x}{y \log_e y}$

[redacted]

[redacted]

The maximum value of $\sin x + \cos x,\ x \in \mathbb{R}$ is:

1. 2
2. $\sqrt{2}$
3. $\frac{1}{\sqrt{2}}$
4. Not known

[redacted]

[redacted]

The maximum value of $\sin x \cdot \cos x$ is:

1. 1
2. $\frac{1}{2}$
3. $\frac{1}{4}$
4. $\sqrt{2}$

[redacted]

[redacted]

The angle between the lines $\vec{r} = 3\hat{i} + 2\hat{j} - 4\hat{k} + \lambda(\hat{i} + 2\hat{j} + 2\hat{k})$ and $\vec{r} = 5\hat{j} - 2\hat{k} + \mu(3\hat{i} + 2\hat{j} + 6\hat{k})$ is:

1. $\sin^{-1}\left(\frac{19}{21}\right)$
2. $\cos^{-1}\left(\frac{19}{23}\right)$
3. $\cos^{-1}\left(\frac{19}{21}\right)$
4. $\sin^{-1}\left(\frac{19}{23}\right)$

[redacted]

[redacted]

The angle between the line $\vec{r} = (\hat{i} + 2\hat{j} - \hat{k}) + \lambda(\hat{i} - \hat{j} + \hat{k})$ and the plane $\vec{r} \cdot (2\hat{i} - \hat{j} + \hat{k}) = 4$ is :

1. $\sin^{-1}\left(\frac{2\sqrt{2}}{3}\right)$
2. $\cos^{-1}\left(\frac{2\sqrt{2}}{3}\right)$
3. $\tan^{-1}\left(\frac{2\sqrt{2}}{3}\right)$
4. $\sin^{-1}\left(\frac{2\sqrt{3}}{5}\right)$

[redacted]

The angle between the line $\vec{r} = (\hat{i} + 2\hat{j} - \hat{k}) + \lambda(\hat{i} - \hat{j} + \hat{k})$ and the plane $\vec{r} \cdot (2\hat{i} - \hat{j} + \hat{k}) = 4$ is :

1. $\sin^{-1}\left(\frac{2\sqrt{2}}{3}\right)$
2. $\cos^{-1}\left(\frac{2\sqrt{2}}{3}\right)$
3. $\tan^{-1}\left(\frac{2\sqrt{2}}{3}\right)$
4. $\sin^{-1}\left(\frac{2\sqrt{3}}{5}\right)$

[redacted]

The angle between the pair of straight lines given by $\vec{r} = (3\hat{i} + 2\hat{j} - 4\hat{k}) + \lambda(\hat{i} + 2\hat{j} + 2\hat{k})$ and

$\vec{r} = 5\hat{i} - 2\hat{j} + \mu(3\hat{i} + 2\hat{j} + 6\hat{k})$ is :

1. $\cos^{-1}\left(\frac{19}{21}\right)$
2. $\cos^{-1}\left(\frac{17}{21}\right)$

3. $\cos^{-1}\left(\frac{11}{21}\right)$

4. $\cos^{-1}\left(\frac{7}{21}\right)$

[redacted]

The angle between the pair of lines given by $\vec{r} = \hat{i} + 2\hat{j} - 3\hat{k} + \lambda(\hat{i} - 2\hat{j} + 2\hat{k})$ and $\vec{r} = 5\hat{i} + \hat{j} + \hat{k} + \mu(3\hat{i} - 2\hat{j} + 6\hat{k})$

1. $\cos^{-1}\left(\frac{21}{19}\right)$

2. $\sin^{-1}\left(\frac{19}{21}\right)$

3. $\cos^{-1}\left(\frac{19}{21}\right)$

4. $\sin^{-1}\left(\frac{21}{19}\right)$

[redacted]

[redacted]

[redacted]

If $y=\sin^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ then $\frac{dy}{dx}=$

1. $-\frac{2}{1+x^2}$
2. $\frac{2}{1+x^2}$
3. $-\frac{1}{1+x^2}$
4. $\frac{1}{1+x^2}$

[redacted]

[redacted]

If y $=\sin^{-1}x$, then

1. $\frac{d^2y}{dx^2}=\frac{x}{1+x^2}\frac{dy}{dx}$
2. $\frac{d^2y}{dx^2}=\frac{x}{1-x^2}\frac{dy}{dx}$
3. $\frac{d^2y}{dx^2}=\frac{-x}{1+x^2}\frac{dy}{dx}$
4. $\frac{dy}{dx}=\frac{x}{1+x^2}\frac{d^2y}{dx^2}$

[redacted]

If y $=\sin^{-1}x$, then

1. $\frac{d^2y}{dx^2}=\frac{x}{1+x^2}\frac{dy}{dx}$
2. $\frac{d^2y}{dx^2}=\frac{x}{1-x^2}\frac{dy}{dx}$
3. $\frac{d^2y}{dx^2}=\frac{-x}{1+x^2}\frac{dy}{dx}$
4. $\frac{dy}{dx}=\frac{x}{1+x^2}\frac{d^2y}{dx^2}$

[redacted]

If $y=\frac{1}{2}x\sqrt{a^2-x^2}+\frac{a^2}{2}\sin^{-1}\left(\frac{x}{a}\right)$, then $\frac{dy}{dx}=$

(1) $\sqrt{a^2-x^2}$

(2) $\sqrt{a^2+x^2}$

(3) $\frac{1}{\sqrt{a^2-x^2}}$

(4) $\frac{1}{\sqrt{a^2+x^2}}$

[redacted]

[redacted]

If $x = \sqrt{a^{\sin^{-1} t}}, y = \sqrt{a^{\cos^{-1} t}}$, then $\frac{dy}{dx}$ is:

1. $\frac{y}{x}$
2. $-\frac{y}{x}$
3. $\frac{y^2}{x}$
4. $\frac{y}{x^2}$

[redacted]

If $x = \sqrt{a^{\sin^{-1} t}}, y = \sqrt{a^{\cos^{-1} t}}$, then $\frac{dy}{dx}$ is:

1. $\frac{y}{x}$
2. $-\frac{y}{x}$
3. $\frac{y^2}{x}$
4. $\frac{y}{x^2}$

[redacted]

If $y = \sin^{-1}\sqrt{\frac{x}{x+1}} + \sec^{-1}\sqrt{\frac{x+1}{x}}$, then $\frac{dy}{dx}$ is

1. 0
2. 1
3. $\frac{1}{\sqrt{x+1}}$
4. $\frac{1}{\sqrt{x}}$

[redacted]

If $y = \sin^{-1} x + \sin^{-1}\sqrt{1-x^2}, x \in (-1, 0)$, then $\frac{dy}{dx}$ is equal to

1. 0
2. $\frac{1}{\sqrt{1-x^2}}$
3. $\frac{2}{\sqrt{1-x^2}}$
4. $\frac{-2}{\sqrt{1-x^2}}$

[redacted]

[redacted]

The unit vector in the direction of $\vec{a}+\vec{b}$ if $\vec{a}=2\hat{i}-\hat{j}+2\hat{k}$ & $\vec{b}=-\hat{i}+\hat{j}-\hat{k}$ is:

1. $\hat{i}+0\hat{j}+\hat{k}$
2. $\hat{i}-\hat{j}+\hat{k}$
3. $\hat{i}+\hat{j}+\hat{k}$
4. $\frac{1}{\sqrt{2}}\hat{i}+\frac{1}{\sqrt{2}}\hat{k}$

[redacted]

[redacted]

The projection of $\hat{i}-\hat{j}$ on the vector $\hat{i}+\hat{j}$ is :

1. $\sqrt{2}$
2. $\frac{1}{\sqrt{2}}$
3. 2
4. 0

[redacted]

The projection of the vector $\vec{a}=\hat{i}+2\hat{j}-3\hat{k}$ on the vector $2\hat{i}+6\hat{j}+3\hat{k}$ is

1. $\frac{5}{\sqrt{14}}$
2. $\frac{5}{7}$
3. 0
4. $\frac{5}{14}$

[redacted]

[redacted]

If $\begin{vmatrix} 2x & 2 \\ 4 & x \end{vmatrix} = 10,$ then x is:

1. ± 2
2. ± 3
3. ± 4
4. 0

[redacted]

[redacted]

If $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 3 & 0 \\ 4 & -8 \end{vmatrix}$, then value(s) of x is/are

1. 3
2. $2\sqrt{2}$
3. $\pm 2\sqrt{2}$
4. 8

[redacted]

[redacted]

The value of integral $\int \sqrt{4x^2+9}\, dx$ is

1. $\frac{x}{2}\sqrt{4x^2+9}+\frac{9}{2}\log\left|2x+\sqrt{4x^2+9}\right|+C$
2. $\frac{x}{2}\sqrt{4x^2+9}+\frac{3}{2}\log\left|2x+\sqrt{4x^2+9}\right|+C$
3. $2x\sqrt{4x^2+9}+\frac{9}{2}\log\left|2x+\sqrt{4x^2+9}\right|+C$
4. $x\sqrt{4x^2+9}+\frac{9}{4}\log\left|2x+\sqrt{4x^2+9}\right|+C$

[redacted]

[redacted]

The value of $\int_0^1 \log_e(\frac{1}{x}-1)\, dx$ is:

1. 1
2. 0
3. $\frac{3}{2}$
4. $\log 2$

[redacted]

[redacted]

The value of $\int_0^1 [\log x - \log(1-x)]\, dx$ is

1. $\frac{1}{2}$
2. 2
3. 1
4. 0

[redacted]

[redacted]

The sum of the minor and the cofactor of the element 6 in the determinant $\Delta = \begin{vmatrix} 2 & 3 & 1 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$ is:

(1) -5

(2) -10

(3) 10

(4) 0

[redacted]

[redacted]

Sum of the minor and the cofactor of the element 6 in the determinant $\begin{vmatrix} 2 & 3 & 1 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$ is :

1. -5
2. -10
3. 10
4. 0

[redacted]

[redacted]

The value of the integral $\int e^x \left(\frac{1}{x} - \frac{1}{x^2}\right) dx$ is:

(1) $\frac{e^x}{x} + C,$ where C is a constant

(2) $\frac{e^{-x}}{x} + C,$ where C is a constant

(3) $e^x + C,$ where C is a constant

(4) $e^{-x} + C,$ where C is a constant

[redacted]

[redacted]

The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^5 + x^3 + x + 2)\, dx$ is:

(1) 0

(2) 2

(3) 2π

(4) π

[redacted]

[redacted]

The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^5 + x^3 + x + 2)\, dx$ is:

(1) 0

(2) 2

(3) 2π

(4) π

[redacted]

[redacted]

The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^5 + x^3 + x + 2)\, dx$ is:

(1) 0

(2) 2

(3) 2π

(4) π

[redacted]

[redacted]

$\int_{-5}^{5} \left(3x^5 + \sqrt{5}\,x^3\right) e^{x^2}\, dx$ is equal to:

(1) 0

(2) 1

(3) 2

(4) 3

[redacted]

[redacted]

The value of the integral $\int e^x \left(\log x + \frac{1}{x}\right) dx$ is :

1. $e^x \log x + C,$ Where C is a constant.
2. $e^{-x} \log x + C,$ Where C is a constant.
3. $\frac{e^x}{x} + C,$ Where C is a constant.
4. $\frac{e^{-x}}{x} + C,$ Where C is a constant.

[redacted]

The value of the integral $\int e^x \left(\log x + \frac{1}{x}\right) dx$ is :

1. $e^x \log x + C,$ Where C is a constant.
2. $e^{-x} \log x + C,$ Where C is a constant.
3. $\frac{e^x}{x} + C,$ Where C is a constant.
4. $\frac{e^{-x}}{x} + C,$ Where C is a constant.

[redacted]

$$\int \left(\frac{1}{\log_e t} - \frac{1}{(\log_e t)^2}\right) dt \text{ is equal to}$$

(1) $\frac{1}{\log_e t} + C,$ where C is constant of integration

(2) $\frac{t}{\log_e t} + C,$ where C is constant of integration

(3) $-\frac{t}{\log_e t} + C,$ where C is constant of integration

(4) $-\frac{1}{\log_e t} + C,$ where C is constant of integration

[redacted]

Value of $\int \left(\frac{1}{\log x} - \frac{1}{(\log x)^2}\right) dx$ is

1. $\frac{x}{\log x} + c,$ where c is an arbitrary constant

2. $x \log x + c,$ where c is an arbitrary constant

3. $\frac{1}{\log x}+c$, where c is an arbitrary constant

4. $\frac{e^x}{\log x}+c$: where c is an arbitrary constant

[redacted]

The value of $\int\left(\frac{1}{\log_e x}-\frac{1}{(\log_e x)^2}\right)dx$ is

1. $x\log_e x+c$: where c is an arbitrary constant
2. $e^{x\log_e x}+c$: where c is an arbitrary constant
3. $\frac{e^x}{\log_e x}+c$: where c is an arbitrary constant
4. $\frac{x}{\log_e x}+c$: where c is an arbitrary constant

[redacted]

[redacted]

Vector in the direction of $\hat{i}+\hat{j}+\hat{k}$ with magnitude 5 units is :

(1) $\dfrac{\hat{i}-\hat{j}+\hat{k}}{\sqrt{3}}$

(2) $\dfrac{\hat{i}+\hat{j}+\hat{k}}{\sqrt{3}}$

(3) $\dfrac{5(\hat{i}+\hat{j}+\hat{k})}{\sqrt{3}}$

(4) $\dfrac{5}{3}(\hat{i}+\hat{j}+\hat{k})$

[redacted]

[redacted]

The unit vector in the direction of sum of vectors $\vec{a}=2\hat{i}-\hat{j}+\hat{k}$ and $\vec{b}=2\hat{j}+\hat{k}$ is :

(1) $\dfrac{2\hat{i}+\hat{j}+2\hat{k}}{3}$

(2) $2\hat{i}+\hat{j}+2\hat{k}$

(3) $\dfrac{2\hat{i}+\hat{j}+2\hat{k}}{5}$

(4) $\dfrac{2\hat{i}+\hat{j}+2\hat{k}}{7}$

[redacted]

The unit vector in the direction of sum of vectors $\vec{a}=2\hat{i}-\hat{j}+\hat{k}$ and $\vec{b}=2\hat{j}+\hat{k}$ is :

(1) $\dfrac{2\hat{i}+\hat{j}+2\hat{k}}{3}$

(2) $2\hat{i}+\hat{j}+2\hat{k}$

(3) $\dfrac{2\hat{i}+\hat{j}+2\hat{k}}{5}$

(4) $\dfrac{2\hat{i}+\hat{j}+2\hat{k}}{7}$

[redacted]

A vector of magnitude 8 units in the direction perpendicular to both the vectors $\hat{i}+\hat{j}+\hat{k}$ and $2\hat{i}+\hat{k}$ is

[redacted]

(1) $8(\hat{i}+\hat{j}-2\hat{k})$

(2) $\dfrac{8}{\sqrt{6}}(-\hat{i}+\hat{j}+2\hat{k})$

(3) $\dfrac{8}{\sqrt{6}}(\hat{i}+\hat{j}-2\hat{k})$

(4) $\dfrac{8}{\sqrt{6}}(\hat{i}-\hat{j}+2\hat{k})$

[redacted]

[redacted]

[redacted]

The general solution of the differential equation $\frac{dy}{dx} = \sin^{-1} x$ is :

(1) $y = x\sin^{-1} x - \sqrt{1-x^2} + C,$ where C is a constant

(2) $y = x\sin^{-1} x + \sqrt{1+x^2} + C,$ where C is a constant

(3) $y = x\sin^{-1} x + \sqrt{1-x^2} + C,$ where C is a constant

(4) $y = -x\sin^{-1} x + \sqrt{1-x^2} + C,$ where C is a constant

[redacted]

[redacted]

Solution of differential equation $\frac{dy}{dx} = \cos(x+y+3)$ is:

(1) $y = -\sin(x+y+3) + c$

(2) $y = \sin(x+y+3) + c$

(3) $y = 2\tan^{-1}(x+c) - x - 3$

(4) $y = \frac{1}{2}\tan^{-1}(x+c) + x + 3$

[redacted]

[redacted]

Solution of differential equation $\frac{dy}{dx} = \cos(x+y+3)$ is:

(1) $y = -\sin(x+y+3) + c$

(2) $y = \sin(x+y+3) + c$

(3) $y = 2\tan^{-1}(x+c) - x - 3$

(4) $y = \frac{1}{2}\tan^{-1}(x+c) + x + 3$

[redacted]

[redacted]

The general solution of the differential equation $\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0$ is :

(1) $\sin^{-1} x - \sin^{-1} y = C$

(2) $\sin^{-1} x + \sin^{-1} y = C$

(3) $2\sin^{-1} x - \sin^{-1} y = C$

(4) $\log x + \log y = C$

(where C is constant of integration)

[redacted]

[redacted]

Match List-I with List-II

List-I List-II

Function $f(x)$ Interval

[redacted]

$f(x) = x|x|$ Decreases on $(0, \infty)$

[redacted]

$f(x) = x^2 + 2x - 5$ Increases on $(3, \infty)$

[redacted]

$f(x) = x^2 - 6x + 9$ Decreases on $(-\infty, -1)$

[redacted]

$f(x) = -x^2$ Increases on $(-\infty, \infty)$

[redacted]

Choose the correct answer from the options given below:

1. $(A) - (II),\ (B) - (III),\ (C) - (IV),\ (D) - (I)$
2. $(A) - (IV),\ (B) - (III),\ (C) - (II),\ (D) - (I)$
3. $(A) - (II),\ (B) - (IV),\ (C) - (III),\ (D) - (I)$
4. $(A) - (II),\ (B) - (III),\ (C) - (IV),\ (D) - (IV)$

[redacted]

Match List-I with List-II

List-I List-II

[redacted]

(A) $f(x) = x|x|$ (I) Decreases on $(0, \infty)$

(B) $f(x) = x^2 + 2x - 5$ (II) Increases on $(3, \infty)$

(C) $f(x) = x^2 - 6x + 9$ (III) Decreases on $(-\infty, -1)$

(D) $f(x) = -x^2$ (IV) Increases on $(-\infty, \infty)$

[redacted]

Choose the correct answer from the options given below:

1. $(A) - (II),\ (B) - (III),\ (C) - (IV),\ (D) - (I)$
2. $(A) - (IV),\ (B) - (III),\ (C) - (II),\ (D) - (I)$
3. $(A) - (II),\ (B) - (IV),\ (C) - (III),\ (D) - (I)$
4. $(A) - (II),\ (B) - (III),\ (C) - (IV),\ (D) - (IV)$

[redacted]

[redacted]

[redacted]

The integral $I = \int e^x \left(\frac{1+\sin x}{1+\cos x}\right) dx$ is :

(1) $e^x \tan x + C,$ where C is a constant

(2) $e^x \sec x + C,$ where C is a constant

(3) $e^x \tan\left(\frac{x}{2}\right) + C,$ where C is a constant

(4) $e^{-x} \tan\left(\frac{x}{2}\right) + C,$ where C is a constant

[redacted]

[redacted]

$$\int \frac{\cos x - \sin x}{1+\sin 2x} dx \text{ is equal to}$$

(1) $\frac{1}{\cos x + \sin x} + C,$ where C is constant of integration

(2) $\frac{-1}{\cos x + \sin x} + C,$ where C is constant of integration

(3) $\frac{1}{1+\sin 2x} + C,$ where C is constant of integration

(4) $\frac{1}{1-\sin 2x} + C,$ where C is constant of integration

[redacted]

[redacted]

$$\text{Let } A = \begin{bmatrix} 1 & \cos\theta & 1 \\ -\cos\theta & 1 & \cos\theta \\ -1 & -\cos\theta & 1 \end{bmatrix},\ 0 \le \theta \le 2\pi, \text{ then :}$$

(1) $|A| = 0$

(2) $|A| \in [2, 4]$

(3) $|A| \in (2, 4)$

(4) $|A| \in (2, \infty)$

[redacted]

[redacted]

$$\text{If } A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}, \text{ then } A^2 =$$

(1) $\begin{bmatrix} \cos 2\theta & -\sin 2\theta \\ \sin 2\theta & -\cos 2\theta \end{bmatrix}$

(2) $\begin{bmatrix} -\sin 2\theta & \sin 2\theta \\ \cos 2\theta & \cos 2\theta \end{bmatrix}$

(3) $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

(4) $\begin{bmatrix} -\cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

[redacted]

[redacted]

$$\text{If } A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}, \text{ then } A^2 =$$

(1) $\begin{bmatrix} \cos 2\theta & -\sin 2\theta \\ \sin 2\theta & -\cos 2\theta \end{bmatrix}$

(2) $\begin{bmatrix} -\sin 2\theta & \sin 2\theta \\ \cos 2\theta & \cos 2\theta \end{bmatrix}$

(3) $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

(4) $\begin{bmatrix} -\cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

[redacted]

[redacted]

$$\text{If } A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}, \text{ then } A^2 =$$

(1) $\begin{bmatrix} \cos 2\theta & -\sin 2\theta \\ \sin 2\theta & -\cos 2\theta \end{bmatrix}$

(2) $\begin{bmatrix} -\sin 2\theta & \sin 2\theta \\ \cos 2\theta & \cos 2\theta \end{bmatrix}$

(3) $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

(4) $\begin{bmatrix} -\cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

[redacted]

[redacted]

[redacted]

Corner points of the feasible region for a linear programming problem are $(0,2),(3,0),(6,0),(6,8)$ and $(0,5)$.

Let $F=4x+6y$ be the objective function. Then the minimum value of F occurs at :

(1) $(0,2)$ only

(2) $(3,0)$ only

(3) The mid point of the line segment joining the points $(0,2)$ and $(3,0)$ only

(4) Every point on the line segment joining the points $(0,2)$ and $(3,0)$

[redacted]

[redacted]

If the objective function for an L.P.P. is $z=3x-4y$

and the corner points for the bounded feasible region are $(0,0),(5,0),(6,5),(6,8),(4,10)$ and $(0,8)$,

then the minimum value of z occurs at :

(1) $(0,0)$

(2) $(6,5)$

(3) $(0,8)$

(4) $(4,10)$

[redacted]

[redacted]

If the objective function for an L.P.P. is $z=3x-4y$

and the corner points for the bounded feasible region are $(0,0),(5,0),(6,5),(6,8),(4,10)$ and $(0,8)$,

then the minimum value of z occurs at :

(1) $(0,0)$

(2) $(6,5)$

(3) $(0,8)$

(4) $(4,10)$

[redacted]

[redacted]

Corner points of the feasible region for a linear programming program are $(0,2),(3,0),(4,1),(2,3)$ and $(0,3)$.

Let $F=4x+6y$ be the objective function.

The minimum value of F occurs at :

(1) $(0,2)$ only

(2) $(3,0)$ only

(3) mid point of the line segment joining the points $(0,2)$ and $(3,0)$ only

(4) every point on the line segment joining the points $(0,2)$ and $(3,0)$

[redacted]

Corner points of the feasible region for a linear programming problem are $(0,2)$, $(3,0)$, $(6,0)$ and $(0,5)$.

Let $F=4x+6y$ be the objective function. The minimum value of F occurs at:

(1) $(0,2)$ only

(2) $(3, 0)$ only

(3) any point on the line joining the points $(0, 2)$ and $(3, 0)$ only

(4) the mid point of the line segment joining the points $(0, 2)$ and $(3, 0)$ only

[redacted]

[redacted]

[redacted]

[redacted]

If the corner points of the bounded feasible region for a Linear Programming Problem (LPP) are $A(0, 2),\ B(3, 0),\ C(2, 3)$ and $D(3, 1)$, then the maximum value of the objective function $Z = 4x + 2y$ occurs at

1. $(0, 2)$ only
2. the mid-point of the line segment joining the points $(2, 3)$ and $(3, 1)$ only
3. $(2, 3)$ and $(3, 1)$ only
4. every point on the line segment joining the points $(2, 3)$ and $(3, 1)$

[redacted]

[redacted]

If the corner points of bounded feasible region for an LPP are $(0, 2), (3, 0), (6, 0), (6, 8)$ and $(0, 5)$ then the minimum value of the objective function $f = 4x + 6y$ occur at

1. (3,0) only
2. (0,2) only
3. Every point on the line segment joining the points $(0, 2)$ and $(3, 0)$
4. Only the mid point of the line segment joining the points $(0, 2)$ and $(3, 0)$

[redacted]

If the corner points of the bounded feasible region of an LPP are $(0, 2), (3, 0), (6, 0), (6, 8)$ and $(0, 5)$ then the minimum value of the objective function $F = 4x + 6y$ occurs at

1. $(0, 2)$ only

2. $(3, 0)$ only

3. the midpoint of the line segment joining $(0, 2)$ and $(3, 0)$

4. every point on the line segment joining $(0, 2)$ and $(3, 0)$

[redacted]

[redacted]

If A is a square matrix such that $A^2 = A$, then $(I + A)^3 - 8A$ is equal to:

(1) I

(2) A

(3) $I - A$

(4) $3A$

[redacted]

[redacted]

If A is a square matrix such that $A^2 = A$, then the value of $(I - A)^2 - (I + A)^3$ is :

(1) $-8A$

(2) $8A$

(3) $2(I - 4A)$

(4) $2(I + 4A)$

[redacted]

[redacted]

The value(s) of x for which the matrix $A = \begin{bmatrix} x-1 & 1 & 1 \\ 1 & x-1 & 1 \\ 1 & 1 & x-1 \end{bmatrix}$ is singular, is/are :

(1) 1

(2) $-1, 2$

(3) ± 1

(4) $1, 2$

[redacted]

[redacted]

Which of the following matrix is not skew symmetric matrix ?

(1) $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$

(2) $\begin{bmatrix} 0 & -3 \\ 3 & 1 \end{bmatrix}$

(3) $\begin{bmatrix} 0 & -2 \\ 2 & 0 \end{bmatrix}$

(4) $\begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & -3 \\ 2 & 3 & 0 \end{bmatrix}$

[redacted]

[redacted]

Which of the following matrix is not skew symmetric matrix ?

(1) $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$

(2) $\begin{bmatrix} 0 & -3 \\ 3 & 1 \end{bmatrix}$

(3) $\begin{bmatrix} 0 & -2 \\ 2 & 0 \end{bmatrix}$

(4) $\begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & -3 \\ 2 & 3 & 0 \end{bmatrix}$

[redacted]

[redacted]

[redacted]

The Greatest Integer Function $f : \mathbb{R} \to \mathbb{R}$ given by $f(x) = [x],\ x \in \mathbb{R}$ and $[x]$ denotes the greatest integer less than or equal to x is :

(1) one-one

(2) onto

(3) both one-one and onto

(4) neither one-one nor onto

[redacted]

[redacted]

The greatest integer function $f : R \to R$ given by $f(x) = [x]$ is :

(1) one-one but not onto

(2) onto but not one-one

(3) one-one and onto

(4) neither one-one nor onto

[redacted]

The greatest integer function $f : R \to R$ given by $f(x) = [x]$ is :

(1) one-one but not onto

(2) onto but not one-one

(3) one-one and onto

(4) neither one-one nor onto

[redacted]

[redacted]

A random variable X has the following probability distribution

X	2	3	4	5
$P(X)$	$5/k$	$7/k$	$9/k$	$11/k$

Then the value of $\frac{k}{4}$ is

1. 8
2. 16
3. 32
4. 64

[redacted]

[redacted]

[redacted]

[redacted]

In an LPP, if the objective function $Z = ax + by$ has the same maximum value at two corner points of the feasible region, then the number of points of which $Z_{\max}$ occurs is :

(1) 2

(2) 0

(3) finite

(4) infinite

[redacted]

In a LPP, if the objective function $Z = ax + by$ has the same maximum value at two corner points

of the feasible region, then the number of points at which $Z_{\max}$ occurs is:

(1) 0

(2) 2

(3) Finite

(4) Infinite

[redacted]

[redacted]

In a LPP, if the objective function $Z = ax + by$ has the same maximum value at two corner points

of the feasible region, then the number of points at which $Z_{\max}$ occurs is:

(1) 0

(2) 2

(3) Finite

(4) Infinite

[redacted]

[redacted]

The objective function of an LPP is $Z = ax + by$. If the maximum value of the objective function is 180, which occurs at two points (15

then which one of the following is true?

(1) $a = 3, b = 9$

(2) $a = 9, b = 3$

(3) $a = 6, b = 6$

(4) $a = 4, b = 8$

[redacted]

[redacted]

[redacted]

If $y = \log(x + \sqrt{x^2 + a^2})$ then $\frac{dy}{dx} =$

(1) $\frac{1}{\sqrt{x^2 + a^2}}$

(2) $\sqrt{x^2 + a^2}$

(3) $\frac{-1}{\sqrt{x^2 + a^2}}$

(4) $-\sqrt{x^2 + a^2}$

[redacted]

If $y = x \log x$, then which of the following is correct ?

(1) $x\frac{dy}{dx} - x = y$

(2) $x\frac{dy}{dx} + y = x$

(3) $x\frac{dy}{dx} + xy = 0$

(4) $y\frac{dy}{dx} + x = y$

[redacted]

[redacted]

If $y = x \log x$, then which of the following is correct ?

(1) $x\frac{dy}{dx} - x = y$

(2) $x\frac{dy}{dx} + y = x$

(3) $x\frac{dy}{dx} + xy = 0$

(4) $y\frac{dy}{dx} + x = y$

[redacted]

[redacted]

Let $y = \log_x 5$, then $\frac{dy}{dx} =$

(1) $\frac{\log 5}{x(\log x)^2}$

(2) $-\frac{\log 5}{x(\log x)^2}$

(3) $-\frac{\log 5}{(\log x)^2}$

(4) $\frac{\log 5}{x}$

[redacted]

[redacted]

[redacted]

The function $f(x) = 2x^3 - 3x^2 - 12x + 4$ has :

(1) two points of local minimum

(2) two points of local maximum

(3) one maxima and one minima

(4) no maxima or minima

[redacted]

The function $f(x) = 2x^3 - 3x^2 - 12x + 4$ has :

(1) Two points of local maximum

(2) Two points of local minimum

(3) One local maxima and one local minima

(4) No maxima or minima

[redacted]

[redacted]

The function $f(x) = 2x^3 - 3x^2 - 12x + 4$ has :

(1) Two points of local maximum

(2) Two points of local minimum

(3) One local maxima and one local minima

(4) No maxima or minima

[redacted]

[redacted]

The function $f(x) = \frac{x^4}{4} - \frac{x^2}{2}$ has

(1) 2 points of local maxima

(2) 2 points of local minima and one point of local maxima

(3) 1 point of local minima and 2 points of local maxima

(4) 1 point of local maxima and 1 point of local minima

[redacted]

[redacted]

The function $f(x) = \frac{x^4}{4} - \frac{x^2}{2}$ has

(1) 2 points of local maxima

(2) 2 points of local minima and one point of local maxima

(3) 1 point of local minima and 2 points of local maxima

(4) 1 point of local maxima and 1 point of local minima

[redacted]

[redacted]

[redacted]

The function $f(x) = -2x^3 - 9x^2 - 12x + 5$ is :

(1) increasing in $(-2, -1)$ and decreasing in $(-\infty, -2) \cup (-1, \infty)$

(2) increasing in $(-\infty, -2) \cup (-1, \infty)$ and decreasing in $(-2, -1)$

(3) increasing in $(0, \infty)$ and decreasing in $(-\infty, 0)$

(4) decreasing in $(0, \infty)$ and increasing in $(-\infty, 0)$

[redacted]

The function $f(x) = x + \cot^{-1} x$ is increasing in the interval:

(1) $(-\infty,\ \infty)$

(2) $(-1,\ \infty)$

(3) $(0,\ \infty)$

(4) $(1,\ \infty)$

[redacted]

[redacted]

The function $f(x) = x + \cot^{-1} x$ is increasing in the interval:

(1) $(-\infty,\ \infty)$

(2) $(-1,\ \infty)$

(3) $(0,\ \infty)$

(4) $(1,\ \infty)$

[redacted]

[redacted]

The function $f(x) = |x - 1|$ is strictly increasing in the interval.

(1) $(0, 1)$

(2) $(-\infty, 0)$

(3) $(-\infty, -1)$

(4) $(1, \infty)$

[redacted]

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

(1) Increasing in $(0, \infty)$ and decreasing in $(-\infty, 0)$

(2) Decreasing in $(0, \infty)$ and increasing in $(-\infty, 0)$

(3) Decreasing in $(-\infty, -1] \cup [1, \infty)$ and increasing in $(-1, 1)$

(4) Increasing in $(-\infty, -1] \cup [1, \infty)$ and decreasing in $(-1, 1)$

[redacted]

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

(1) Increasing in $(0, \infty)$ and decreasing in $(-\infty, 0)$

(2) Decreasing in $(0, \infty)$ and increasing in $(-\infty, 0)$

(3) Decreasing in $(-\infty, -1] \cup [1, \infty)$ and increasing in $(-1, 1)$

(4) Increasing in $(-\infty, -1] \cup [1, \infty)$ and decreasing in $(-1, 1)$

[redacted]

[redacted]

The area bounded by the y-axis, $y = \cos x$ and $y = \sin x$ when $0 \leq x \leq \frac{\pi}{2}$ is :

(1) $\sqrt{2}$ sq. units

(2) $(2\sqrt{2}+1)$ sq. units

(3) $(\sqrt{2}+1)$ sq. units

(4) $(\sqrt{2}-1)$ sq. units

[redacted]

The area of region bounded by the x-axis, $y = \cos x$ and $y = \sin x$, $0 \leq x \leq \frac{\pi}{2}$ is:

1. $\sqrt{2}$ sq.units
2. $(2-\sqrt{2})$ sq.units
3. $(\sqrt{2}-1)$ sq.units
4. $(\sqrt{2}+1)$ sq.units

[redacted]

The area (in sq. units) of the region bounded by the curve $y = \sin x$, $-2\pi \leq x \leq 2\pi$ and the x-axis is:

(1) 0

(2) 4

(3) 8

(4) 16

[redacted]

[redacted]

The corner points of the feasible region determined by the set of constraints (linear inequations) are $P(0,5), Q(3,5), R(5,0)$ and $S(4,1)$ and the objective function $z = ax + 2by$ where $a, b > 0$. The condition on a and b such that maximum z occurs at Q and S is :

(1) $a - 3b = 0$

(2) $5a - b = 0$

(3) $a - 2b = 0$

(4) $a - 8b = 0$

[redacted]

For an objective function $z = ax + by$ where $a, b > 0$.

The corner points of feasible region determined by a set of constraints are $(0, 20),\ (10, 10),\ (30, 30),\ (0, 40)$.

The condition on a and b such that max z occurs at both the points $(30, 30)$ and $(0, 40)$ is:

(1) $b - 3a = 0$

(2) $a = 3b$

(3) $a + 2b = 0$

(4) $2a - b = 0$

[redacted]

[redacted]

For an objective function $z = ax + by$ where $a, b > 0$.

The corner points of feasible region determined by a set of constraints are $(0, 20),\ (10, 10),\ (30, 30),\ (0, 40)$.

The condition on a and b such that max z occurs at both the points $(30, 30)$ and $(0, 40)$ is:

(1) $b - 3a = 0$

(2) $a = 3b$

(3) $a + 2b = 0$

(4) $2a - b = 0$

[redacted]

[redacted]

The corner points of the bounded feasible region determined by a set of constraints in an LPP are $P(0, 5), Q(3, 5), R(5, 0)$ and $S(4, 1)$.

[redacted]

If the objective function is $z = ax + 2by,$ where $a, b > 0,$ then the condition on a and b such that the maximum value of z occurs at Q and S is

1. $a - 5b = 0$
2. $a - 3b = 0$
3. $a - 2b = 0$
4. $a - 8b = 0$

[redacted]

[redacted]

$\int_1^4 |x-2|dx$ is equal to

1. 5
2. $\frac{7}{2}$
3. $\frac{3}{2}$
4. $\frac{5}{2}$

[redacted]

The value of the integral $\int_1^3 |x-2|dx$ is :

1. 2
2. 1
3. 4
4. 5

[redacted]

$\int_1^4 |x-2|dx$ is equal to

1. 5
2. $\frac{7}{2}$
3. $\frac{3}{2}$
4. $\frac{5}{2}$

[redacted]

[redacted]

Which of the following statements are correct ?

(A) $\tan^{-1}x + \tan^{-1}y = \tan^{-1}\left(\frac{x+y}{1-xy}\right), xy < 1$

(B) $\tan^{-1}x + \tan^{-1}y = \pi + \tan^{-1}\left(\frac{x+y}{1-xy}\right), xy > 1$

(C) $\sin^{-1}x + \cos^{-1}x = \frac{\pi}{2}, x \in (-1,1)$

(D) $\tan^{-1}x + \cot^{-1}x = \frac{\pi}{2}, x \in \mathrm{R}$

(E) $\cos^{-1}(-x) = -\cos^{-1}x, x \in [-1,1]$

Choose the \textbf{correct} answer from the options given below :

(1) $(A), (B), (D)$ only

(2) $(A), (B)$ only

(3) $(D), (E)$ only

(4) $(A), (D), (E)$ only

[redacted]

Which of the following statements are correct ?

(A) $\sin^{-1}(-x) = -\sin^{-1}x, x \in [-1,1]$

(B) $\tan^{-1}(-x) = -\tan^{-1}x, -1 < x < 1$

(C) $\cos^{-1}(-x) = \pi - \cos^{-1}x, -1 \leq x \leq +1$

(D) $\sec^{-1}(-x) = \pi - \sec^{-1}x, |x| > 1$

(E) $\cot^{-1}(-x) = \pi - \cot^{-1}x, x \in R$

Choose the correct answer from the options given below :

(1) (A) and (C) Only

(2) (B) and (D) Only

(3) (A), (C) and (E) Only

(4) (A), (C) and (D) Only

[redacted]

[redacted]

The probability distribution of a random variable X is given by

X	0	1	2
P(X)	$1-7a^2$	$\frac{1}{2}a+$	$\frac{1}{4}a^2$

If $a>0$, then $P(0<X\le 2)$ is equal to

1. $\frac{1}{16}$
2. $\frac{3}{18}$
3. $\frac{7}{16}$
4. $\frac{9}{16}$

[redacted]

The probability distribution of a random variable X is given by

[redacted]

[redacted]

[redacted] $1-7a^2\ \frac{1}{2}a+\frac{1}{4}a^2$

If $a>0$, then $P(0<X\le 2)$ is equal to

1. $\frac{1}{16}$
2. $\frac{3}{18}$
3. $\frac{7}{16}$
4. $\frac{9}{16}$

[redacted]

The probability distribution of a random variable X is given by

[redacted]

If $k>0$, then $P(0<X\le 2)$ is equal to

1. $\frac{1}{6}$
2. $\frac{5}{6}$
3. $\frac{7}{8}$
4. $\frac{9}{16}$

[redacted]

[redacted]

The value of k for which the function $f(x) = \begin{cases} \frac{x^2+3x-10}{x-2} & x \neq 2 \\ k & x = 2 \end{cases}$ is continuous at $x = 2$; is :

(1) 3

(2) 7

(3) 2

(4) 5

[redacted]

The absolute maximum value of the function $f(x) = 4x - \frac{1}{2}x^2$ in the interval $\left[-2, \frac{9}{2}\right]$ is

(1) 10

(2) 9

(3) 8

(4) 6

[redacted]

[redacted]

The derivative of $\frac{\tan^{-1} x}{1+\tan^{-1} x}$ with respect to $\tan^{-1} x$ is :

(1) $\frac{\tan^{-1} x}{(1+\tan^{-1} x)^2}$

(2) $\frac{1}{(1+\tan^{-1} x)^2}$

(3) $(1+\tan^{-1} x)^2$

(4) $\frac{\tan^{-1} x}{(1-\tan^{-1} x)^2}$

[redacted]

Derivative of $2x^2$ with respect to $5x^4$ is:

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

(2) $\frac{1}{5x^2}$

(3) $\frac{1}{5x^2}$

(4) $\frac{1}{5x^3}$

[redacted]

[redacted]

Derivative of $2x^2$ with respect to $5x^4$ is:

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

(2) $\frac{1}{5x^2}$

(3) $\frac{1}{5x^2}$

(4) $\frac{1}{5x^3}$

[redacted]

[redacted]

[redacted]

If $\vec{a}$ and $\vec{b}$ are unit vectors, then the angle between $\vec{a}$ and $\vec{b}$ for $\vec{a} + \sqrt{3}\vec{b}$ to be a unit vector is given by :

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

(2) $\frac{5\pi}{6}$

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

(4) $\frac{2\pi}{3}$

[redacted]

Let $\vec{a}$ and $\vec{b}$ be two unit vectors and θ is the angle between them. If $\vec{a} + \vec{b}$ is a unit vector, then θ is:

1. $\frac{2\pi}{3}$
2. $\frac{\pi}{2}$
3. $\frac{\pi}{3}$
4. $\frac{\pi}{4}$

[redacted]

Let $\vec{a}$ and $\vec{b}$ be two unit vectors and θ is the angle between them. If $\vec{a} + \vec{b}$ is a unit vector, then θ is:

1. $\frac{2\pi}{3}$
2. $\frac{\pi}{2}$
3. $\frac{\pi}{3}$
4. $\frac{\pi}{4}$

[redacted]

Let $\vec{a}$ and $\vec{b}$ be two unit vectors and θ is the angle between them. If $\vec{a} + \vec{b}$ is a unit vector, then θ is:

1. $\frac{2\pi}{3}$
2. $\frac{\pi}{2}$
3. $\frac{\pi}{3}$
4. $\frac{\pi}{4}$

[redacted]

Let $\vec{a}$ and $\vec{b}$ be unit vectors. If $\sqrt{3}\vec{a} - \vec{b}$ is a unit vector, then the angle between $\vec{a}$ and $\vec{b}$ is

1. $\frac{\pi}{6}$

2. $\frac{\pi}{4}$

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

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

[redacted]

[redacted]

[redacted]

In a box containing 100 bulbs, 10 are defective. Then the probability, that out of a sample of 5 bulbs none is defective, is:

1. 10^{-1}
2. $\left(\frac{1}{2}\right)^5$
3. $\left(\frac{9}{10}\right)^5$
4. $\left(\frac{9}{10}\right)$

[redacted]

In a box containing 100 bulbs, 10 are defective.
The probability that out of a sample of 5 bulbs none is defective is:

(1) 10^{-1}

(2) $\left(\frac{1}{2}\right)^5$

(3) $\left(\frac{9}{10}\right)^5$

(4) $\frac{9}{10}$

[redacted]

[redacted]

In a box containing 100 bulbs, 10 are defective.
The probability that out of a sample of 5 bulbs none is defective is:

(1) 10^{-1}

(2) $\left(\frac{1}{2}\right)^5$

(3) $\left(\frac{9}{10}\right)^5$

(4) $\frac{9}{10}$

[redacted]

[redacted]

In a box containing 100 bulbs, 10 are defective. The probability that out of a sample of 5 bulbs none is defective, is :

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

(2) $\left(\frac{1}{2}\right)^5$

(3) $\left(\frac{9}{10}\right)^5$

(4) $\frac{9}{10}$

[redacted]

Question: In a box containing 100 bulbs, 10 are defective. The probability that out of a sample of 5 bulbs, none is defective is:

1. $\frac{1}{10}$

2. $\left(\frac{9}{10}\right)^5$

3. $\left(\frac{1}{2}\right)^5$

4. $\frac{9}{10}$

[redacted]

[redacted]

Question: If the matrix A = $\begin{bmatrix} 0 & x+y & 1 \\ 3 & z & 2 \\ x-y & -2 & 0 \end{bmatrix}$ is skew-symmetric, then:

1. x = 2, y = 1, z = 0
2. x = 2, y = 2, z = 0
3. x = -2, y = -1, z = 0
4. x = -2, y = -1, z = -1

[redacted]

If the matrix $\begin{bmatrix} 0 & 1 & 4x \\ -1 & 0 & -5 \\ 2 & 5 & y \end{bmatrix}$ is skew-symmetric, then

1. $x = -1,\ y = 0$
2. $x = -\frac{1}{2},\ y = 0$
3. $x = 1,\ y = -1$
4. $x = 0,\ y = -1$

[redacted]

If $\begin{bmatrix} x-2 & 3 & -2 \\ y & 0 & -4 \\ 2 & z & 0 \end{bmatrix}$ is a skew symmetric matrix , then the value of $x+y+z$ is

1. 9
2. -1
3. 7
4. 3

[redacted]

If the matrix $M = \begin{bmatrix} 0 & -1 & 3\alpha \\ 1 & \beta & -5 \\ -6 & 5 & 0 \end{bmatrix}$ is skew-symmetric, then

1. $\alpha = 2,\ \beta = 1$
2. $\alpha = 2,\ \beta = -1$
3. $\alpha = 2,\ \beta = 0$
4. $\alpha = 1,\ \beta = 0$

[redacted]

[redacted]

[redacted]

Question: Match List I with List II and choose the correct answer from the options given below:

[redacted]

A. $\int \frac{\sin x}{1+\cos x} dx$ I. $e^{\tan^{-1} x} + C$

B. $\int \frac{1}{1-\tan x} dx$ II. $\log(\log x + 1) + C$

C. $\int \frac{e^{\tan^{-1} x}}{1+x^2} dx$ III. $-\log|1+\cos x| + C$

D. $\int \frac{1}{x + x\log x} dx$ IV. $\frac{x}{2} - \frac{1}{2}\log|\cos x - \sin x| + C$

1. A-II, B-III, C-IV, D-I

2. A-III, B-IV, C-I, D-II

3. A-I, B-II, C-III, D-IV

4. A-IV, B-I, C-III, D-II

[redacted]

Match List I with List II

[redacted]

A. $\int x^2 e^{x^3} dx$ I. $\frac{1}{2a}\log\left|\frac{a+x}{a-x}\right| + C$

B. $\int e^x \left(\tan^{-1} x + \frac{1}{1+x^2}\right) dx$ II. $\frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + C$

C. $\int \frac{dx}{a^2 - x^2}$ III. $\frac{1}{3}e^{x^3} + C$

D. $\int \frac{dx}{x^2 + a^2}$ IV. $e^x \tan^{-1} x + C$

Choose the correct answer from the options given below:

1.A-I, B-IV, C-II, D-III

2.A-II, B-III, C-IV, D-I

3.A-III, B-IV, C-I, D-II

4.A-IV, B-I, C-III, D-II

[redacted]

Match List I with List II

LIST I **LIST II**

A.	$\int_1^2 \frac{\sqrt{x}}{\sqrt{3-x}+\sqrt{x}}\,dx$	I.	$-\frac{1}{2}\log 3$
B.	$\int_1^2 x^2\,dx$	II.	$\frac{7}{3}$
C.	$\int_{-4}^{-1} \frac{1}{x}\,dx$	III.	$\frac{1}{2}$
D.	$\int_0^1 \frac{1}{2x-3}\,dx$	IV.	$-\log 4$

Choose the correct answer from the options given below:

1. A-III, B-I, C-II, D-IV
2. A-I, B-III, C-II, D-IV
3. A-III, B-II, C-IV, D-I
4. A-IV, B-III, C-I, D-II

[redacted]

Match List I with List II

	LIST I		LIST II
A.	$\int_1^2 \frac{\sqrt{x}}{\sqrt{3-x}+\sqrt{x}}\,dx$	I.	$-\frac{1}{2}\log 3$
B.	$\int_1^2 x^2\,dx$	II.	$\frac{7}{3}$
C.	$\int_{-4}^{-1} \frac{1}{x}\,dx$	III.	$\frac{1}{2}$
D.	$\int_0^1 \frac{1}{2x-3}\,dx$	IV.	$-\log 4$

Choose the correct answer from the options given below:

1. A-III, B-I, C-II, D-IV
2. A-I, B-III, C-II, D-IV
3. A-III, B-II, C-IV, D-I
4. A-IV, B-III, C-I, D-II

[redacted]

[redacted]

Question: Match List I with List II and choose the correct answer from the options given below:

[redacted]

A. $\sin^{-1}x + \cos^{-1}x, x \in [-1, 1]$	I. $-\frac{\pi}{2}$
B. $\tan^{-1}\sqrt{3} - \cot^{-1}(-\sqrt{3})$	II. $-\frac{\pi}{6}$
C. $\cos^{-1}\left(\cos\frac{13\pi}{6}\right)$	III. $\frac{\pi}{2}$
D. $\sin^{-1}\left(-\frac{1}{2}\right)$	IV. $\frac{\pi}{6}$

1. A-III, B-I, C-IV, D-II
2. A-IV, B-I, C-II, D-III
3. A-II, B-III, C-IV, D-I
4. A-I, B-II, C-III, D-IV

[redacted]

Match List I with List II

	LIST I	LIST II
A.	If $4\sin^{-1}x + \cos^{-1}x = \pi,$ then x equal to	I. $\frac{\pi}{2}$
B.	The value of $\frac{1-\tan^2 15^\circ}{1+\tan^2 15^\circ}$ is	II. $\frac{1}{2}$
C.	If $x + \frac{1}{x} = 2,$ then principal value of $\sin^{-1}x$ is	III. $\frac{3\pi}{4}$
D.	Two angles of a triangle are $\cot^{-1}2$ and $\cot^{-1}3,$ then third angle is	IV. $\frac{\sqrt{3}}{2}$

Choose the correct answer from the options given below :

1. A-II, B-IV, C-I, D-III
2. A-III, B-I, C-IV, D-II
3. A-I, B-II, C-III, D-IV
4. A-IV, B-III, C-II, D-I

[redacted]

Match List I with List II

LIST I	LIST I
A. $\lim_{x\to 0}\frac{(1-\cos 2x)\sin 5x}{x^2 \sin 3x}$	I. 18

B. $\lim_{x\to\infty} \frac{(3x-5)(2x-7)}{(4x-9)(5x-3)}$ II. $\frac{10}{3}$

C. $\lim_{x\to 0} \frac{2\sin^2 3x}{x^2}$ III. $\frac{3}{4}$

D. $\lim_{x\to \frac{\pi}{4}} \frac{1-\cos^3 x}{2-\cot x-\cot^3 x}$ IV. $\frac{3}{10}$

Choose the correct answer from the options given below:

1. A-IV, B-I, C-III, D-II
2. A-III, B-II, C-IV, D-I
3. A-II, B-IV, C-I, D-III
4. A-I, B-III, C-II, D-IV

[redacted]

Match List I with List II

LIST I **LIST I**

A. $\lim_{x\to 0} \frac{(1-\cos 2x)\sin 5x}{x^2 \sin 3x}$ I. 18

B. $\lim_{x\to\infty} \frac{(3x-5)(2x-7)}{(4x-9)(5x-3)}$ II. $\frac{10}{3}$

C. $\lim_{x\to 0} \frac{2\sin^2 3x}{x^2}$ III. $\frac{3}{4}$

D. $\lim_{x\to \frac{\pi}{4}} \frac{1-\cos^3 x}{2-\cot x-\cot^3 x}$ IV. $\frac{3}{10}$

Choose the correct answer from the options given below:

1. A-IV, B-I, C-III, D-II
2. A-III, B-II, C-IV, D-I
3. A-II, B-IV, C-I, D-III
4. A-I, B-III, C-II, D-IV

[redacted]

[redacted]

If $A = \begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and B is a square matrix of order 3, then $|AB|$ is equal to:

1. $|B|^2$
2. $|B|$
3. $\sin^2\theta|B|$
4. $\cos^2\theta|B|$

[redacted]

If A is any square matrix of order 3 and $B = \begin{bmatrix} \sin\theta & \cos\theta & 0 \\ -\cos\theta & \sin\theta & 0 \\ 0 & 0 & a \end{bmatrix}$, a is any constant, then $|AB|$ is equal to:

(1) $a|A|$

(2) $a^2|A|$

(3) a

(4) $|A|$

[redacted]

[redacted]

If A is any square matrix of order 3 and $B = \begin{bmatrix} \sin\theta & \cos\theta & 0 \\ -\cos\theta & \sin\theta & 0 \\ 0 & 0 & a \end{bmatrix}$, a is any constant, then $|AB|$ is equal to:

(1) $a|A|$

(2) $a^2|A|$

(3) a

(4) $|A|$

[redacted]

[redacted]

[redacted]

Value of $\frac{e^{\sin(\tan^{-1}x+\cot^{-1}x)}}{e^{\sin(\sin^{-1}x+\cos^{-1}x)}}, x \in [-1,1]$, is:

1. 0
2. $\frac{\pi}{2}$
3. 1
4. -$\frac{\pi}{2}$

[redacted]

The value of $\cot^{-1}\left[2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right]$ is

1. $\frac{\pi}{6}$
2. $\frac{\pi}{4}$
3. $\frac{2\pi}{3}$
4. $\frac{\pi}{3}$

[redacted]

The value of $\cot^{-1}\left[2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right]$ is

1. $\frac{\pi}{6}$
2. $\frac{\pi}{4}$
3. $\frac{2\pi}{3}$
4. $\frac{\pi}{3}$

[redacted]

The value of $\cot^{-1}\left[2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right]$ is

1. $\frac{\pi}{6}$
2. $\frac{\pi}{4}$
3. $\frac{2\pi}{3}$
4. $\frac{\pi}{3}$

[redacted]

The value of $\tan^{-1}1+\cos^{-1}\left(-\frac{1}{2}\right)+\sin^{-1}\left(-\frac{1}{2}\right)$ is

1. $\frac{\pi}{4}$
2. $\frac{\pi}{2}$
3. $\frac{3\pi}{4}$
4. π

[redacted]

The value of $\tan^{-1} 1 + \cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{2}\right)$ is

1. $\frac{\pi}{4}$
2. $\frac{\pi}{2}$
3. $\frac{3\pi}{4}$
4. π

[redacted]

The value of x given by $\cos(\tan^{-1} x) = \sin\left(\cot^{-1} \frac{3}{4}\right)$ is:

1. $\frac{1}{4}$
2. $\frac{3}{4}$
3. $\frac{3}{2}$
4. 1

[redacted]

The value of the expression $\sin[\cot^{-1}(\cos(\tan^{-1} 1))]$ is:

1. $\sqrt{\frac{2}{3}}$
2. $\frac{\sqrt{2}}{3}$
3. $\frac{2}{\sqrt{3}}$
4. 1

[redacted]

The value of x given by $\cos(\tan^{-1} x) = \sin\left(\cot^{-1} \frac{3}{4}\right)$ is:

1. $\frac{1}{4}$
2. $\frac{3}{4}$
3. $\frac{3}{2}$
4. 1

[redacted]

The value of the expression $\sin[\cot^{-1}(\cos(\tan^{-1} 1))]$ is:

1. $\sqrt{\frac{2}{3}}$

2. $\frac{\sqrt{2}}{3}$

3. $\frac{2}{\sqrt{3}}$

4. 1

[redacted]

[redacted]

If the matrix $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then A^2 is equal to:

1. $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

2. $\begin{bmatrix} \cos^2\theta & \sin^2\theta \\ -\sin^2\theta & \cos^2\theta \end{bmatrix}$

3. $\begin{bmatrix} \cos\theta^2 & \sin\theta^2 \\ -\sin\theta^2 & \cos\theta^2 \end{bmatrix}$

4. $\begin{bmatrix} \cos\theta + \sin\theta & \cos\theta - \sin\theta \\ \sin\theta - \cos\theta & \cos\theta + \sin\theta \end{bmatrix}$

[redacted]

If $\begin{vmatrix} 1 & \cos\theta & 0 \\ \sin\theta & 1 & \cos\theta \\ \cos\theta & 1 & -\sin\theta \end{vmatrix} = A\sin\theta + B\cos\theta + C\sin\theta\cos\theta$ then:

1. $A + B = 0$

2. $B + C = 2$

3. $C + A = 1$

4. $B - A = 1$

[redacted]

[redacted]

The differential equation of the family of curves $y = a\sin(bx+c)$, a and c are parameters, is :

(1) $\frac{d^2y}{dx^2} + b^2y = 0$

(2) $\frac{dy}{dx} + b^2y = 0$

(3) $\frac{d^2y}{dx^2} - b^2y = 0$

(4) $\frac{d^2y}{dx^2} + y = 0$

[redacted]

The order and degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^2 + x^2\left(\frac{dy}{dx}\right)^3 + y = \sin x$ respectively are :

(1) 2, 2

(2) 2, 3

(3) 2, 1

(4) 1, 2

[redacted]

The order and degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^2 + x^2\left(\frac{dy}{dx}\right)^3 + y = \sin x$ respectively are :

(1) 2, 2

(2) 2, 3

(3) 2, 1

(4) 1, 2

[redacted]

[redacted]

The probability that a student is not a swimmer is $\frac{1}{5}$. Then the probability that out of five students, four are swimmers is :

(1) ${}^5C_4\left(\frac{4}{5}\right)^4\frac{1}{5}$

(2) $\left(\frac{4}{5}\right)^4\frac{1}{5}$

(3) ${}^5C_4\left(\frac{1}{5}\right)^4\left(\frac{4}{5}\right)$

(4) $\left(\frac{1}{5}\right)^4\left(\frac{4}{5}\right)$

[redacted]

The probability that a student is not a swimmer is $\frac{1}{5}$. Then, the probability that out of 5 students, 4 are swimmers is

1. ${}^5C_4\left(\frac{1}{5}\right)\left(\frac{4}{5}\right)^4$
2. ${}^5C_4\left(\frac{1}{5}\right)^4\left(\frac{4}{5}\right)$
3. ${}^5C_3\left(\frac{1}{5}\right)^2\left(\frac{4}{5}\right)^3$
4. $\left(\frac{4}{5}\right)^4\left(\frac{1}{5}\right)$

[redacted]

[redacted]

$$\int_1^2 \frac{x\,dx}{(x+1)(x+2)} =$$

(1) $\tan^{-1}\frac{32}{27}$

(2) $\tan^{-1}\frac{27}{32}$

(3) $\log\frac{32}{27}$

(4) $\log\frac{27}{32}$

[redacted]

$$\int x^2 \tan^{-1} x\,dx =$$

(1) $\frac{x^3}{3}\tan^{-1} x - \frac{x^2}{6} + \frac{1}{6}\log|x^2+1| + C$

(2) $\frac{x^3}{3}\tan^{-1} x + \frac{x^2}{6} + \frac{1}{6}\log|x^2+1| + C$

(3) $\frac{x^3}{3}\tan^{-1} x - \frac{x^2}{6} - \frac{1}{6}\log|x^2+1| + C$

(4) $\frac{x^3}{3}\tan^{-1} x + \frac{x^2}{6} - \frac{1}{6}\log|x^2+1| + C$

[redacted]

[redacted]

$$\int x^2 \tan^{-1} x\,dx =$$

(1) $\frac{x^3}{3}\tan^{-1} x - \frac{x^2}{6} + \frac{1}{6}\log|x^2+1| + C$

(2) $\frac{x^3}{3}\tan^{-1} x + \frac{x^2}{6} + \frac{1}{6}\log|x^2+1| + C$

(3) $\frac{x^3}{3}\tan^{-1} x - \frac{x^2}{6} - \frac{1}{6}\log|x^2+1| + C$

(4) $\frac{x^3}{3}\tan^{-1} x + \frac{x^2}{6} - \frac{1}{6}\log|x^2+1| + C$

[redacted]

[redacted]

[redacted]

The position vector of a point R which divides the line joining two points P and Q whose position vectors are $\hat{i}+2\hat{j}-\hat{k}$ and $-\hat{i}+\hat{j}+\hat{k}$ respectively in the ratio 2 : 1 externally is :

(1) $-\frac{1}{3}\hat{i}+\frac{4}{3}\hat{j}+\frac{1}{3}\hat{k}$

(2) $-3\hat{i}+3\hat{k}$

(3) $3\hat{i}-3\hat{k}$

(4) $\frac{1}{3}\hat{i}-\frac{4}{3}\hat{j}-\frac{1}{3}\hat{k}$

[redacted]

[redacted]

The position vector of a point which divides the line joining the points with position vectors $(\vec{a}-2\vec{b})$ and $(2\vec{a}+\vec{b})$ externally in the ratic

1. $3\vec{a}+4\vec{b}$
2. $-3\vec{a}+4\vec{b}$
3. $3\vec{a}-4\vec{b}$
4. $\frac{5}{3}\vec{a}$

[redacted]

[redacted]

[redacted]

Which of the following statements are \textbf{correct} ?

(A) $|A'| = |A|$, where A is the transpose of matrix A

(B) If $A = [a_{ij}]_{3\times 3}$, then $|4A| = 64|A|$

(C) $|A| = |\text{adj } A|^{n-1}$, where n is the order of the matrix

(D) If A is an invertible matrix of order 2, then $\det(A^{-1})$ is equal to $\dfrac{1}{\det(A)}$

Choose the \textbf{correct} answer from the options given below :

(1) $(A), (B), (D)$ Only

(2) $(A), (C)$ Only

(3) $(A), (B), (C)$ Only

(4) $(A), (D)$ Only

[redacted]

26. For a square matrix $A_{n\times n}$

(A) $|\text{adj } A| = |A|^{n-1}$

(B) $|A| = |\text{adj } A|^{n-1}$

(C) $A(\text{adj } A) = |A|$

(D) $|A^{-1}| = \dfrac{1}{|A|}$

Choose the \textbf{correct} answer from the options given below :

(1) (B) and (D) only

(2) (A) and (D) only

(3) (A), (C) and (D) only

(4) (B), (C) and (D) only

[redacted]

[redacted]

The black and red die are rolled. The conditional probability of obtaining a sum greater than 9 given that the black die resulted in a 5 is :

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

(2) $\frac{1}{6}$

(3) $\frac{1}{18}$

(4) $\frac{1}{9}$

[redacted]

A black and a red die are rolled simultaneously. The probability of obtaining a sum greater than 9, given that the black resulted in a 5 is

1. 1/2
2. 1
3. 2/3
4. 1/3

[redacted]

[redacted]

The given function $f(x) = [x]$ is discontinuous at :

(1) every integer

(2) every even number

(3) every real number

(4) at zero only

[redacted]

The function $f(x) = \begin{cases} \frac{x^2+2x-3}{x-1} & x \neq 1 \\ 2 & x = 1 \end{cases}$ is :

(1) continuous at $x = 1$ only

(2) discontinuous at $x = 1$

(3) continuous at every real number

(4) discontinuous at every real number

[redacted]

[redacted]

If A is an invertible matrix of order 2; then $\det(A^{-1})$ is equal to:

(1) 1

(2) $\frac{1}{\det(A)}$

(3) $\det(A)$

(4) 0

[redacted]

[redacted]

If A is a square matrix of order 2, then $|\text{adj } A|$ is equal to:

(1) $|A^{-1}|$

(2) $|A|$

(3) $|A|^2$

(4) $\frac{1}{|A|}$

[redacted]

[redacted]

If A is a square matrix of order 2, then $|\text{adj } A|$ is equal to:

(1) $|A^{-1}|$

(2) $|A|$

(3) $|A|^2$

(4) $\frac{1}{|A|}$

[redacted]

[redacted]

[redacted]

If $f : [3, \infty) \to A$ defined by $f(x) = x^2$ is an onto function, then A is:

(1) $\mathbb{R}$

(2) $[5, \infty)$

(3) $[6, \infty)$

(4) $[9, \infty)$

[redacted]

[redacted]

If the function $f : \mathbb{R} \to \mathbb{R}$ be defined by $f(x) = x^2 - 1,$ then $f^{-1}(8)$ is:

(1) $\{0, 3\}$

(2) $\{-1, 1\}$

(3) $\{-3, 3\}$

(4) $\{-2, 2\}$

[redacted]

[redacted]

If the function $f : \mathbb{R} \to \mathbb{R}$ be defined by $f(x) = x^2 - 1,$ then $f^{-1}(8)$ is:

(1) $\{0, 3\}$

(2) $\{-1, 1\}$

(3) $\{-3, 3\}$

(4) $\{-2, 2\}$

[redacted]

[redacted]

[redacted]

Given $p \neq 1$, then $\int \frac{dx}{x(\log_e x)^p}$ is equal to:

(1) $\frac{(\log_e x)^{1+p}}{1+p}$

(2) $\frac{1+p}{(\log_e x)^{1+p}}$

(3) $\frac{(\log_e x)^{1-p}}{1-p}$

(4) $\frac{1-p}{(\log_e x)^{1-p}}$

[redacted]

[redacted]

If $\int_0^1 \frac{a\sqrt{x}\,dx}{(x^{3/2}+1)} = 1$, then a is equal to:

(1) 2

(2) 3

(3) 1

(4) 4

[redacted]

[redacted]

$\int \frac{x}{x^2+x-12}\,dx$ is equal to

(1) $\frac{3}{7}\log|x-3| + \frac{4}{7}\log|x+4| + C$

(2) $-\frac{3}{7}\log|x-3| + \frac{4}{7}\log|x+4| + C$

(3) $\frac{4}{7}\log|x-3| + \frac{3}{7}\log|x+4| + C$

(4) $\frac{4}{7}\log|x-3| - \frac{3}{7}\log|x+4| + C$

[redacted]

$\int_{-1}^{1} \frac{x^3+|x|+1}{x^2+2|x|+1}\,dx$ is equal to

(1) $\frac{1}{2}\log_e 2 - 1$

(2) $2\log_e 2$

(3) $2\log_e 2 - 2$

(4) $4\log_e 2$

[redacted]

[redacted]

[redacted]

A card is picked up at random from 52 playing cards. Given that the picked card is a queen, then the probability of this card to be a card of spade is:

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

(2) $\frac{4}{13}$

(3) $\frac{1}{4}$

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

[redacted]

[redacted]

A card is selected at random from a pack of 52 playing cards. The selected card is a queen. The probability that this card is a card of spade is :

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

(2) $\frac{1}{4}$

(3) $\frac{4}{13}$

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

[redacted]

[redacted]

A card is selected at random from a pack of 52 playing cards. The selected card is a queen. The probability that this card is a card of spade is :

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

(2) $\frac{1}{4}$

(3) $\frac{4}{13}$

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

[redacted]

[redacted]

A card is picked at random from a pack of 52 playing cards. Given that the picked card is a queen, the probability of this card to be a ca

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

(2) $\frac{4}{13}$

(3) $\frac{1}{4}$

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

[redacted]

A card is picked at random from a pack of 52 playing cards. Given that the picked card is a queen, the probability of this card to be a ca

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

(2) $\frac{4}{13}$

(3) $\frac{1}{4}$

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

[redacted]

[redacted]

The function $f : \mathbb{R} \to \mathbb{R}$ given by $f(x) = -|x-1|$ is

(1) continuous as well as differentiable at $x = 1$

(2) not continuous but differentiable at $x = 1$

(3) continuous but not differentiable at $x = 1$

(4) neither continuous nor differentiable at $x = 1$

[redacted]

[redacted]

The function $f : R \to R, f(x) = x^2$ is :

(1) injective but not surjective

(2) surjective but not injective

(3) injective as well as surjective

(4) neither injective nor surjective

[redacted]

[redacted]

The value of the determinant $\begin{vmatrix} a\cos\theta & a\sin\theta \\ -a\sin\theta & a\cos\theta \end{vmatrix}$ is:

(1) a

(2) a^2

(3) 1

(4) $2a$

[redacted]

[redacted]

The value of the determinant $\begin{vmatrix} \cos^2\theta & \cos\theta\sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{vmatrix}$ is equal to

(1) 1

(2) $\cos\theta$

(3) $\cos 2\theta$

(4) $\cos\theta - \sin\theta$

[redacted]

[redacted]

The value of the determinant $\begin{vmatrix} \cos^2\theta & \cos\theta\sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{vmatrix}$ is equal to

(1) 1

(2) $\cos\theta$

(3) $\cos 2\theta$

(4) $\cos\theta - \sin\theta$

[redacted]

[redacted]

The value of the determinant $\begin{vmatrix} a\cos\theta & b\sin\theta & 0 \\ -b\sin\theta & a\cos\theta & 0 \\ 0 & 0 & c \end{vmatrix}$ is :

(1) $(a^2+b^2)c$

(2) $(a^2\cos^2\theta + b^2\sin^2\theta)c$

(3) $(a^2\cos^2\theta - b^2\sin^2\theta)c$

(4) $(a^2+b^2)c^2$

[redacted]

The value of the determinant $\begin{vmatrix} a\cos\theta & b\sin\theta & 0 \\ -b\sin\theta & a\cos\theta & 0 \\ 0 & 0 & c \end{vmatrix}$ is :

(1) $(a^2+b^2)c$

(2) $(a^2\cos^2\theta + b^2\sin^2\theta)c$

(3) $(a^2\cos^2\theta - b^2\sin^2\theta)c$

(4) $(a^2+b^2)c^2$

[redacted]

The value of the determinant $\begin{vmatrix} a\cos\theta & b\sin\theta & 0 \\ -b\sin\theta & a\cos\theta & 0 \\ 0 & 0 & c \end{vmatrix}$ is :

(1) $(a^2+b^2)c$

(2) $(a^2\cos^2\theta + b^2\sin^2\theta)c$

(3) $(a^2\cos^2\theta - b^2\sin^2\theta)c$

(4) $(a^2+b^2)c^2$

[redacted]

The value of the determinant $\begin{vmatrix} a\cos\theta & b\sin\theta & 0 \\ -b\sin\theta & a\cos\theta & 0 \\ 0 & 0 & c \end{vmatrix}$ is :

(1) $(a^2+b^2)c$

(2) $(a^2\cos^2\theta + b^2\sin^2\theta)c$

(3) $(a^2\cos^2\theta - b^2\sin^2\theta)c$

(4) $(a^2+b^2)c^2$

[redacted]

[redacted]

If $\int_0^1 \frac{e^x}{1+x}\,dx = K$, then $\int_0^1 \frac{e^x}{(1+x)^2}\,dx$ is equal to:

(1) $K - 1 + \frac{e}{2}$

(2) $K + 1 - \frac{e}{2}$

(3) $K - 1 - \frac{e}{2}$

(4) $K + 1 + \frac{e}{2}$

[redacted]

[redacted]

If $\int \frac{dx}{(x+1)(x+2)} = \int \frac{A}{x+1}\,dx + \int \frac{B}{x+2}\,dx$, then $A + B =$

(1) 2

(2) 1

(3) 0

(4) -1

[redacted]

[redacted]

If $\int \frac{dx}{(x+1)(x+2)} = \int \frac{A}{x+1}\,dx + \int \frac{B}{x+2}\,dx$, then $A + B =$

(1) 2

(2) 1

(3) 0

(4) -1

[redacted]

[redacted]

If $\int_0^a 3x^2\,dx = 27$, then value of a is :

(1) 2

(2) 3

(3) 1

(4) $\sqrt{2}$

[redacted]

[redacted]

If $\int_0^a 3x^2\,dx = 27$, then value of a is :

(1) 2

(2) 3

(3) 1

(4) $\sqrt{2}$

[redacted]

[redacted]

If $\int_0^1 (3x^2 + 2x + 5k)\, dx = 0,$ then the value of k is:

(1) $\frac{3}{5}$

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

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

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

[redacted]

[redacted]

$\int_0^2 (x^2 + 1)\, dx$ is equal to

(1) $\frac{14}{3}$

(2) 4

(3) 10

(4) 8

[redacted]

$\int_0^2 (x^2 + 1)\, dx$ is equal to

(1) $\frac{14}{3}$

(2) 4

(3) 10

(4) 8

[redacted]

$\int_{-5/2}^{5/2} |x| dx$ is equal to:

(1) $\frac{25}{4}$

(2) 0

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

(4) $-\frac{5}{2}$

[redacted]

If $\int_0^1 \frac{e^x}{1+x}\,dx = m$, then the value of $\int_0^1 \frac{e^x}{(1+x)^2}\,dx$ is:

1. $m - e + 1$
2. $\frac{m}{2} + e - 1$
3. $m - \frac{e}{2} + 1$
4. $m + \frac{e}{2} - 1$

[redacted]

[redacted]

[redacted]

If $x = \log t^2$ and $y = (\log t)^2$ then $\frac{d^2y}{dx^2}$ is:

(1) 2

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

(3) $\frac{\log t}{t}$

(4) $\frac{4\log t - 4}{t^6}$

[redacted]

[redacted]

If $y = x^2 \log x$ then $\frac{d^2y}{dx^2} =$

(1) $(x^2 + 2x + 1)\log x$

(2) $\log(3e\,x^2)$

(3) $\log(x + x^2)$

(4) $\log(e^3 x^2)$

[redacted]

[redacted]

[redacted]

If $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 & -10 \\ 1 & -2 & -5 \\ 9 & 22 & 15 \end{bmatrix}$, then matrix A is equal to:

(1) $\begin{bmatrix} 1 & 4 & -5 \\ 3 & -4 & 0 \end{bmatrix}$

(2) $\begin{bmatrix} 1 & -2 \\ -5 & 3 \\ 4 & 0 \end{bmatrix}$

(3) $\begin{bmatrix} 1 & -2 & -5 \\ 3 & 4 & 0 \end{bmatrix}$

(4) $\begin{bmatrix} 1 & -3 \\ 2 & -4 \\ 5 & 0 \end{bmatrix}$

[redacted]

[redacted]

If the matrix $A = \begin{bmatrix} x & 2 & y \\ -2 & 0 & 3 \\ -1 & z & 0 \end{bmatrix}$ is skew-symmetric, then the value of $2x - 3y + 5z$ is equal to

(1) 18

(2) 15

(3) -10

(4) -18

[redacted]

[redacted]

If $u = \sin^{-1}\left(\dfrac{2x}{1+x^2}\right)$ and $v = \tan^{-1} x,\ x \in (-1, 1),$ then $\dfrac{du}{dv}$ is equal to:

(1) 3

(2) 0

(3) 1

(4) 2

[redacted]

[redacted]

$$\cos^{-1}\left(\frac{3}{5}\cos x + \frac{4}{5}\sin x\right) =$$

(1) $x + \tan^{-1}\left(\frac{4}{3}\right)$

(2) $x - \tan^{-1}\left(\frac{4}{3}\right)$

(3) $2x + \tan^{-1}\left(\frac{4}{3}\right)$

(4) $2x - \tan^{-1}\left(\frac{4}{3}\right)$

[redacted]

[redacted]

$$\cos^{-1}\left(\frac{3}{5}\cos x + \frac{4}{5}\sin x\right) =$$

(1) $x + \tan^{-1}\left(\frac{4}{3}\right)$

(2) $x - \tan^{-1}\left(\frac{4}{3}\right)$

(3) $2x + \tan^{-1}\left(\frac{4}{3}\right)$

(4) $2x - \tan^{-1}\left(\frac{4}{3}\right)$

[redacted]

[redacted]

[redacted]

Consider the LPP,

Maximize $z = 2x + 3y$, subject to the conditions,

$$x + y \leq 2,$$

$$x \leq 2,$$

$$x \geq 0,\ y \geq 0,$$

then maximum value of the objective function is:

(1) 8

(2) 6

(3) 4

(4) 0

[redacted]

[redacted]

Consider the LPP, Max $Z = 2x + y$, subject to the conditions

$$3x + 2y \leq 6$$

$$4x + y \leq 4$$

$x \geq 0, y \geq 0$, then the maximum value of the objective function is:

1. 3
2. $\frac{16}{5}$
3. $\frac{14}{5}$
4. $\frac{21}{5}$

[redacted]

Consider the LPP, Max $Z = 2x + y$, subject to the conditions

$$3x + 2y \leq 6$$

$$4x + y \leq 4$$

$x \geq 0, y \geq 0$, then the maximum value of the objective function is:

1. 3
2. $\frac{16}{5}$
3. $\frac{14}{5}$
4. $\frac{21}{5}$

[redacted]

Consider the LPP, Min $Z = 2x - 3y$ subject to the conditions

$$x + y \leq 3,$$

$$x \leq 3,$$

$$x \geq 0,\ y \geq 0,$$

then the minimum value of the objective function is at the point.

(1) $(0, 0)$

(2) $(0, 3)$

(3) $(3, 0)$

(4) $(1, 2)$

[redacted]

[redacted]

The angle between x axis and the vector $\hat{i}+\hat{j}+\hat{k}$ is :

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

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

(3) $\cos^{-1}\left(\frac{1}{3}\right)$

(4) $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$

[redacted]

[redacted]

$$\tan\left[\frac{1}{2}\cos^{-1}\left(\frac{4}{5}\right)\right]=$$

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

(2) $\frac{1}{\sqrt{10}}$

(3) $\frac{\sqrt{3}}{10}$

(4) 3

[redacted]

[redacted]

If $y=\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right), 0<x<1,$ then $\frac{dy}{dx}$ is equal to:

(1) $\frac{2}{1+x^2}$

(2) $-\frac{2}{\sqrt{1-x^2}}$

(3) $-\frac{2}{\sqrt{1+x^2}}$

(4) $\frac{2}{\sqrt{1-x^2}}$

[redacted]

[redacted]

[redacted]

Let $A = \begin{bmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{bmatrix}$, where $0 \le \theta \le 2\pi$.

Then $\det(A)$ lies in the interval :

(1) $[2, 3]$

(2) $[3, 4]$

(3) $[2, 4]$

(4) $(2, 4)$

[redacted]

[redacted]

Let $\Delta = \begin{vmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{vmatrix}$ then Δ lies in the interval :

(1) $[2, 3]$

(2) $[2, 4]$

(3) $[3, 4]$

(4) $[4, 2]$

[redacted]

Let $\Delta = \begin{bmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{bmatrix}$, then Δ lies in the interval

1. $[2, 3]$
2. $[3, 4]$
3. $(2, 4)$
4. $[2, 4]$

[redacted]

Let $\Delta = \begin{bmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{bmatrix}$, then Δ lies in the interval

1. $[2, 3]$
2. $[3, 4]$
3. $(2, 4)$
4. $[2, 4]$

[redacted]

[redacted]

Let $P = [a_{ij}]$ be a 3×3 matrix and let $Q = [b_{ij}]$ be a 3×3 matrix,

where $b_{ij} = 2^{i+j} a_{ij}$ for $1 \leq i, j \leq 3$.

If the determinant of P is 2, then the determinant of the matrix Q is ______.

(1) 2^{10}

(2) 2^{11}

(3) 2^{12}

(4) 2^{13}

[redacted]

[redacted]

Let $P = [a_{ij}]$ be a 3×3 matrix and let $Q = [b_{ij}]$ where $b_{ij} = 2^{i+j} a_{ij}$, $\forall 1 \leq i, j \leq 3$.

If the determinant of P is 2, then the determinant of Q is:

(1) 2^{13}

(2) 2^{12}

(3) 2^{11}

(4) 2^{10}

[redacted]

[redacted]

The value of λ, so that the vector $\vec{a} = 2\hat{i} + \lambda\hat{j} + \hat{k}$ and $\vec{b} = \hat{i} - 2\hat{j} + 3\hat{k}$ are perpendicular to each other, is :

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

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

(3) 5

(4) $\frac{7}{2}$

[redacted]

[redacted]

38. The unit vector perpendicular to each of the vectors $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$, where $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + 3\hat{k}$, is :

(1) $\frac{1}{\sqrt{6}}\hat{i} + \frac{2}{\sqrt{6}}\hat{j} + \frac{1}{\sqrt{6}}\hat{k}$

(2) $-\frac{1}{\sqrt{6}}\hat{i} + \frac{1}{\sqrt{6}}\hat{j} - \frac{1}{\sqrt{6}}\hat{k}$

(3) $-\frac{1}{\sqrt{6}}\hat{i} + \frac{2}{\sqrt{6}}\hat{j} + \frac{2}{\sqrt{6}}\hat{k}$

(4) $-\frac{1}{\sqrt{6}}\hat{i} + \frac{2}{\sqrt{6}}\hat{j} - \frac{1}{\sqrt{6}}\hat{k}$

[redacted]

[redacted]

If $\begin{bmatrix}1 & 2 & 3\end{bmatrix}A = \begin{bmatrix}4 & 5\end{bmatrix}$, then the order of matrix A is:

1. 2×3
2. 2×1
3. 3×2
4. 3×1

[redacted]

If the matrix $A = \begin{bmatrix}0 & b & 1\\ 2 & 0 & c\\ 3 & 4 & 0\end{bmatrix}$ is a symmetric matrix, then the values of b and c are:

1. $b = 1$ and $c = 1$
2. $b = 2$ and $c = 4$
3. $b = -2$ and $c = -4$
4. $b = 0$ and $c = 0$

[redacted]

If the matrix $A = \begin{bmatrix}0 & b & 1\\ 2 & 0 & c\\ 3 & 4 & 0\end{bmatrix}$ is a symmetric matrix, then the values of b and c are:

1. $b = 1$ and $c = 1$
2. $b = 2$ and $c = 4$
3. $b = -2$ and $c = -4$
4. $b = 0$ and $c = 0$

[redacted]

If $B = \begin{bmatrix}1 & x & 0\\ 1 & 3 & 3\\ 2 & 0 & 4\end{bmatrix}$ is the adjoint of matrix A of order 3×3 and $|A| = 4$ then the value of x is:

1. 4
2. 2
3. 5
4. 0

[redacted]

If $B = \begin{bmatrix}1 & x & 0\\ 1 & 3 & 3\\ 2 & 0 & 4\end{bmatrix}$ is the adjoint of matrix A of order 3×3 and $|A| = 4$ then the value of x is:

1. 4
2. 2
3. 5
4. 0

[redacted]

If $a_{ij} = i + 3j$, then the matrix of order 2 with elements as a_{ij} is

1. $\begin{bmatrix} 4 & 7 \\ 5 & 12 \end{bmatrix}$

2. $\begin{bmatrix} 3 & 7 \\ 5 & 12 \end{bmatrix}$

3. $\begin{bmatrix} 4 & 7 \\ 5 & 8 \end{bmatrix}$

4. $\begin{bmatrix} 3 & 7 \\ 5 & 14 \end{bmatrix}$

[redacted]

$$\text{If } \begin{bmatrix} 1 & 0 \\ b & 5 \end{bmatrix} + 2\begin{bmatrix} a & 0 \\ 1 & -2 \end{bmatrix} = I,$$

where I is the unit matrix of order 2, then the value of $(a-b)$ is:

1. 0
2. 1
3. 2
4. 3

[redacted]

If $A = \begin{bmatrix} 0 & a & 2 \\ -2 & 0 & b \\ -2 & 2 & c \end{bmatrix}$ is a skew symmetric matrix, then the value of $(a+b+c)^3$ is:

1. 1
2. 0
3. 8
4. 2

[redacted]

[redacted]

If $P\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} = \begin{bmatrix} -7 & -8 & -9 \\ 2 & 4 & 6 \end{bmatrix}$, then matrix P is equal to:

1. $\begin{bmatrix} 1 & 2 \\ -2 & 0 \end{bmatrix}$

2. $\begin{bmatrix} 1 & -2 \\ 2 & 0 \end{bmatrix}$

3. $\begin{bmatrix} 1 & 0 \\ 2 & -2 \end{bmatrix}$

4. $\begin{bmatrix} 1 & 2 \\ 2 & 0 \end{bmatrix}$

[redacted]

[redacted]

[redacted]

The value of the integral $I = \int_{-1}^{2} |x|\, dx$ is :

1. 0
2. $\frac{1}{2}$
3. $\frac{5}{2}$
4. $\frac{3}{2}$

[redacted]

The value of the integral $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos^2 x\, dx$ is:

1. $\frac{\pi}{4}$
2. $\frac{\pi}{2}$
3. 0
4. $-\frac{\pi}{2}$

[redacted]

The value of the integral $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos^2 x\, dx$ is:

1. $\frac{\pi}{4}$
2. $\frac{\pi}{2}$
3. 0
4. $-\frac{\pi}{2}$

[redacted]

The value of a for which $\int_{1}^{a} x^2 dx = \frac{7}{3}$ is :

1. -1
2. 1
3. 2
4. -2

[redacted]

The value of a for which $\int_{1}^{a} x^2 dx = \frac{7}{3}$ is :

1. -1
2. 1
3. 2
4. -2

[redacted]

The value of the integral $I = \int_{-3}^{3} |x|\, dx$ is:

1. 18
2. 0
3. 9
4. -9

[redacted]

[redacted]

The value of the definite integral $I = \int_{-1}^{1} \frac{1}{1+\sqrt{e^x}}\, dx$ is:

1. 0
2. 1
3. 2
4. 3

[redacted]

The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (\sin|x| + \cos|x|)dx$ is

1. 0
2. 2
3. 4
4. $\frac{5}{2}$

[redacted]

The value of $\int_{0}^{1} xe^x dx$ is:

1. $\frac{1}{e}$
2. e
3. 1
4. -1

[redacted]

The value of $\int_{-1}^{1} |x^3 - x| dx$ is

1. 0
2. $\frac{1}{4}$

3. $\frac{1}{2}$
4. 1

[redacted]

The value of $\int_{-1}^{1} |x|\, dx$ is

1. 0
2. 1
3. $\frac{1}{2}$
4. 2

[redacted]

[redacted]

[redacted]

The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^3 + x\cos x + \tan^5 x)dx$ is:

1. 0
2. 1
3. 2
4. π

[redacted]

The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(x^3 + x\cos x + \tan^5 x + 1\right) dx$ is:

1. 0
2. 2
3. π
4. 1

[redacted]

The value of $\int_{\frac{-\pi}{2}}^{\pi/2} (x^5 + x^3 \cos x)\, dx$ is:

1. 0
2. -1
3. π
4. 1

[redacted]

[redacted]

The function $f(x) = |x - 1|, x \in R$ is:

1. Continuous at $x = 1$, but not differentiable at $x = 1$
2. Discontinuous at $x = 1$, but differentiable at $x = 1$
3. Continuous and differentiable at $x = 1$
4. Neither continuous nor differentiable at $x = 1$

[redacted]

The function given by $f(x) = |x-1| + |x-2| + |x-3|$ is:

1. Continuous and differentiable for all $x \in \mathbb{R}$.
2. Continuous everywhere but differentiable at $x = 1, 2$ and 3 only
3. Continuous but not differentiable at $x = 1, 2$ and 3
4. Differentiable but not continuous at $x = 1, 2$ and 3

[redacted]

The function given by $f(x) = |x-1| + |x-2| + |x-3|$ is:

1. Continuous and differentiable for all $x \in \mathbb{R}$.
2. Continuous everywhere but differentiable at $x = 1, 2$ and 3 only
3. Continuous but not differentiable at $x = 1, 2$ and 3
4. Differentiable but not continuous at $x = 1, 2$ and 3

[redacted]

The function given by $f(x) = |x-1| + |x-2| + |x-3|$ is:

1. Continuous and differentiable for all $x \in \mathbb{R}$.
2. Continuous everywhere but differentiable at $x = 1, 2$ and 3 only
3. Continuous but not differentiable at $x = 1, 2$ and 3
4. Differentiable but not continuous at $x = 1, 2$ and 3

[redacted]

The function $f(x) = |x-1|$ is

1. Continuous at $x = 1$ and not differentiable at $x = 1$.
2. Continuous and differentiable at $x = 1$.
3. Discontinuous and differentiable at $x = 1$.
4. Neither continuous nor differentiable at $x = 1$.

[redacted]

The function $f(x) = |x-1|$ is

1. Continuous at $x = 1$ and not differentiable at $x = 1$.
2. Continuous and differentiable at $x = 1$.
3. Discontinuous and differentiable at $x = 1$.
4. Neither continuous nor differentiable at $x = 1$.

[redacted]

The function $f(x) = |x-1|$ is

1. Continuous at $x = 1$ and not differentiable at $x = 1$.
2. Continuous and differentiable at $x = 1$.
3. Discontinuous and differentiable at $x = 1$.

4. Neither continuous nor differentiable at $x = 1$.

[redacted]

[redacted]

The function $f : \mathbb{R} \to \mathbb{R}$ defined by

$$f(x) = \begin{cases} x^2, & x \geq 1 \\ x, & x < 1 \end{cases} \text{ is}$$

1. Continuous but not differentiable at $x = 1$
2. Continuous and differentiable at $x = 1$
3. Neither continuous nor differentiable at $x = 1$
4. Continuous but not differentiable at $x = 0$

[redacted]

[redacted]

[redacted]

The function $f(x) = \begin{cases} \frac{|x|}{x}, & \text{if } x \neq 0 \\ 0, & \text{if } x = 0 \end{cases}$ is:

1. Continuous at x = 0
2. Discontinuous at x = 0
3. Continuous for all x $\in$ R
4. Discontinuous for all x $\in$ R

[redacted]

The function $f(x) = \begin{cases} \frac{x^2+2x-3}{x-1}, & \text{if } x \neq 1 \\ 0, & \text{if } x = 1 \end{cases}$ is

1. Continuous at $x = 1$
2. discontinuous at $x = 1$
3. Continuous at each real number
4. discontinuous at each real number

[redacted]

Determine the value of k for which the function $f(x) = \begin{cases} \frac{x^2-9}{x-3}, & x \neq 3 \\ k, & x = 3 \end{cases}$ is continuous at $x = 3$

1. 6
2. -6
3. 3
4. 0

[redacted]

If the function $f(x) = \begin{cases} \frac{\sin 3x}{x}, & \text{if } x \neq 0 \\ \frac{3k}{2}, & \text{if } x = 0 \end{cases}$ is continuous at $x = 0$, then the value of k is:

1. $\frac{2}{3}$
2. 4
3. 2
4. 9

[redacted]

[redacted]

The value of k for which the function, defined by, $f(x) = \begin{cases} \frac{3x+4\tan x}{x} & : x \neq 0 \\ k & : x = 0 \end{cases}$ is continuous at $x = 0$, is

1. 3

2. 4

3. 7

4. 0

[redacted]

The value of k for which the function $f(x) = \begin{cases} \frac{1-\cos 8x}{16x^2} & , \text{ if } x \neq 0 \\ k & , \text{ if } x = 0 \end{cases}$ is continuous at $x = 0$ is:

1. 0

2. 2

3. -2

4. 1

[redacted]

[redacted]

The area bounded by the curve y = sin x between x = 0 and x = 2π is:

1. 4 sq.units
2. 4π sq.units
3. 0
4. 2 sq.units

[redacted]

The area bounded by the curve $y = \sin x$ and x-axis between $x = -\pi$ and $x = \pi$ is:

1. 4
2. 2
3. 0
4. π

[redacted]

The area of the region bounded by the curve $y = \sin x$ and the x-axis between $x = \pi/2$ and $x = 3\pi/2$ is:

1. 1 sq. units
2. π sq. units
3. -1 sq. units
4. 2 sq. units

[redacted]

The area (sq. units) bounded by the curve $y = \sin x,\ \pi \leq x \leq 2\pi$ and the x-axis is

1. 4
2. 2
3. 1
4. 2π

[redacted]

[redacted]

The function f(x) = log (sin x) is \textunderscore\textunderscore\textunderscore\textunderscore\textunderscore\textu

1. strictly increasing in $(0, \frac{\pi}{2})$
2. strictly decreasing in $(0, \frac{\pi}{2})$
3. strictly increasing in $(\frac{\pi}{2}, \pi)$
4. neither increasing nor decreasing in $(\frac{\pi}{2}, \pi)$

[redacted]

The function $f(x) = \tan x - x$

1. is a decreasing function on $[0, \frac{\pi}{2})$
2. is an increasing function on $[0, \frac{\pi}{2})$
3. is a constant function
4. is neither increasing nor decreasing function on $[0, \frac{\pi}{2})$

[redacted]

[redacted]

The principle value of $\cos^{-1}\left(-\frac{1}{2}\right)$ is :

1. $\frac{2\pi}{3}$
2. $-\frac{2\pi}{3}$
3. $\frac{\pi}{6}$
4. $-\frac{\pi}{6}$

[redacted]

The value of $\tan^{-1}(-\sqrt{3})+\cos^{-1}\left(-\frac{1}{2}\right)$ is:

1. $\frac{\pi}{3}$
2. $-\frac{\pi}{3}$
3. $\frac{2\pi}{3}$
4. π

[redacted]

The value of $\tan^{-1}(1)+\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)+\sin^{-1}\left(\frac{1}{2}\right)$ is

1. $\frac{5\pi}{4}$
2. $\frac{\pi}{4}$
3. $\frac{5\pi}{12}$
4. $\frac{7\pi}{12}$

[redacted]

$\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$ equals:

1. $\frac{7\pi}{6}$
2. $\frac{5\pi}{6}$
3. $-\frac{5\pi}{6}$
4. $\frac{\pi}{6}$

[redacted]

[redacted]

The function $f : \mathbb{R} \to \mathbb{R}, f(x) = x^2$ is

1. injective but not surjective
2. surjective but not injective
3. injective as well as surjective
4. neither injective nor surjective

[redacted]

The function $f : \mathbb{R} \to \mathbb{R}, f(x) = |x|$ ($\mathbb{R}$ is the set of real numbers) is

1. injective but not surjective
2. surjective but not injective
3. both injective and surjective
4. neither injective nor surjective

[redacted]

[redacted]

If A and B are square matrices of the same order, then $AB^T - BA^T$ is a

1. Symmetric matrix
2. Skew symmetric matrix
3. Identity matrix
4. Zero matrix

[redacted]

If A and B are symmetric matrices of same order, then AB - BA is a

1. Symmetric matrix
2. Skew symmetric matrix
3. Zero matrix
4. Identity matrix

[redacted]

If A and B are symmetric matrices, then $AB - BA$ is

1. Singular matrix
2. Zero matrix
3. Symmetric matrix
4. Skew symmetric matrix

[redacted]

[redacted]

The value of integral $I = \int \frac{1-\sin x}{\cos^2 x}\, dx$ is:

1. $\tan x - \sec x + c,$ where c is a constant
2. $\sec x - \tan x + c,$ where c is a constant
3. $\sec x \tan x + c,$ where c is a constant
4. $\tan x + \sec x + c,$ where c is a constant

[redacted]

$$\int \frac{\cos x - \sin x}{1 + \sin 2x} dx \text{ is equal to:}$$

1. $\frac{1}{\sin x + \cos x} + c,$ where C is a constant.
2. $\frac{-1}{\sin x + \cos x} + c,$ where C is a constant.
3. $\frac{1}{\cos x - \sin x} + c,$ where C is a constant.
4. $\frac{2}{\sin x + \cos x} + c,$ where C is a constant.

[redacted]

$$\int \frac{\cos x - \sin x}{1 + \sin 2x} dx \text{ is equal to:}$$

1. $\frac{1}{\sin x + \cos x} + c,$ where C is a constant.
2. $\frac{-1}{\sin x + \cos x} + c,$ where C is a constant.
3. $\frac{1}{\cos x - \sin x} + c,$ where C is a constant.
4. $\frac{2}{\sin x + \cos x} + c,$ where C is a constant.

[redacted]

$$\int \frac{1 - \sin x}{\cos^2 x}\, dx \text{ is equal to:}$$

1. $\tan x - \sec x + C$ where C is the constant of integration
2. $\cot x -$ \cosec$x + C$ where C is the constant of integration
3. $\tan x + \sec x + C$ where C is the constant of integration
4. $\cot x +$ \cosec$x + C$ where C is the constant of integration

[redacted]

$$\int \frac{1 - \sin x}{\cos^2 x}\, dx \text{ is equal to:}$$

1. $\tan x - \sec x + C$ where C is the constant of integration
2. $\cot x -$ \cosec$x + C$ where C is the constant of integration
3. $\tan x + \sec x + C$ where C is the constant of integration
4. $\cot x +$ \cosec$x + C$ where C is the constant of integration

[redacted]

$$\int \frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha}\, dx \text{ is equal to}$$

1. $2\sin x + 2x\cos\alpha + C,$ where C is an arbitrary constant
2. $2\sin x + 2\sin\alpha + C,$ where C is an arbitrary constant
3. $\frac{\sin 2x}{2} + x\cos 2\alpha + C,$ where C is an arbitrary constant
4. $\frac{\sin 2x}{2} + \frac{\sin 2\alpha}{2} + C,$ where C is an arbitrary constant

[redacted]

[redacted]

[redacted]

Two cards are drawn with replacement from a pack of 52 cards.

The probability distribution of number of aces is:

[redacted]

x_i	0	1	2

[redacted]

p_i	$\frac{144}{169}$	$\frac{24}{169}$	$\frac{1}{169}$

(1)

[redacted]

(2)

[redacted]

x_i	0	1	2

[redacted]

p_i	$\frac{188}{221}$	$\frac{32}{221}$	$\frac{1}{221}$

[redacted]

(3)

[redacted]

x_i [redacted]

[redacted]

p_i	$\frac{124}{169}$	$\frac{20}{169}$	$\frac{1}{169}$

[redacted]

(4)

[redacted]

[redacted] $\frac{144}{169}$ $\frac{20}{169}$ $\frac{1}{169}$

[redacted]

[redacted]

[redacted]

The probability distribution of number of aces when two cards are drawn

without replacement from a pack of 52 cards is:

(1)

[redacted]

[redacted]

[redacted] $\frac{144}{221}$ $\frac{24}{221}$ $\frac{1}{221}$

[redacted]

(2)

[redacted]

[redacted] $\frac{144}{169}$ $\frac{24}{144}$ $\frac{1}{144}$

(3)

[redacted]

[redacted] $\frac{188}{221}$ $\frac{32}{221}$ $\frac{1}{221}$

[redacted]

(4)

[redacted]

[redacted] $\frac{188}{221}$ $\frac{24}{221}$ $\frac{1}{221}$

[redacted]

[redacted]

Two cards are drawn without replacement. The probability distribution of number of aces is given by :

1.

[redacted]

[redacted] $\frac{188}{221}$ $\frac{32}{221}$ $\frac{1}{221}$

2.

[redacted]

[redacted] $\frac{144}{169}$ $\frac{24}{169}$ $\frac{1}{169}$

[redacted]

3.

[redacted]

[redacted] $\frac{188}{221}$ $\frac{24}{221}$ $\frac{1}{221}$

4.

[redacted]

[redacted] $\frac{188}{221}$ $\frac{1}{221}$ $\frac{24}{221}$

[redacted]

Two cards are drawn without replacement. The probability distribution of number of aces is given by :

1.

[redacted]

[redacted] $\frac{188}{221}\ \frac{32}{221}\ \frac{1}{221}$

2.

[redacted]

[redacted] $\frac{144}{169}\ \frac{24}{169}\ \frac{1}{169}$

[redacted]

3.

[redacted]

[redacted] $\frac{188}{221}\ \frac{24}{221}\ \frac{1}{221}$

4.

[redacted]

[redacted] $\frac{188}{221}\ \frac{1}{221}\ \frac{24}{221}$

[redacted]

[redacted]

The function $f(x) = x^x$ has a critical point at :

(1) $x = e$

(2) $x = \frac{1}{e}$

(3) $x = 1$

(4) $x = \sqrt{e}$

[redacted]

[redacted]

The function $f(x) = x^2 - 2x$ has a critical point at:

(1) $x = 0$

(2) $x = 1$

(3) $x = 2$

(4) $x = -1$

[redacted]

[redacted]

[redacted]

If A is a square matrix such that $A^2 = A$, then $|A|$ equals :

(1) 0 or 2

(2) 0 or 1

(3) 0 or -1

(4) -1 or -2

[redacted]

[redacted]

If A is a non-singular square matrix of order 3 such that $A^3 = 4A^2$, then the value of $|A|$ is:

(1) 16

(2) 64

(3) 4

(4) 8

[redacted]

[redacted]

If A is a non-singular square matrix of order 3 such that $A^3 = 4A^2$, then the value of $|A|$ is:

(1) 16

(2) 64

(3) 4

(4) 8

[redacted]

[redacted]

[redacted]

If A is a square matrix of order 3 such that $|A| = 2$, then adj(adj A) is :

(1) 0

(2) 2

(3) 16

(4) -16

[redacted]

[redacted]

If A is a square matrix of order 3 and $|A| = 5$, then $|\text{adj } A|$ is :

(1) 5

(2) 25

(3) 125

(4) 625

[redacted]

[redacted]

If A is a square matrix of order 3 and $|A| = 5$, then $|\text{adj } A|$ is :

(1) 5

(2) 25

(3) 125

(4) 625

[redacted]

[redacted]

[redacted]

A pair of dice is thrown 5 times. If getting a total of 7 is considered a success, then the probability of at least 3 successes i

(1) $46\left(\frac{1}{6}\right)^4$

(2) $96\left(\frac{1}{6}\right)^4$

(3) $625\left(\frac{1}{6}\right)^4$

(4) $1250\left(\frac{1}{6}\right)^4$

[redacted]

[redacted]

A pair of dice is thrown, getting a total of 7 is considered a success.

Then the probability of success in a single throw is:

(1) $\frac{5}{36}$

(2) $\frac{4}{36}$

(3) $\frac{6}{36}$

(4) $\frac{7}{36}$

[redacted]

[redacted]

A pair of dice is thrown, getting a total of 7 is considered a success.

Then the probability of success in a single throw is:

(1) $\frac{5}{36}$

(2) $\frac{4}{36}$

(3) $\frac{6}{36}$

(4) $\frac{7}{36}$

[redacted]

[redacted]

A pair of dice is thrown 7 times. If getting a total of 7 is considered a success, the probability of exactly 6 successes, is :

(1) $45\left(\frac{5}{6}\right)^7$

(2) $35\left(\frac{5}{6}\right)^7$

(3) $35\left(\frac{1}{6}\right)^7$

(4) $45\left(\frac{1}{6}\right)^{7}$

[redacted]

[redacted]

A bag contains 12 white and 18 red balls. Two balls are drawn in succession without replacement.

The probability that the first is red and the second is white is:

(1) $\frac{63}{145}$

(2) $\frac{36}{154}$

[redacted]

(4) $\frac{36}{145}$

[redacted]

[redacted]

A bag contains 4 red and 6 black balls. Two balls are drawn in succession without replacement. The probability that the first is red and

1. $\frac{2}{5}$
2. $\frac{2}{3}$
3. $\frac{4}{15}$
4. $\frac{6}{25}$

[redacted]

[redacted]

Solution of $\frac{dy}{dx} + y = 2$ is:

(1) $\log(2-y) = C - x$; where C is an arbitrary constant of integration

(2) $\log y = Cx$; where C is an arbitrary constant of integration

(3) $\log x = y + 1$

(4) $\log(2+y) = C + x$; where C is an arbitrary constant of integration

[redacted]

[redacted]

Solution of the differential equation $\frac{dy}{dx} = 1 + x + y + xy$ are :

(1) $\log(1+y) = x - \frac{x^2}{2} + C$

(2) $\log(1-y) = x + \frac{x^2}{2} + C$

(3) $\log(1+y) = x + \frac{x^2}{2} + C$

(4) $\log(1+y) = -x - \frac{x^2}{2} + C$

Where C is an arbitrary constant

[redacted]

[redacted]

The stationary point of $f(x) = \sin^4 x + \cos^4 x,\ x \in \left(0, \frac{\pi}{2}\right)$ is given by:

(1) $x = \frac{\pi}{4}$

(2) $x = \frac{\pi}{3}$

(3) $x = \frac{\pi}{6}$

(4) $x = \frac{\pi}{8}$

[redacted]

[redacted]

The interval in which the function given by $f(x) = \sin^4 x + \cos^4 x,\ x \in \left[0, \frac{\pi}{2}\right]$ is decreasing is:

(1) $\left(0, \frac{\pi}{4}\right]$

(2) $\left(0, \frac{\pi}{4}\right)$

(3) $\left[0, \frac{\pi}{4}\right)$

(4) $\left[0, \frac{\pi}{4}\right]$

[redacted]

[redacted]

[redacted]

The integral $\int e^x \left(1 + \frac{1}{x} + \log x\right) dx$ is equal to:

1. $e^x(x + \log x) + C$
2. $e^x(1 + \log x) + C$
3. $e^x \log x + C$
4. $e^x(x - \log x) + C$

[redacted]

The integral $\int e^x \left(\log x + \frac{1}{x^2}\right) dx$ equals for some arbitrary constant k

1. $e^x \left(\log x + \frac{1}{x^2}\right) + k$
2. $e^x \left(\log x - \frac{1}{x}\right) + k$
3. $e^x \left(\log x - \frac{1}{x^2}\right) + k$
4. $e^x \left(\log x + \frac{1}{x}\right) + k$

[redacted]

The value of $\int_2^4 \frac{x}{x^2 + 1} dx$ is equal to:

1. $\frac{1}{2} \log_e \left(\frac{17}{5}\right)$
2. $\frac{1}{5} \log_e \left(\frac{17}{5}\right)$
3. $\log_e \left(\frac{17}{5}\right)$
4. $2 \log_e \left(\frac{17}{5}\right)$

[redacted]

$\int \left(\frac{1}{\log_e x} - \frac{1}{(\log_e x)^2}\right) dx$ is equal to

1. $\frac{x}{\log_e x} + c : C$ is an arbitrary constant
2. $\frac{1}{\log_e x} + c : C$ is an arbitrary constant
3. $\frac{x}{(\log_e x)^2} + c : C$ is an arbitrary constant
4. $\frac{\log_e x}{x} + c : C$ is an arbitrary constant

[redacted]

[redacted]

The solution of the differential equation $\frac{dy}{dx} = 1 + x + y^2 + xy^2$ is:

1. $\tan^{-1} y = x + \frac{x^2}{2} + C$

2. $\log(1 + y^2) = x + \frac{x^2}{2} + C$

3. $\tan^{-1} y = \tan^{-1} x + \frac{x^2}{2} + C$

4. $\tan^{-1} y = x + \frac{x^2}{2} + \frac{x^3}{3} + C$

[redacted]

The solution of the differential equation $\frac{dy}{dx} = \frac{x+y}{x-y}$ is

1. $y = \frac{x}{2}\log_e(x^2 + y^2) + C$: C is an arbitrary constant

2. $y = \sqrt{x^2 + y^2} + C$: C is an arbitrary constant

3. $y = \frac{1}{2}\log_e(x^2 + y^2) + C$: C is an arbitrary constant

4. $\tan^{-1} \frac{y}{x} = \frac{1}{2}\log_e(x^2 + y^2) + C$: C is an arbitrary constant

[redacted]

[redacted]

The function $f(x) = \sin x(1+\cos x);\ x \in \left[0, \frac{3\pi}{2}\right]$ will have:

1. Maximum value $\frac{3\sqrt{3}}{4}$ at $x = \frac{\pi}{3}$
2. Minimum value $= 0,$ at $x = \pi$
3. Minimum value $= 0$ at $x = \frac{3\pi}{2}$
4. Maximum value $= \frac{3\sqrt{3}}{4}$ at $x = \frac{3\pi}{2}$

[redacted]

The absolute maximum value of the function $f(x) = \sin x + \cos x, x \in [0, \pi]$ is:

1. $\sqrt{2}$
2. 2
3. 1
4. $\frac{1}{\sqrt{2}}$

[redacted]

The absolute maximum value of the function $f(x) = \sin x + \cos x, x \in [0, \pi]$ is:

1. $\sqrt{2}$
2. 2
3. 1
4. $\frac{1}{\sqrt{2}}$

[redacted]

[redacted]

Consider the function $f : \mathbb{N} \to \mathbb{N}$ given by $f(x) = \begin{cases} x+1, & \text{if } x \text{ is odd} \\ x-1, & \text{if } x \text{ is even} \end{cases}$

1. f is neither one-one nor onto
2. f is one-one but not onto
3. f is onto but not one-one
4. f is both one-one and onto

[redacted]

The function $f : \mathbb{R} \to [-1, 1]$ defined by $f(x) = \cos x$ is:

1. one-one but not onto
2. onto but not one-one
3. Both one-one and onto
4. Neither one-one nor onto

[redacted]

[redacted]

If $y = \log\left[\frac{x^2}{e^2}\right]$ then value of $\frac{d^2y}{dx^2}$ is :

(1) $\frac{x^2}{e^4}$

(2) $\frac{-2}{x^2}$

(3) $\frac{e}{x^2}$

(4) $2x + \log 2$

[redacted]

If $y = \log x^5$, then $\frac{d^2y}{dx^2}$ is given by :

(1) $\frac{1}{x^5}$

(2) $\frac{1}{5x^4}$

(3) $-\frac{20}{x^2}$

(4) $-\frac{5}{x^2}$

[redacted]

[redacted]

A and B throw a die alternatively till one of them gets a number more than 4 and wins the game.

Then the probability of winning the game by B, if A starts first :

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

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

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

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

[redacted]

Two persons A and B throw a die alternately till one of them gets a 'three' and wins the game.

The probability of A's winning if A starts first is:

1. $\frac{6}{11}$
1. $\frac{1}{6}$
1. $\frac{5}{6}$
1. $\frac{5}{11}$

[redacted]

[redacted]

A and B throw a die alternatively till one of them gets 3 or 6 and wins the game. If B starts the game, then the probability of winning the game by A is

1. 2/5
2. 3/5
3. 6/11
4. 5/11

[redacted]

[redacted]

The interval in which $f(x) = \sin x - \cos x,\ 0 \leq x \leq 2\pi$ is strictly decreasing is:

(1) $\left(\frac{\pi}{4}, \frac{5\pi}{4}\right)$

(2) $\left(0, \frac{\pi}{4}\right) \cup \left(\frac{5\pi}{4}, 2\pi\right)$

(3) $\left(\frac{3\pi}{4}, \frac{7\pi}{4}\right)$

(4) $\left(0, \frac{3\pi}{4}\right) \cup \left(\frac{7\pi}{4}, 2\pi\right)$

[redacted]

The function $f(x) = \cos x$ is strictly decreasing in :

(1) $\left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$

(2) $(0, 2\pi)$

(3) $(\pi, 2\pi)$

(4) $(0, \pi)$

[redacted]

[redacted]

The integrating factor of the differential equation $\frac{dy}{dx} + y\cot x = 2x + x^2 \cot x, x \neq 0$ is

1. $\cos x$
2. $\cot x$
3. $\sin x$
4. $-\sin x$

[redacted]

The integrating factor of the differential equation $x\frac{dy}{dx} - y = \sin x$ is :

1. $-\frac{1}{x}$
2. x
3. $e^{\log x}$
4. $\frac{1}{x}$

[redacted]

Integrating factor of $\frac{dy}{dx} + y\cot x = 2x + x^2 \cot x \ (x \neq 0)$ is:

1. $\cos x$
2. $-\sin x$
3. $\sin x$
4. $-\cos x$

[redacted]

Integrating factor of $\frac{dy}{dx} + y\cot x = 2x + x^2 \cot x \ (x \neq 0)$ is:

1. $\cos x$
2. $-\sin x$
3. $\sin x$
4. $-\cos x$

[redacted]

[redacted]

The interval in which the function f given by $f(x) = x^3 + \frac{1}{x^3}, x \neq 0$ is increasing:

1. $(-\infty, \infty)$
2. $(-1, 0) \cup (0, 1)$
3. $(-\infty, -1) \cup (1, \infty)$
4. $(-1, 1)$

[redacted]

The function $f(x) = x^4 - 2x^2$ is increasing on

1. $(-1, 0) \cup (1, \infty)$
2. $(-\infty, -1) \cup (0, 1)$
3. $(-\infty, \infty)$
4. $(-\infty, 0) \cup (1, \infty)$

[redacted]

The largest interval, in which the function $f(x) = x^3 + 2x^2 - 1$ is increasing, is:

1. $(0, \infty)$
2. $(-4, 4)$
3. $\left[-\frac{4}{3}, 0\right]$
4. $(-\infty, -\frac{4}{3}] \cup [0, \infty)$

[redacted]

[redacted]

The largest open interval, in which the function $f(x) = \frac{x}{x^2+1}$ increases, is

1. $(0, 1)$
2. $(-1, 0)$
3. $(-1, 1)$
4. $(-\infty, -1) \cup (1, \infty)$

[redacted]

[redacted]

Angle between the line $\frac{x-1}{3}=\frac{y+1}{5}=\frac{z-2}{4}$ and the plane $2x+2y-z=3$ is:

(1) $\sin^{-1}\left(\frac{2}{\sqrt{5}}\right)$

(2) $\sin^{-1}\left(\sqrt{\frac{2}{5}}\right)$

(3) $\sin^{-1}\left(\frac{\sqrt{2}}{5}\right)$

(4) $\sin^{-1}\left(\frac{2\sqrt{2}}{5}\right)$

[redacted]

[redacted]

The angle between the line $\frac{x+1}{2}=\frac{y}{3}=\frac{z-3}{6}$ and the plane $10x+2y-11z=3$ is :

(1) $\sin^{-1}\left(-\frac{8}{21}\right)$

(2) $\sin^{-1}\left(-\frac{21}{8}\right)$

(3) $\sin^{-1}\left(\frac{21}{8}\right)$

(4) $\sin^{-1}\left(\frac{8}{21}\right)$

[redacted]

[redacted]

$$\int \frac{dx}{1+\tan x} \text{ is equal to :}$$

1. $\frac{x}{2}+\frac{1}{2}\log|\cos x-\sin x|+c$
2. $\frac{x}{2}+\frac{1}{2}\log|\cos x+\sin x|+c$
3. $\frac{x}{2}-\frac{1}{2}\log|\cos x-\sin x|+c$
4. $\frac{x}{2}-\frac{1}{2}\log|\cos x+\sin x|+c$

[redacted]

The value of $\int_0^{\frac{\pi}{2}} \log\left(\frac{5+4\sin x}{5+4\cos x}\right)dx$ is:

1. 0
2. 1
3. 2
4. $\frac{1}{2}$

[redacted]

The value of $\int_0^{\frac{\pi}{2}} \log\left(\frac{5+4\sin x}{5+4\cos x}\right)dx$ is:

1. 0
2. 1
3. 2
4. $\frac{1}{2}$

[redacted]

$$\int_0^{\pi/2} \frac{\sin^8 x}{\sin^8 x+\cos^8 x}dx \text{ is equal to}$$

1. $\frac{\pi}{2}$
2. $\frac{\pi}{4}$
3. 0
4. $-\frac{\pi}{2}$

[redacted]

[redacted]

If the function $f(x) = x^2 + kx + 7$ is strictly increasing in the interval $[-2, 2]$, then

1. $K < 4$
2. $K > 4$
3. $K < -4$
4. $K > -4$

[redacted]

[redacted]

If the minimum value of a is $-\frac{k}{2}$, such that the function $f(x) = x^2 + ax + 5$ is increasing in $[1, 2]$. Then value of k is

1. -4
2. 2
3. 4
4. -2

[redacted]

[redacted]

If A is a square matrix such that $A^2 = A$, then $(I + A)^3 - 7A$ is equal to:

1. A
2. $3A$
3. I
4. $A - I$

[redacted]

If A is a square matrix such that $A^2 = A$ and I is the identity matrix of the same order as A, then $(I + 2A)^2 - 5A$ is equal to:

1. $I + 2A$
2. $I + 3A$
3. $I + A$
4. I

[redacted]

If A is a square matrix and I is an identity matrix of same order such that $A^2 = A$, then $(I + A)^3 - 8I$ is equal to

1. A
2. A $- I$
3. $7(A - I)$
4. I

[redacted]

[redacted]

The value of the integral $\int \frac{dx}{e^x + e^{-x}}$ is equal to:

1. $\tan^{-1}(e^x) + c,$ where c is a constant
2. $\tan^{-1}(e^{-x}) + c,$ where c is a constant
3. $\tan^{-1}(e^x + e^{-x}) + c,$ where c is a constant
4. $\log_e(e^x + e^{-x}) + c,$ where c is a constant

[redacted]

$\int \frac{dx}{e^x + e^{-x}}$ is equal to

1. $\tan^{-1}(e^x) + c : c$ is an arbitrary constant
2. $\tan^{-1}(e^{-x}) + c : c$ is an arbitrary constant
3. $\log(e^x - e^{-x}) + c : c$ is an arbitrary constant
4. $\log(e^x + e^{-x}) + c : c$ is an arbitrary constant

[redacted]

[redacted]

[redacted]

How many times a person must toss a fair coin so that the probability of having at least one head is more than 80% ?

1. 1

2. 2

3. 3

4. 4

[redacted]

[redacted]

How many minimum number of times must a man toss a fair coin so that the probability of having at least one head is more than 90%?

1. 3
2. 4
3. 5
4. 10

[redacted]

[redacted]

[redacted]

Let A be a non-singular square matrix of order n with $|\text{adj } A| = 64$ and $|A| = 4,$ then 'n' is :

(1) 3

(2) 4

(3) 5

(4) 6

[redacted]

Let A be a square matrix of order $3 \times 3,$ then $|KA|$ is equal to :

(1) $K|A|$

(2) $K^2|A|$

(3) $K^3|A|$

(4) $3K|A|$

[redacted]

11. If A is a square matrix of order 4 and $|A| = 4$, then $|2A|$ will be :

(1) 8

(2) 64

(3) 16

(4) 4

[redacted]

Let $A = [a_{ij}]$ be a square matrix of order 3 with $|A| = 2$ and let $C = [C_{ij}],$ where C_{ij} is the cofactor of a_{ij} in A.

Then $|C|$ is equal to:

(1) 2

(2) 4

(3) 8

(4) 1

[redacted]

[redacted]

[redacted]

If $f(x) = \cos 3x, 0 \leq x \leq \frac{\pi}{2}$, then :

(A) f is strictly increasing on $\left[0, \frac{\pi}{3}\right]$

(B) f is strictly decreasing on $\left(\frac{\pi}{3}, \frac{\pi}{2}\right]$

(C) f is strictly increasing on $\left(\frac{\pi}{3}, \frac{\pi}{2}\right]$

(D) f is strictly decreasing on $\left[0, \frac{\pi}{3}\right]$

(E) f is strictly increasing on $\left[0, \frac{\pi}{2}\right]$

Choose the correct answer from the options given below :

(1) (C) and (D) only

(2) (A) and (B) only

(3) (A) only

(4) (E) only

[redacted]

If $f(x) = \sin x - \cos x, x \in [0, 2\pi]$ then

(A) $f(x)$ is increasing in $\left(0, \frac{3\pi}{4}\right)$

(B) $f(x)$ is decreasing in $\left(0, \frac{3\pi}{4}\right)$

(C) $f(x)$ is decreasing in $\left(\frac{3\pi}{4}, \frac{7\pi}{4}\right)$

(D) $f(x)$ is decreasing in $\left(\frac{7\pi}{4}, 2\pi\right)$

Choose the correct answer from the options given below:

1. (A), (D) and (C) only
2. (B), (C) and (D) only
3. (A) and (C) only
4. (B) and (D) only

[redacted]

[redacted]

For the objective function $z = px + qy$, where $p, q > 0$ the corner points of the feasible region determined by the system of linear constraints are $(0,10), (5,5), (15,15)$ and $(0,20)$, condition on p and q so that maximum of z occurs at both the points $(15,15)$ and $(0,20)$ is :

(1) $p = q$

(2) $p = 2q$

(3) $q = 2p$

(4) $q = 3p$

[redacted]

64. The corner points of the feasible region for an L.P.P. are $(0,10), (5,5), (5,15)$ and $(0,30)$. If the objective function is $Z = \alpha x + \beta y, \alpha, \beta > 0$, the condition on α and β so that maximum of Z occurs at corner points $(5,15)$ and $(0,30)$ is :

(1) $\alpha = 5\beta$

(2) $5\alpha = \beta$

(3) $\alpha = 3\beta$

(4) $4\alpha = 5\beta$

[redacted]

[redacted]

The value of the determinant $\begin{vmatrix} a+b & b+c & c+a \\ c & a & b \\ 1 & 1 & 1 \end{vmatrix}$ is :

(1) 0

(2) -1

(3) 1

(4) 2

[redacted]

The value of the determinant $\begin{vmatrix} 66 & 18 & 36 \\ 1 & 3 & 4 \\ 11 & 3 & 6 \end{vmatrix}$ is:

(1) -1

(2) 1

(3) 0

(4) 2

[redacted]

[redacted]

The probability of a shooter hitting a target is $\frac{2}{3}$.

Minimum how many number of times must the shooter fire so that the probability of hitting the target at least once is n

(1) 3

(2) 2

(3) 4

(4) 5

[redacted]

57. The probability of a shooter hitting a target is 3/4. How many minimum number of times must he fire so that the probability of hitting the target at least once is more than 90\% ?

(1) 1

(2) 2

(3) 3

(4) 4

[redacted]

The probability of a man hitting a target is $\frac{1}{2}$.

How many times must he fire so that the probability of hitting the target at least once is more than 90%?

1. 3
2. 4
3. 5
4. 6

[redacted]

[redacted]

A problem in mathematics is given to three students whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively, the proba

(1) $\frac{1}{4}$

(2) $\frac{3}{4}$

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

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

[redacted]

A problem in mathematics is given to three students whose chances of solving it are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ respectively. The probability that the prol

1. $\frac{3}{4}$
2. 1
3. $\frac{1}{3}$
4. $\frac{1}{6}$

[redacted]

[redacted]

A problem in Mathematics is given to two students X and Y whose chances of solving it are $\frac{1}{3}$ and $\frac{1}{4}$ respectively. The probability that only X solves the problem, is:

1. $\frac{1}{3}$
2. $\frac{1}{12}$
3. $\frac{1}{4}$
4. $\frac{7}{12}$

[redacted]

[redacted]

If $y = \sin^{-1} x$, then $(1 - x^2)\dfrac{d^2y}{dx^2} - x\dfrac{dy}{dx}$ is :

(1) -1

(2) 2

(3) 0

(4) -2

[redacted]

If $y = \sin^{-1} x$, then $(1 - x^2)\dfrac{d^2y}{dx^2}$ is equal to

(1) $-x\dfrac{dy}{dx}$

(2) $x\dfrac{dy}{dx}$

(3) $\dfrac{y}{x}\dfrac{dy}{dx}$

(4) $\dfrac{-y}{x}\dfrac{dy}{dx}$

[redacted]

[redacted]

[redacted]

The matrix $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & 5 \end{bmatrix}$ is:

(1) a scalar matrix

(2) a skew symmetric matrix

(3) a diagonal matrix

(4) a column matrix

[redacted]

[redacted]

The matrix $A = \begin{bmatrix} 0 & -5 & 8 \\ 5 & 0 & 12 \\ -8 & -12 & 0 \end{bmatrix}$ is a

1.diagonal matrix

2.symmetric matrix

3.skew symmetric matrix

4.scalar matrix

[redacted]

The matrix $A = \begin{bmatrix} 0 & -5 & 8 \\ 5 & 0 & 12 \\ -8 & -12 & 0 \end{bmatrix}$ is a

1.diagonal matrix

2.symmetric matrix

3.skew symmetric matrix

4.scalar matrix

[redacted]

[redacted]

If A is a non-identity invertible symmetric matrix, then A^{-1} is:

1. Symmetric matrix
2. Skew-symmetric matrix
3. Identity matrix
4. Zero matrix

[redacted]

If A is an invertible symmetric matrix, then A^{-1} is

1. a symmetric matrix
2. a skew-symmetric matrix
3. neither a symmetric matrix nor a skew-symmetric matrix
4. always an identity matrix

[redacted]

[redacted]

[redacted]

The general solution of the differential equation $ydx + xdy = 0$ is:

1. $xy = C,$ where C is a constant.
2. $\frac{1}{x} + \frac{1}{y} = C,$ where C is a constant.
3. $\log x \cdot \log y = C,$ where C is a constant.
4. $x + y = C,$ where C is a constant.

[redacted]

The solution of the differential equation $\log\left(\frac{dy}{dx}\right) = ax + by$ is:

1. $\frac{1}{b}e^{by} = \frac{1}{a}e^{ax} + C$ Where C is an arbitrary constant
2. $\frac{1}{b}e^{-by} = \frac{1}{a}e^{ax} + C$ Where C is an arbitrary constant
3. $-\frac{1}{b}e^{-by} = \frac{1}{a}e^{ax} + C$ Where C is an arbitrary constant
4. $-\frac{1}{b}e^{by} = \frac{1}{a}e^{ax} + C$ Where C is an arbitrary constant

[redacted]

The solution of the differential equation $\log\left(\frac{dy}{dx}\right) = ax + by$ is:

1. $\frac{1}{b}e^{by} = \frac{1}{a}e^{ax} + C$ Where C is an arbitrary constant
2. $\frac{1}{b}e^{-by} = \frac{1}{a}e^{ax} + C$ Where C is an arbitrary constant
3. $-\frac{1}{b}e^{-by} = \frac{1}{a}e^{ax} + C$ Where C is an arbitrary constant
4. $-\frac{1}{b}e^{by} = \frac{1}{a}e^{ax} + C$ Where C is an arbitrary constant

[redacted]

The general solution of the differential equation $\log_e\left(\frac{dy}{dx}\right) = ax + by$ is

1. $\frac{e^{-ax}}{a} + \frac{e^{by}}{b} + C = 0,$ Where C is constant of integration
2. $\frac{e^{-ax}}{a} - \frac{e^{by}}{b} + C = 0,$ Where C is constant of integration
3. $\frac{e^{ax}}{a} + \frac{e^{-by}}{b} + C = 0,$ Where C is constant of integration
4. $\frac{e^{ax}}{a} - \frac{e^{-by}}{b} + C = 0,$ Where C is constant of integration

[redacted]

The solution of the differential equation $\frac{dy}{dx} - \frac{y}{x} = 2\log_e x$

1. $y = x\log_e x + C$: C is an arbitrary constant

2. $y = x(\log_e x + C)$: C is an arbitrary constant

3. $y = x((\log_e x)^2 + C)$: C is an arbitrary constant

4. $y = x(2(\log_e x)^2 + C)$: C is an arbitrary constant

[redacted]

[redacted]

If θ is the angle between the vectors $2\hat{i} - 2\hat{j} + 4\hat{k}$ and $3\hat{i} + \hat{j} + 2\hat{k}$, then value of $\sin\theta$ is :

1. $\frac{2}{3}$
2. $\frac{2}{\sqrt{7}}$
3. $\frac{\sqrt{2}}{7}$
4. $\sqrt{\frac{2}{7}}$

[redacted]

If θ is the angle between two unit vectors $\hat{a}$ and $\hat{b}$ then $|\hat{a} - \hat{b}| =$

1. $\sin\frac{\theta}{2}$
2. $2\sin\frac{\theta}{2}$
3. $\cos\frac{\theta}{2}$
4. $2\cos\frac{\theta}{2}$

[redacted]

[redacted]

The domain of $y = \cos^{-1}(x^2 - 4)$ is:

1. $[3, 5]$
2. $[0, \pi]$
3. $[-\sqrt{5}, -\sqrt{3}] \cap [-\sqrt{5}, \sqrt{3}]$
4. $[-\sqrt{5}, -\sqrt{3}] \cup [\sqrt{3}, \sqrt{5}]$

[redacted]

The domain of $y = \cos^{-1}(x^2 - 4)$ is

1. $[0, \pi]$
2. $[-\sqrt{5}, -\sqrt{3}] \cup [\sqrt{3}, \sqrt{5}]$
3. $[-\sqrt{5}, -\sqrt{3}] \cap [-\sqrt{5}, \sqrt{3}]$
4. $[-1, 1]$

[redacted]

[redacted]

[redacted]

15. For the function $f(x) = 2x^3 - 9x^2 + 12x - 5, x \in [0, 3]$, match \textbf{List-I} with \textbf{List-II} :

\textbf{List-I}	\textbf{List-II}
(A) Absolute maximum value	(I) 3
(B) Absolute minimum value	(II) 0
(C) Point of maxima	(III) -5
(D) Point of minima	(IV) 4

Choose the \textbf{correct} answer from the options given below :

(1) (A) - (IV), (B) - (II), (C) - (I), (D) - (III)

(2) (A) - (II), (B) - (III), (C) - (I), (D) - (IV)

(3) (A) - (IV), (B) - (III), (C) - (II), (D) - (I)

(4) (A) - (IV), (B) - (III), (C) - (I), (D) - (II)

[redacted]

Consider the function $f(x) = x^3 - 3x$. Then

Match List-I with List-II

[redacted]

List-I	**List-II**
(A) Point of local Maxima	(I) 1
(B) Point of local Minima	(II) -1
(C) Local maximum value	(III) 2
\[(D) Local minimum value	(IV) -2

[redacted]

Choose the correct answer from the options given below:

1. (A) - (II), (B) - (I), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
3. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)
4. (A) - (IV), (B) - (III), (C) - (I), (D) - (II)

[redacted]

The function $f(x) = 2x^3 - 15x^2 + 36x + 5$ for $x \in [2, 5]$ has

[redacted]

[redacted]

[redacted]

Match \textbf{List-I} with \textbf{List-II}

The function $f(x) = (x-1)(x+1)^2$ has

[redacted]

List-I	List-II
(A) A local maxima at $x =$ ___	(I) $\frac{1}{3}$
(B) A local minima at $x =$ ___	(II) 0
(C) The local minimum value of $f(x) =$ ___	(III) -1
(D) The local maximum value of $f(x) =$ ___	(IV) $-\frac{32}{27}$

Choose the \textbf{correct} answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)

2. (A) - (II), (B) - (IV), (C) - (III), (D) - (I)

3. (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

4. (A) - (IV), (B) - (III), (C) - (I), (D) - (II)

[redacted]

[redacted]

27. The matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is a :

(A) scalar matrix

(B) diagonal matrix

(C) skew-symmetric matrix

(D) symmetric matrix

Choose the \textbf{correct} answer from the options given below :

(1) (A), (B) and (D) only

(2) (A), (B) and (C) only

(3) (A), (B), (C) and (D)

(4) (B), (C) and (D) only

[redacted]

The matrix $A = \begin{bmatrix} 0 & 0 & 5 \\ 0 & 5 & 0 \\ 5 & 0 & 0 \end{bmatrix}$ is a:

(A) Diagonal matrix

(B) Scalar matrix

(C) Square matrix

(D) Symmetric matrix

Choose the correct answer from the options given below:

1. $(A), (B)$ and (C) only
2. (B) and (C) only
3. (C) and (D) only
4. (A) and (D) only

[redacted]

The matrix $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ is a

(A) Null matrix

(B) Unit matrix

(C) Symmetric matrix

(D) Skew-symmetric matrix

Choose the **correct** answer from the options given below:

1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (C) and (D) only
4. (C) and (D) only

[redacted]

If $A = \begin{bmatrix} x+z & 2 & -3 \\ x & 0 & 4 \\ 3 & x-y & 0 \end{bmatrix}$ is a skew-symmetric matrix, then which of the following are true?

(A) $y > z > x$

(B) $x > y$

(C) $x + y + z > 0$

(D) $z > x$

Choose the \textbf{correct} answer from the options given below:

1. (A) and (D) only
2. (B), (C) and (D) only
3. (B) only
4. (C) and (D) only

[redacted]

[redacted]

34. $f(x) = \sin x + \frac{1}{2}\cos 2x$ in $\left[0, \frac{\pi}{2}\right]$

(A) $f'(x) = \cos x - \sin 2x$

(B) The critical points of the function are $x = \frac{\pi}{6}$ and $x = \frac{\pi}{2}$

(C) The minimum value of the function is 2

(D) The maximum value of the function is $\frac{3}{4}$

Choose the \textbf{correct} answer from the options given below :

(1) (A), (B) and (D) only

(2) (A), (B) and (C) only

(3) (A), (B), (C) and (D)

(4) (B), (C) and (D) only

[redacted]

The function $f(x) = \sin 3x$,$x \in \left[0, \frac{\pi}{2}\right]$

(A) is increasing on $\left[0, \frac{\pi}{6}\right]$

(B) is decreasing on $\left[\frac{\pi}{6}, \frac{\pi}{2}\right]$

(C) is increasing on $\left[0, \frac{\pi}{2}\right]$

(D) is decreasing on $\left[0, \frac{\pi}{2}\right]$

Choose the \textbf{correct} answer from the options given below:

1. (A), (B) and (C) only

2. (A) and (B) only

3. (B), (C) and (D) only

4. (D) and (A) only

[redacted]

[redacted]

37. If $\sin y = x\sin(a+y)$, then $\frac{dy}{dx}$ is :

(1) $\frac{\sin^2 a}{\sin(a+y)}$

(2) $\frac{\sin(a+y)}{\sin^2 a}$

(3) $\frac{\sin(a+y)}{\sin a}$

(4) $\frac{\sin^2(a+y)}{\sin a}$

[redacted]

If $\sin y = x\cos(a+y)$, then $\frac{dy}{dx}$ is equal to

1. $\frac{\cos^2(a+y)}{\cos a}$
2. $\frac{\cos a}{\cos^2(a+y)}$
3. $\frac{\sin^2 y}{\cos a}$
4. $\frac{\sin^2 y}{\cos^2(a+y)}$

[redacted]

[redacted]

46. The probability of not getting 53 Tuesdays in a leap year is :

(1) 2/7

(2) 1/7

(3) 0

(4) 5/7

[redacted]

The probability of not getting 53 Sundays in a leap year is:

(1) $\frac{1}{7}$

(2) $\frac{2}{7}$

(3) $\frac{3}{7}$

(4) $\frac{5}{7}$

[redacted]

[redacted]

51. A random variable X has the following probability distribution :

[redacted]

[redacted] k^2 $2k^2$ $7k^2 + k$

Match the options of \textbf{List-I} to \textbf{List-II} :

\textbf{List-I}	\textbf{List-II}
(A) k	(I) $\frac{7}{10}$
(B) $P(X < 3)$	(II) $\frac{53}{100}$
(C) $P(X > 2)$	(III) $\frac{1}{10}$
(D) $P(2 < X < 7)$	(IV) $\frac{3}{10}$

Choose the \textbf{correct} answer from the options given below :

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)]\[2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

[redacted]

(A)value of k $(I)\frac{16}{25}$

[redacted]

(B)$P(X \geq 2)$ $(II)\frac{9}{25}$

[redacted]

(C)$P(X = 3)$ $(III)\frac{4}{25}$

[redacted]

(D)$P(X < 2)$ $(IV)\frac{8}{25}$

Choose the correct answer from the options given below:

1. (A) - (III), (B) - (II), (C) - (I), (D) - (IV)
2. (A) - (III), (B) - (I), (C) - (II), (D) - (IV)
3. (A) - (II), (B) - (III), (C) - (I), (D) - (IV)
4. (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

[redacted]

If a random variable X has the following probability distribution:

[redacted]

[redacted] $K \ \frac{K}{2} \ \frac{K}{4} \ \frac{K}{8}$

then,

Match \textbf{List-I} with \textbf{List-II}

\textbf{List-I}	\textbf{List-II}
[redacted]	
(A) The value of K is	(I) 2/15
[redacted]	
(B) $P(0 < X < 2)$ is	(II) 1/15
[redacted]	
(C) $P(1 < X < 3)$ is	(III) 8/15
[redacted]	
(D) $P(X > 2)$ is	(IV) 4/15

Choose the \textbf{correct} answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (II), (B) - (III), (C) - (I), (D) - (IV)
3. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)
4. (A) - (IV), (B) - (I), (C) - (III), (D) - (II)

[redacted]

For a random variable x, probability distribution P(x) is given by $P(x) = \frac{k}{6}(3-x), x = 0, 1, 2$, then

Match \textbf{List-I} with \textbf{List-II}

\textbf{List-I}	\textbf{List-II}
(A) k is equal to	(I) $\frac{1}{2}$
(B) $P(x=0)$	(II) 1
(C) $P(x<2)$	(III) $\frac{1}{6}$
(D) $P(1 < x \leq 2)$	(IV) $\frac{5}{6}$

Choose the \textbf{correct} answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (IV), (C) - (III), (D) - (II)
3. (A) - (II), (B) - (I), (C) - (IV), (D) - (III)
4. (A) - (II), (B) - (IV), (C) - (I), (D) - (III)

[redacted]

[redacted]

52. Match \textbf{List-I} with \textbf{List-II} :

\textbf{List-I (Function)} \textbf{List-II (Derivative w.r.t. x)}

[redacted]

(A) $\frac{5^x}{\log_e 5}$	(I) $5^x(\log_e 5)^2$
(B) $\log_e 5$	(II) $5^x \log_e 5$
(C) $5^x \log_e 5$	(III) 5^x
(D) 5^x	(IV) 0

[redacted]

Choose the \textbf{correct} answer from the options given below :

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

[redacted]

Match **List-I** with **List-II**

List-I	**List-II**
(Function)	**(Derivative with respect to 'x')**
(A) $f(x) = x^x$	(I) $a\,x^{a-1}$
(B) $f(x) = a^x$	(II) 0
(C) $f(x) = a^a$	(III) $a^x \log_e a$
(D) $f(x) = x^a$	(IV) $x^x(1 + \log_e x)$

Choose the **correct** answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
3. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Match List-I with List-II

[redacted]

(A) $f(x) = x^x$ [redacted]

[redacted]

(B) $f(x) = a^x$ (II) 0

(C) $f(x) = a^a$ (III) $a^x \log_e a$

(D) $f(x) = x^a$ (IV) $x^x(1 + \log_e x)$

Choose the correct answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
3. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

[redacted]

List-I	**List-II**
Differential equation	**Integrating factor**
(A) $x\dfrac{dy}{dx} - y = 2x^2$	(I) e^{-y}
(B) $\dfrac{dy}{dx} + \dfrac{y}{x} = 2x$	(II) $\dfrac{1}{x}$
(C) $x\dfrac{dy}{dx} + 2y = x^2 \log x$	(III) x
(D) $\dfrac{dx}{dy} - x = y$	(IV) x^2

Choose the \textbf{correct answer} from the options given below:

1.(A) - (IV), (B) - (I), (C) - (II), (D) - (III)
2.(A) - (I), (B) - (II), (C) - (III), (D) - (IV)
3.(A) - (II), (B) - (III), (C) - (IV), (D) - (I)
4.(A) - (III), (B) - (IV), (C) - (I), (D) - (II)

[redacted]

Match \textbf{List-I} with \textbf{List-II}

\textbf{List-I}	\textbf{List-II}
\textbf{Definite integral}	\textbf{Value}
(A) $\displaystyle\int_0^1 \frac{2x}{1+x^2}dx$	(I) 2
(B) $\displaystyle\int_{-1}^1 \sin^3 x \cos^4 x dx$	(II) $\log_e(\frac{3}{2})$
(C) $\displaystyle\int_0^\pi \sin x dx$	(III) $\log_e 2$

(D) $\int_2^3 \frac{2}{x^2-1}dx$ (IV) 0

Choose the \textbf{correct} answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (III), (B) - (II), (C) - (I), (D) - (IV)
3. (A) - (III), (B) - (I), (C) - (IV), (D) - (II)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

[redacted]

Match \textbf{List-I} with \textbf{List-II}

\textbf{List-I} \textbf{List-II}

(A) $\int_0^1 \frac{x^2}{1+x^3}dx$ (I) 0

(B) $\int_0^{\pi} 3\sin x dx$ (II) $2\log_e\left(\frac{3}{2}\right)$

(C) $\int_{-1}^{1} \sin^5 x \cos^6 x dx$ (III) 6

(D) $\int_2^3 \frac{4}{x^2-1}dx$ (IV) $\frac{1}{3}\log_e 2$

Choose the \textbf{correct} answer from the options given below:

1. (A) - (III), (B) - (II), (C) - (I), (D) - (IV)
2. (A) - (IV), (B) - (I), (C) - (III), (D) - (II)
3. (A) - (IV), (B) - (III), (C) - (I), (D) - (II)
4. (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

[redacted]

[redacted]

$$\$ \int \frac{e^{2x}-e^{-2x}}{e^{2x}+e^{-2x}} dx \$$$

[redacted]

1. $\frac{1}{2}\log|e^{2x}-e^{-2x}|+C$, where C is an arbitrary constant.

2. $\log|e^{2x}-e^{-2x}|+C$, where C is an arbitrary constant.

3. $\frac{1}{2}\log|e^{2x}+e^{-2x}|+C$, where C is an arbitrary constant.

4. $\log|e^{2x}+e^{-2x}|+C$, where C is an arbitrary constant.

[redacted]

$\int e^{2x}\left(\sin x+\frac{1}{2}\cos x\right)dx$ is equal to

1. $-\frac{1}{2}e^{2x}\cos x+C,\ C$ is an arbitrary constant
2. $\frac{1}{2}e^{2x}\sin x+C,\ C$ is an arbitrary constant
3. $e^{2x}\sin x+C,\ C$ is an arbitrary constant
4. $-e^{2x}\cos x+C,\ C$ is an arbitrary constant

[redacted]

The integral $I=\int \frac{e^{5\log_e x}-e^{4\log_e x}}{e^{3\log_e x}-e^{2\log_e x}}dx$ is equal to

1. $\frac{x}{2}+C,$ where C is the constant of integration

2. $\frac{x^2}{2}+C,$ where C is the constant of integration

3. $\frac{x^3}{3}+C,$ where C is the constant of integration

4. $\frac{x^4}{4}+C,$ where C is the constant of integration

[redacted]

The integral $\int \frac{2\,dx}{e^{2x}-1}$ is equal to:

1. $\log\left|e^{2x}-1\right|+C : C$ is an arbitrary constant
2. $\log\left|\frac{e^{2x}-1}{e^{2x}+1}\right|+C : C$ is an arbitrary constant

3. $\log\left|\frac{e^{2x}}{e^{2x}-1}\right| + C : C$ is an arbitrary constant

4. $\log\left|\frac{e^{2x}-1}{e^{2x}}\right| + C : C$ is an arbitrary constant

[redacted]

$$\int \frac{e^{2x}-1}{e^{2x}+1}\,dx =$$

1. $\log|e^{x}+e^{-x}| + C : C$ is an arbitrary constant
2. $\log|e^{2x}+1| + C : C$ is an arbitrary constant
3. $\log|e^{2x}-e^{-x}| + C : C$ is an arbitrary constant
4. $\log|e^{2x}-1| + C : C$ is an arbitrary constant

[redacted]

[redacted]

[redacted]

If A is a square matrix of order 3 and $|A| = 5,$ then the value of $|-AA^{T}|$ is:

1. 25
2. -25
3. 5
4. -5

[redacted]

[redacted]

If A is a square matrix of order 3 and $|A| = 4,$

then the value of $|2A^{T}|$ is

1. 8
2. -8
3. -32
4. 32

[redacted]

[redacted]

[redacted]

If the matrix $\begin{bmatrix} 2 & -1 & 3 \\ \lambda & 0 & 7 \\ -1 & 1 & 4 \end{bmatrix}$ is not invertible, then the value of λ is:

1. 0
2. -1
3. 1
4. $\frac{1}{2}$

[redacted]

[redacted]

If $A = \begin{bmatrix} 2 & 1 & -1 \\ 0 & 1 & 2 \\ 2 & -1 & \lambda \end{bmatrix}$ is a singular matrix, then the value of λ is:

1. 0
2. 3
3. 5
4. -5

[redacted]

If A^{-1} exists for the matrix $A = \begin{bmatrix} 1 & \lambda & -1 \\ -1 & 1 & 0 \\ \lambda & 1 & 1 \end{bmatrix}$ then

1. $\lambda = -1$
2. $\lambda \neq -1$
3. $\lambda \neq 2$
4. $\lambda \neq 1$

[redacted]

[redacted]

Let $A = \begin{bmatrix} \frac{1}{3} & 2 \\ 0 & 2x-3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 6 \\ 0 & -1 \end{bmatrix}$.

If $AB = I$ (where I is an identity matrix of order 2), then the value of x is:

1. -1
2. 1
3. 0
4. 2

[redacted]

[redacted]

[redacted]

If $A = \begin{bmatrix} 0 & x^2-6 & -3 \\ -x & 0 & -8 \\ x^2-2x & 8 & 0 \end{bmatrix}$ is a skew symmetric matrix, then the value(s) of x is/ are -

(A) 3

(B) -3

(C) -2

(D) -1

Choose the \textbf{correct} answer from the options given below:

1. (A) and (C) only
2. (A), (C) and (D) only
3. (A) only
4. (B), (C) and (D) only

[redacted]

[redacted]

If $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & -3 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 3 \\ 4 & -5 \\ 1 & 2 \end{bmatrix}$, then which of the following statements are TRUE?

(A) AB is defined

(B) AB and BA both are defined and $AB = I$, where I is an identity matrix of order 2

(C) BA is defined

(D) AB and BA both are defined and $AB = BA$

Choose the \textbf{correct} answer from the options given below:

1. (A), (B) and (C) only

2. (B), (C) and (D) only

3. (A) and (C) only

4. (A), (C) and (D) only

[redacted]

For the matrix $A = \begin{bmatrix} 2 & -1 & -1 \\ 0 & 2 & 3 \\ 1 & -2 & 1 \end{bmatrix}$, which of the following statements are \textbf{correct}?

(A) The order of the matrix is 3×3

(B) $|A| = 21$

(C) $|\text{adj } A| = 225$

(D) A is skew symmetric matrix

Choose the \textbf{correct} answer from the options given below:

1. (A), (B) and (C) only
2. (B), and (D) only
3. (A), and (C) only
4. (A), and (D) only

[redacted]

[redacted]

If A is a square matrix such that $A^2 = A$ and I is the identify matrix of the same order as A then $(I + 2A)^3 - 6A$ is equal

1. $I + 26A$
2. $20A$
3. $I + 20A$
4. $26A$

[redacted]

If A is a square matrix such that $A^2 = A$ and I is the identity matrix of the same order as A,

then $(I + A)^2 - 3A$ is equal to

1. I
2. $2A$
3. $3I$
4. A

[redacted]

[redacted]

An urn contains 5 red and 5 black balls. A ball is drawn at random, its color is noted and is returned to the urn. Moreover, 2 additional balls of the same color are put in the urn and then a ball is drawn at random.

The probability that the second drawn ball is red, is:

1. $\frac{5}{12}$
2. $\frac{1}{2}$
3. $\frac{1}{3}$
4. $\frac{1}{4}$

[redacted]

[redacted]

1. $\frac{7}{10}$
2. $\frac{4}{5}$
3. $\frac{3}{5}$
4. $\frac{2}{5}$

[redacted]

[redacted]

[redacted]

A function $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = \dfrac{x}{x^2+1}$

is (where $\mathbb{R}$ is the set of real numbers):

1. one-one but not onto
2. onto but not one-one
3. neither one-one nor onto
4. both one-one and onto

[redacted]

The function $f : [-1, 1] \to \mathbb{R}$ is given by $f(x) = \dfrac{x}{x+2}$

1. onto only
2. both one-one and onto
3. one-one only
4. neither one-one nor onto

[redacted]

The function $f : [0, \infty) \to \mathbb{R}$ defined by, $f(x) = 2x^2 + 3$, is

1. one-one and onto
2. one-one but not onto
3. onto but not one-one
4. neither one-one nor onto

[redacted]

Consider the function $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = \dfrac{x}{x^2+1}$ then

1. f is one-one but not onto.
2. f is onto but not one-one
3. f is both one-one and onto
4. f is neither one-one nor onto

[redacted]

[redacted]

The function $f : [-1, 1] \to \mathbb{R}$ (set of real numbers) given by $f(x) = \dfrac{x}{x+3}$ is

1. one-one only
2. onto only
3. both one-one and onto
4. neither one-one nor onto

[redacted]

[redacted]

[redacted]

(A) $|\text{adj } A|$ (I) $8|A|$

(B) $|A(\text{adj } A)|$ (II) $|A|^2$

(C) $|2A|$ (III) $\frac{1}{|A|}$

(D) $|A^{-1}|$ (IV) $|A|^3$

[redacted]

[redacted]

[redacted]

Let A be a non-singular square matrix of order n, then

[redacted]

[redacted] (I) $\frac{1}{|A|}$

[redacted]

(B) $|\text{adj } A|$ (II) $|A|^n$

(C) $|A^{-1}|$ (III) $|A|I$

[redacted]

(D) $|A(\text{adj } A)|$ (IV) $|A|^{n-1}$

[redacted]

Choose the correct answer from the options given below:

1. (A) - (I), (B) - (IV), (C) - (II), (D) - (III)
2. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
3. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

[redacted]

[redacted]

If $x=-1$ and $x=-2$ are the extreme points of $f(x)=\alpha\log|x|+\beta x^2+x$ then

1. $\alpha=\frac{-2}{3}, \beta=\frac{1}{6}$

2. $\alpha=\frac{-2}{3}, \beta=-\frac{1}{6}$

3. $\alpha=\frac{2}{3}, \beta=\frac{1}{6}$

4. $\alpha=\frac{2}{3}, \beta=-\frac{1}{6}$

[redacted]

If $f(x)=a\log_e|x|+bx^2+x$ has critical points at $x=-2$ and $x=1,$ then

1. $a+2b=0$
2. $a-2b=0$
3. $a+4b=0$
4. $a-4b=0$

[redacted]

[redacted]

[redacted]

If $z = 3x + 4y$ be the objective function of a linear programming problem (LPP) and $(3, 1), (2, 4), (0, 4), (5, 0)$ be corner p

[redacted]

1. 13
2. 10
3. 22
4. 14

[redacted]

If $z = 5x + 8y$ is the objective function of a LPP and $(0, 0), (3, 1), (2, 4), (0, 3), (5, 0)$ are corner points of the bounded feasible region, then the maximum value of the objective function is

1. 24
2. 42
3. 100
4. 23

[redacted]

[redacted]

[redacted]

If A be a square matrix of order 3 such that $|A| = 2,$ then $|\text{adj}(2A)|$ is equal to

1. 16
2. 32
3. 64
4. 256

[redacted]

For a square matrix A of order 3, if $|A| = 2,$ then $|\text{adj}(2A)| =$

1. 16
2. 64
3. 32
4. 256

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

(A) Degree of this differential equation $\frac{d^4y}{dx^4} + 2\log_e\left(\frac{d^3y}{dx^3}\right) = 0$ [redacted]

[redacted]

(B) Order of this differential equation $e^{\left(\frac{dy}{dx}\right)^3} + 3y\left(\frac{d^2y}{dx^2}\right)^3 = 0$ [redacted]

[redacted]

(C) Degree of $\frac{d^4y}{dx^4} + \left(\frac{dy}{dx}\right)^2 = 0$ [redacted]

[redacted]

(D) Order of the differential equation $2\frac{d^4y}{dx^4} + \left(\frac{d^2y}{dx^2}\right)^5 = 0$ [redacted]

Choose the correct answer from the options given below:

1. (A) - (II), (B) - (IV), (C) - (III), (D) - (I)
2. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)
3. (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
4. (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

[redacted]

Match List-I with List-II

[redacted]

List-I	**List-II**
Differential Equations	**Order and degree**
(A) $\frac{dy}{dx} + e^y = 0$	(I) order 2, degree not defined
(B) $\frac{d^2y}{dx^2} = \left[1 + \left(\frac{dy}{dx}\right)^2\right]^{3/2]}$	(II) order 2, degree 1
(C) $\left(\frac{d^2y}{dx^2}\right)^2 + e^{\left(\frac{dy}{dx}\right)} = 0$	(III) order 1, degree 1
(D) $\frac{d^2y}{dx^2} + x\frac{dy}{dx} - 2y = \log x; x > 0$	(IV) order 2, degree 2

[redacted]

[redacted]

1. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

2. (A) - (I), (B) - (IV), (C) - (III), (D) - (II)

3. (A) - (III), (B) - (II), (C) - (I), (D) - (IV)

4. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)

[redacted]

Match \textbf{List-I} with \textbf{List-II}

List-I	List-II
Differential Equation	**Degree**
(A) $xy\frac{d^2y}{dx^2} + x\left(\frac{dy}{dx}\right)^2 - y\frac{dy}{dx} = 0$	(I) 3
(B) $\frac{d^2y}{dx^2} + \log\left(\frac{dy}{dx}\right) = 0$	(II) 1
(C) $\left(\frac{d^2y}{dx^2}\right)^2 + \left(\frac{dy}{dx}\right)^3 + \frac{dy}{dx} + 1 = 0$	(III) not defined
(D) $2x^2\left(\frac{d^2y}{dx^2}\right)^3 - 5\left(\frac{dy}{dx}\right)^2 + y = 0$	(IV) 2

Choose the \textbf{correct} answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
3. (A) - (IV), (B) - (III), (C) - (I), (D) - (II)
4. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)

[redacted]

[redacted]

Which of the following terms are associated with a linear programming problem?

(A) Constraints

(B) Independent events

(C) Feasible region

(D) Objective function

[redacted]

1. (A) and (C) only
2. (A), (C) and (D) only
3. (B), (C) and (D) only
4. (A), (B) and (D) only

[redacted]

A Linear Programming Problem (LPP) consists of which of the following components?

(A) Decision variables

(B) The graphical compliment

(C) The objective function

(D) The linear constraints

Choose the correct answer from the options given below:

1. (A) and (C) only
2. (A) only
3. (C) and (D) only
4. (A), (C) and (D) only

[redacted]

[redacted]

Which of the following statements are TRUE?

(A) The variable t of t-distribution ranges from $-\infty$ to ∞.

(B) The probability curve of the t-distribution is symmetric about the line t=0

(C) The variance of the t-distribution is greater than one.

(D) As the number of degrees of freedom decreases, the t-distribution curve moves closer to the standard normal probability curve.

Choose the correct answer from the options given below:

1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (C) and (D) only

[redacted]

Which of the following are correct?

(A) The probability curve in t-distribution is symmetric about the line t=0.

(B) t-axis is an asymptote of the curve.

(C) The variable t of t-distribution ranges from $-\infty$ to ∞.

(D) As the number of degrees of freedom increases, the t-distribution curve moves closer to the binomial distribution.

Choose the \textbf{correct} answer from the options given below:

1. (A), (B) and (C) only
2. (A), (B) and (D) only
3. (A), (B), (C) and (D)
4. (C) and (D) only

[redacted]

[redacted]

Question: Choose the correct statement about CAGR (compound annual growth rate)?

1. CAGR is the average annualized return of an investment.
2. CAGR is calculated by taking arithmetic mean of series of returns.
3. CAGR is linear measure that does not account for the effects of compounding.
4. CAGR is calculated by using the final and beginning value of an investment.

[redacted]

Which of the following is correct about the compound annual growth rate?

1. It is an average annualized return of an investment.
2. It is calculated by taking the arithmetic mean of series of returns.
3. It is a linear measure that does not account for the effects of compounding.
4. It smoothens out the volatile nature of year by year growth/decay rates and provides more accurate results.

[redacted]

[redacted]

Question: If $A = \begin{bmatrix} 5 & 2 \\ 4 & 3 \end{bmatrix}$ is a given matrix, then which statements are correct?

(A) $|A| = 7$

(B) minor of 3 = -5

(C) co-factor of 2 = -4

(D) $adj(A) = \begin{bmatrix} 3 & -2 \\ -4 & 5 \end{bmatrix}$

1. (A), (C) and (D) only
2. (A), (B) and (C) only
3. (B), (C) and (D) only
4. (A), (B) and (D) only

[redacted]

If matrix $A = \begin{bmatrix} x & 2 & 3 \\ a & y & -5 \\ b & c & 0 \end{bmatrix}$ is a skew-symmetric matrix, then

(A) $x + y + c = 5$

(B) $c = 5$

(C) $a + b + c = 0$

(D) $a + b - c = 10$

Choose the correct answer from the options given below:

1. (A) and (B) only
2. (A), (B) and (C) only
3. (D) and (A) only
4. (A) and (C) only

[redacted]

[redacted]

The curve y = f(x) is normal probability curve, then which of the following statements are correct?

(A) mean, median and mode of the distribution coincide.

(B) the area bounded by the curve y = f(x) and x-axis is one unit.

(C) The curve is symmetrical about the line x = μ , where μ is the mean.

(D) y-axis is an asymptote to the curve.

Choose the correct answer from the options given below:

1. (A), (B) and (C) only
2. (A), (C) and (D) only
3. (B) and (D) only
4. (B), (C) and (D) only

[redacted]

The probability distribution function of a normal variate with mean μ and variance σ^2 is given by:

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}, -\infty < x < \infty, -\infty < \mu < \infty, \sigma > 0$$

If $y = f(x)$ be the normal probability curve, then which of the following is correct?

(A) The normal curve is symmetrical about the line $x = \mu$.

(B) Mean, median and mode of the distribution coincide.

(C) Y-axis is an asymptote to the normal curve.

(D) If x increases numerically, $f(x)$ decreases rapidly.

Choose the correct answer from the options given below:

1. (A) and (D) only
2. (A), (B) and (D) only
3. (A), (B), (C) and (D)
4. (B) and (C) only

[redacted]

[redacted]

The demand for a certain product is represented by the function

$$p = 150 + 10x - x^2 \text{ (in Rs.)}$$

where x is the number of units demanded and p is the price per unit, then the value of marginal revenue , when 10 units

1. Rs.50
2. Rs.100
3. Rs.150
4. Rs.200

[redacted]

The demand for a certain product is represented by the function $p = 300 + 25x - x^2$ (in rupees), where x is the number

of units demanded and p is the price per unit, then the marginal revenue when 15 units are sold, is

1. [redacted]675
2. [redacted]375
3. [redacted]1050
4. [redacted]775

[redacted]

The demand function for a certain product is represented by the equation: $p = 20 + 5x - 3x^2$,

where x is the number of units demanded and p is the price per unit (in Rs.),

then the marginal revenue when 2 units are sold, is:

1. Rs. 8

2. Rs. 4

3. Rs. 6

4. Rs. 2

[redacted]

[redacted]

Let θ be the angle between two vectors $\vec{a}$ and $\vec{b}$. Then match List-I with List-II

[redacted]

(A) $\sin\theta$	(I) $\dfrac{\vec{a}\cdot\vec{b}}{\lvert\vec{a}\rvert\lvert\vec{b}\rvert}$
(B) $\cos\theta$	(II) $\lvert\vec{a}\times\vec{b}\rvert$
(C) Area of the parallelogram with adjacent sides represented by $\vec{a}$ and $\vec{b}$	(III) $\dfrac{\vec{a}\cdot\vec{b}}{\lvert\vec{a}\rvert}$
(D) Projection of $\vec{a}$ on $\vec{b}$	(IV) $\dfrac{\lvert\vec{a}\times\vec{b}\rvert}{\lvert\vec{a}\rvert\lvert\vec{b}\rvert}$

Choose the correct answer from the options given below:

1. (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
2. (A) - (I), (B) - (IV), (C) - (II), (D) - (III)
3. (A) - (IV), (B) - (I), (C) - (III), (D) - (II)
4. (A) - (I), (B) - (IV), (C) - (III), (D) - (II)

[redacted]

Match List-I with List-II

Let θ be the angle between the vector $\vec{a}$ and $\vec{b}$.

List-I	\[List-II
(A) $\vec{a}\cdot\vec{b}$	(I) $\dfrac{\vec{a}\cdot\vec{b}}{\lvert\vec{b}\rvert^2}\vec{b}$
(B) $\vec{a}\times\vec{b}$	(II) $\vec{a}\cdot\vec{b}=0$
(C) Projection vector of $\vec{a}$ on $\vec{b}(\neq 0)$	(III) $\lvert\vec{a}\rvert\lvert\vec{b}\rvert\sin\theta\,\hat{n}$ where $\hat{n}$ is a unit vector perpendicular to both $\vec{a}$ and $\vec{b}$
(D) $\vec{a}$ and $\vec{b}$ are orthogonal vectors	(IV) $\lvert\vec{a}\rvert\lvert\vec{b}\rvert\cos\theta$

Choose the correct answer from the options given below:

1. (A) – (I), (B) – (II), (C) – (III), (D) – (IV)
2. (A) – (IV), (B) – (I), (C) – (III), (D) – (II)
3. (A) – (IV), (B) – (III), (C) – (I), (D) – (II)
4. (A) – (II), (B) – (IV), (C) – (I), (D) – (III)

[redacted]

[redacted]

If $\vec{a}$ is any vector, then $|\vec{a}\times\hat{i}|^2+|\vec{a}\times\hat{j}|^2+|\vec{a}\times\hat{k}|^2$ is equal to

1. $|\vec{a}|^2$
2. $2|\vec{a}|^2$
3. $3|\vec{a}|^2$
4. $4|\vec{a}|^2$

[redacted]

For any vector $\vec{a}$, the value of $|\vec{a}\times\hat{i}|^2+|\vec{a}\times\hat{j}|^2+|\vec{a}\times\hat{k}|^2$ is equal to:

1. $2|\vec{a}|^2$
2. $3|\vec{a}|^2$
3. $4|\vec{a}|^2$
4. $|\vec{a}|^2$

[redacted]

[redacted]

[redacted]

The probabilities of occurrence of two events E and F are 0.25 and 0.50 respectively. The probability of their simultaneo

The probability that neither E nor F occurs is

1. 0
2. 1
3. 0.39
4. 0.61

[redacted]

The probabilities of occurrence of two events A and B are 0.45 and 0.20 respectively.

The probability of their simultaneous occurrence is 0.06.

The probability that neither A nor B occurs is

1. 0
2. 1
3. 0.41
4. 0.59

[redacted]

[redacted]

[redacted]

Which of the following statement is/are correct?

(A) A square matrix $A=[a_{ij}]$ is called a symmetric matrix if $a_{ij}=a_{ji}$ for all i, j.

(B) $A=[a_{ij}]_{m\times m}$ is a diagonal matrix if $a_{ij}=0$ when $i=j$.

(C) A square matrix $A=[a_{ij}]$ is called a skew symmetric matrix if $a_{ij}=-a_{ji}$ for all i, j.

(D) The multiplication of diagonal matrices of same order is commutative.

[redacted]

[redacted]

1. (A), (B) and (C) only
2. (B), (C) and (D) only
3. (A), (C) and (D) only
4. (C) and (D) only

[redacted]

Which of the following statement are correct?

(A) $A=[a_{ij}]_{n\times n}$ is a diagonal matrix if $a_{ij}=0$ when $i=j$

(B) A square matrix $A=[a_{ij}]$ is called a symmetric matrix if $a_{ij}=a_{ji}$ for all i, j

(C) A square matrix $A=[a_{ij}]$ is called a skew-symmetric matrix if $a_{ij}=-a_{ji}$ for all i, j

(D) For every square matrix $A,$ there exist an identity matrix of the same order such that $IA=AI=I$

Choose the correct answer from the options given below:

1. $(A), (B)$ and (C) only
2. $(B), (C)$ and (D) only
3. (A) and (C) only
4. (B) and (C) only

[redacted]

[redacted]

[redacted]

$$\int \frac{\sqrt{1-x}}{\sqrt{1+x}}dx = \alpha\sqrt{1-x^2} + \beta\sin^{-1}x + C,$$ where C is an arbitrary constant, then which of the following are TRUE?

(A) $\alpha = 1$

(B) $\alpha = -1$

(C) $\beta = 1$

(D) $\beta = -1$

[redacted]

Choose the correct answer from the options given below:

1. (B) and (D) only
2. (A) and (C) only
3. (A) and (D) only
4. (B) and (C) only

[redacted]

[redacted]

[redacted]

If $\int \frac{dx}{(x-1)^{3/4}(x+2)^{5/4}} = \alpha[1-g(x)]^{\beta} + c,$ where c is a constant of integration, then which of the following are true?

(A) $\alpha = \frac{2}{3}$

(B) $\beta = \frac{3}{4}$

(C) $3\alpha + 4\beta = 5$

(D) $g(x) = \frac{3}{x+2}$

Choose the correct answer from the options given below:

1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (C) and (D) only

[redacted]

[redacted]

Let $f(x) = \log_e(\sin x), x \in (0, \pi)$, then which of the following statements is/are TRUE?

(A) $f(x)$ is increasing on $(0, \pi/2)$

(B) $f(x)$ is decreasing on $(\pi/2, \pi)$

(C) $f(x)$ is increasing on $(0, \pi)$

(D) $f(x)$ is decreasing on $(0, \pi)$

Choose the \textbf{correct} answer from the options given below:

1. (C) and (D) only
2. (A) and (B) only
3. (A) only
4. (B) only

[redacted]

The function $f(x) = \log_e(\sin x), x \in (0, \pi)$ is

(A) strictly increasing on $(0, \frac{\pi}{2})$

(B) strictly decreasing on $(0, \frac{\pi}{2})$

(C) strictly increasing on $(\frac{\pi}{2}, \pi)$

(D) strictly decreasing on $(\frac{\pi}{2}, \pi)$

(E) strictly increasing on $(0, \pi)$

Choose the \textbf{correct} answer from the options given below:

1. (A) and (D) only
2. (B) and (C) only
3. (A), (D) and (E) only
4. (B), (D) and (E) only

[redacted]

[redacted]

Match List-I with List-II

[redacted]

[redacted]

(A) $\int \frac{dx}{x^2-16}$ (I) $\frac{1}{8}\log\left|\frac{4+x}{4-x}\right|+c$

[redacted]

[redacted]

(B) $\int \frac{dx}{x^2+16}$ (II) $\log\left|x+\sqrt{x^2-16}\right|+c$

[redacted]

(C) $\int \frac{dx}{16-x^2}$ (III) $\frac{1}{8}\log\left|\frac{x-4}{x+4}\right|+c$

[redacted]

(D) $\int \frac{dx}{\sqrt{x^2-16}}$ (IV) $\frac{1}{4}\tan^{-1}\left(\frac{x}{4}\right)+c$

[redacted]

Choose the correct answer from the options given below:

1. (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
2. (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
3. (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
4. (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

[redacted]

Match List-I with List-II

List-(I)	**Lis-(II)**
Function	**Derivative**
(A) $y=\sin^{-1}x+\sin^{-1}\sqrt{1-x^2},\ \lvert x\rvert<1$	(I) $\frac{dy}{dx}=\frac{1}{2y-1}$
(B) $y=\sqrt{x+y},\ x+y>0,\ y\neq\frac{1}{2}$	(II) $\frac{dy}{dx}=10^x\log_e 10$
(C) $y=\log_{10}x,\ x>0$	(III) $\frac{dy}{dx}=0$
(D) $y=10^x$	(IV) $\frac{dy}{dx}=\frac{1}{x\log_e 10}$

[redacted]

Choose the correct answer from the options given below:

1. $(A)-(III),\ (B)-(I),\ (C)-(IV),\ (D)-(II)$
2. $(A)-(I),\ (B)-(III),\ (C)-(II),\ (D)-(IV)$
3. $(A)-(III),\ (B)-(II),\ (C)-(I),\ (D)-(IV)$
4. $(A)-(II),\ (B)-(I),\ (C)-(III),\ (D)-(IV)$

[redacted]

Match List-I with List-II

[redacted]

List-I	List-(II)
(A) $f(x) = [x]$	(I) Continuous everywhere but not differentiable at $x = -1$
(B) $f(x) = \|x - 1\|$	(II) Continuous everywhere except at all integral values
(C) $f(x) = e^{\|x\|}$	(III) Continuous everywhere but not differentiable at $x = 1$
(D) $f(x) = \|x + 1\|$	(IV) Continuous everywhere but not differentiable at $x = 0$

Choose the correct answer from the options given below:

1. $(A) - (I),\ (B) - (II),\ (C) - (III),\ (D) - (IV)$
2. $(A) - (II),\ (B) - (III),\ (C) - (IV),\ (D) - (I)$
3. $(A) - (III),\ (B) - (IV),\ (C) - (I),\ (D) - (II)$
4. $(A) - (IV),\ (B) - (I),\ (C) - (II),\ (D) - (III)$

[redacted]

Match List-I with List-II

List-I	List-II
(A) The value of $\int_0^4 \|x\|\, dx$ is	(I) 3
(B) The value of $\int_{-2}^2 \|x\|\, dx$ is	(II) -1
(C) The value of $\int_0^3 [x]\, dx$ is	(III) 8
(D) The value of $\int_{-1}^1 [x]\, dx$ is	(IV) 4

[redacted]

Choose the correct answer from the options given below:

1. $(A) - (IV),\ (B) - (III),\ (C) - (II),\ (D) - (I)$
2. $(A) - (III),\ (B) - (IV),\ (C) - (II),\ (D) - (I)$
3. $(A) - (III),\ (B) - (IV),\ (C) - (I),\ (D) - (IV)$
4. $(A) - (III),\ (B) - (IV),\ (C) - (I),\ (D) - (II)$

[redacted]

[redacted] $\frac{dy}{dx}$

(A) $x = \frac{2}{t},\ y = 2t$	(I) $4t^2$
(B) $x = t^3,\ y = 3t + 2$	(II) $2(t + 1)$

(C) $x = \log t,\ y = 2t^2$ (III) $-t^2$

(D) $x = e^t,\ y = 2te^t$ (IV) t^{-2}

Choose the correct answer from the options given below:

1. (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
2. (A)-(II), (B)-(I), (C)-(III), (D)-(IV)
3. (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
4. (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

[redacted]

Match List-I with List-II

List-I	**List-II**
\[Functions	Integers
[redacted]	(I) $\log\left|x + \sqrt{4 + x^2}\right| + C$
[redacted]	(II) $\sin^{-1}\left(\frac{x}{4}\right) + C$
[redacted]	(III) $\frac{1}{4}\log\left|\frac{x-2}{x+2}\right| + C$
[redacted]	(IV) $\frac{1}{4}\tan^{-1}\left(\frac{x}{4}\right) + C$

Choose the correct answer from the options given below:

1. $(A)-(IV),\ (B)-(III),\ (C)-(II),\ (D)-(I)$
2. $(A)-(III),\ (B)-(II),\ (C)-(IV),\ (D)-(I)$
3. $(A)-(III),\ (B)-(IV),\ (C)-(II),\ (D)-(I)$
4. $(A)-(IV),\ (B)-(III),\ (C)-(I),\ (D)-(II)$

[redacted]

[redacted]

List-I	**List-II**
(Definite integral)	**(Value)**
(A) $\int_1^e \frac{\log x}{x}\, dx$	(I) 4
(B) $\int_{-2}^{2} x^3(1 - x^2)\, dx$	(II) $\frac{1}{2}$
(C) $\int_1^2 x dx$	(III) 0
(D) $\int_{-2}^{2} \lvert x\rvert\, dx$	(IV) $\frac{3}{2}$

[redacted]

1. $(A)-(II),\ (B)-(III),\ (C)-(IV),\ (D)-(I)$
2. $(A)-(III),\ (B)-(I),\ (C)-(IV),\ (D)-(II)$
3. $(A)-(I),\ (B)-(III),\ (C)-(IV),\ (D)-(II)$
4. $(A-(III),\ (B)-(II),\ (C)-(I),\ (D)-(IV)$

[redacted]

Match List-I with List-II (Given that c is an arbitrary constant)

[redacted]

[redacted]

List-I	List-II
(A) $\int \frac{dx}{\sqrt{a^2-x^2}}$	(I) $\log_e\left\lvert x+\sqrt{x^2-a^2}\right\rvert+c$
(B) $\int \sqrt{a^2-x^2}\,dx$	(II) $\sin^{-1}\frac{x}{a}+c$
(C) $\int \sqrt{x^2-a^2}\,dx$	(III) $\frac{x}{2}\sqrt{a^2-x^2}+\frac{a^2}{2}\sin^{-1}\frac{x}{a}+c$
(D) $\int \frac{dx}{\sqrt{x^2-a^2}}$	(IV) $\frac{x}{2}\sqrt{x^2-a^2}-\frac{a^2}{2}\log_e\left\lvert x+\sqrt{x^2-a^2}\right\rvert+c$

[redacted]

[redacted]

Choose the correct answer from the options given below:

1. $(A)-(III),\ (B)-(II),\ (C)-(IV),\ (D)-(I)$
2. $(A)-(IV),\ (B)-(II),\ (C)-(I),\ (D)-(III)$
3. $(A)-(I),\ (B)-(II),\ (C)-(IV),\ (D)-(III)$
4. $(A)-(II),\ (B)-(III),\ (C)-(IV),\ (D)-(I)$

[redacted]

[redacted]

Match List-I with List-II (where c is an arbitrary constant)

[redacted]

List-I	List-II
(A) $\int \tan x\,dx$	(I) $\log\lvert\sec x+\tan x\rvert+c$
(B) $\int \cot x\,dx$	(II) $\log\lvert\sec x\rvert+c$
(C) $\int \sec x\,dx$	(III) $\log\lvert\sin x\rvert+c$
(D) $\int \backslash\text{cosec}x\,dx$	(IV) $\log\lvert\backslash\text{cosec}x-\cot x\rvert+c$

[redacted]

[redacted]

Choose the correct answer from the options given below:

1. $(A) - (III)$, $(B) - (IV)$, $(C) - (I)$, $(D) - (II)$
2. $(A) - (III)$, $(B) - (II)$, $(C) - (I)$, $(D) - (IV)$
3. $(A) - (II)$, $(B) - (III)$, $(C) - (I)$, $(D) - (IV)$
4. $(A) - (III)$, $(B) - (IV)$, $(C) - (II)$, $(D) - (I)$

[redacted]

[redacted]

Match List-I with List-II

[redacted]

[redacted]

(A) Degree of the differential equation $\frac{d^3y}{dx^3} + 2\log x \cdot y = 0$ [redacted]

(B) Order of the differential equation $\frac{d^4y}{dx^4} + \left(\frac{dy}{dx}\right)^4 + xy = 0$ [redacted]

(C) Degree of the differential equation $\left(\frac{d^4y}{dx^4}\right)^2 + \left(\frac{dy}{dx}\right)^3 + x^2y = 0$ [redacted]

(D) Order of the differential equation $\frac{d^3y}{dx^3} + y\left(\frac{dy}{dx}\right)^3 = 0$ [redacted]

[redacted]

Choose the correct answer from the options given below:

1. $(A) - (III)$, $(B) - (II)$, $(C) - (IV)$, $(D) - (I)$
2. $(A) - (II)$, $(B) - (III)$, $(C) - (IV)$, $(D) - (I)$
3. $(A) - (III)$, $(B) - (IV)$, $(C) - (II)$, $(D) - (I)$
4. $(A) - (II)$, $(B) - (I)$, $(C) - (IV)$, $(D) - (III)$

[redacted]

[redacted]

Match List-I with List-II

List-I	List-II
Integral	[redacted] **Solution: C is an arbitrary constant**
$(A)\ \int \frac{dx}{x^2+25}$	$(I)\ \frac{1}{10}\log\left\lvert\frac{5+x}{5-x}\right\rvert + C$
$(B)\ \int \frac{dx}{x^2-25}$	$(II)\ \log\left\lvert x+\sqrt{x^2-25}\right\rvert + C$
$(C)\ \int \frac{dx}{25-x^2}$	$(III)\ \frac{1}{5}\tan^{-1}\left(\frac{x}{5}\right) + C$

(D) $\int \frac{dx}{\sqrt{x^2 - 25}}$ (IV) $\frac{1}{10}\log\left|\frac{x-5}{x+5}\right| + C$

[redacted]

Choose the correct answer from the options given below:

1. $(A) - (I)$, $(B) - (IV)$, $(C) - (II)$, $(D) - (III)$
2. $(A) - (III)$, $(B) - (IV)$, $(C) - (I)$, $(D) - (II)$
3. $(A) - (III)$, $(B) - (IV)$, $(C) - (II)$, $(D) - (I)$
4. $(A) - (II)$, $(B) - (IV)$, $(C) - (III)$, $(D) - (I)$

[redacted]

[redacted]

[redacted]

For the differential equation $x\dfrac{dy}{dx}+2y=x^2\log_e x$

(A) Integrating factor is $2x$

(B) Integrating factor is x^2

(C) General Solution is $y=\dfrac{x^2}{16}(4\log_e|x|-1)+Cx^{-2}$, where C is an arbitrary constant.

(D) General Solution is $y=\dfrac{x^4}{16}(4\log_e|x|-1)+C$, where C is an arbitrary constant.

[redacted]

Choose the correct answer from the options given below:

1. (A) and (C) only
2. (B) and (D) only
3. (B) and (C) only
4. (A) and (D) only

[redacted]

For the differential equation $x\dfrac{dy}{dx}+3y=x^2\log_e x$, which of the following statements are TRUE?

(A) Product of order and degree is 1

(B) Integrating factor is x^3

(C) Integrating factor is $3x$

(D) General solution is $y=\dfrac{x^3}{36}(6\log_e|x|-1)+Cx^{-3}$, C is an arbitrary constant

Choose the correct answer from the options given below:

1. (A), (C) and (D) only
2. (A) and (B) only
3. (A) and (D) only
4. (A), (B) and (D) only

[redacted]

[redacted]

[redacted]

Let A be a matrix such that $A = \begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix}$ Then which of the following are TRUE?

(A)A is a non-singular matrix

(B)$A^T = A$

(C)A is not an invertible matrix

(D)A is not a skew-symmetric matrix

Choose the**correct** answer from the options given below:

1.(A) and (D) only

2.(B) and (C) only

3.(A) and (C) only

4.(C) and (D) only

[redacted]

[redacted]

If A is a skew-symmetric matrix, then which of the following statements is \textbf{NOT} true?

(A) A is singular if order of A is odd

(B) A is non-singular

(C) A^{2025} is a skew-symmetric matrix

(D) A^{2025} is a symmetric matrix

(E) all diagonal elements of A are zeros

Choose the \textbf{correct} answer from the options given below:

1. (A), (C) and (E) only

2. (A) and (E) only

3. (B), (D) and (E) only

4. (B) and (D) only

[redacted]

If $\begin{bmatrix} a-b & 0 & 0 \\ 0 & b-c & 0 \\ 0 & 0 & c-2 \end{bmatrix}$ is a scalar matrix such that $a+b+c=0$, then, which of the following are TRUE?

(A) $a = 0$

(B) $b = 0$

(C) $a = 1$

(D) $c = 1$

Choose the correct answer from the options given below:

1. (A) and (C) only

2. (B) and (D) only

3. (C) and (D) only

4. (A), (C) and (D) only

[redacted]

[redacted]

$$\int \sqrt{1+\frac{x^2}{9}}\, dx \text{ is equal to}$$

(Where C is an arbitrary constant)

1. $\frac{1}{9}\left[\frac{9}{2}\log\left|x+\sqrt{x^2+9}\right|+\frac{x}{2}\sqrt{x^2+9}\right]+C$

2. $3\left[\frac{9}{2}\log\left|x+\sqrt{x^2+9}\right|+\frac{x}{2}\sqrt{x^2+9}\right]+C$

3. $\left[\frac{9}{2}\log\left|x+\sqrt{x^2+9}\right|+\frac{x}{2}\sqrt{x^2+9}\right]+C$

4. $\frac{1}{3}\left[\frac{9}{2}\log\left|x+\sqrt{x^2+9}\right|+\frac{x}{2}\sqrt{x^2+9}\right]+C$

[redacted]

[redacted]

$$\int \frac{\sin x - x\cos x}{x(x+\sin x)} dx = \text{ (where C is an arbitrary constant)}$$

1. $\log\left|\frac{x}{x-\sin x}\right|+C$

2. $\log\left|\frac{x}{x+x\sin x}\right|+C$

3. $\log\left|\frac{x}{x+\sin x}\right|+C$

4. $\log\left|\frac{x+\sin x}{x}\right|+C$

[redacted]

$$\int \frac{\sqrt{16+(\log x)^2}}{x} dx \text{ is equal to (where } C \text{ is an arbitrary constant)}$$

1. $2\log\left|\log x+\sqrt{16+(\log x)^2}\right|+\log x\sqrt{16+(\log x)^2}+C$

2. $16\log\left|\log x+\sqrt{16+(\log x)^2}\right|+\frac{\log x}{2}\sqrt{16+(\log x)^2}+C$

3. $8\log\left|\log x+\sqrt{16+(\log x)^2}\right|+\frac{\log x}{2}\sqrt{16+(\log x)^2}+C$

4. $4\log\left|\log x+\sqrt{16+(\log x)^2}\right|+\frac{\log x}{2}\sqrt{16+(\log x)^2}+C$

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

The feasible region of a LPP is bounded. The corresponding objective function is $Z = 6x - 7y$.

Then the objective function attains:

1. Only maximum in the feasible region

2. Only minimum in the feasible region

3. both maximum and minimum in the feasible region

4. either maximum or minimum but not both in the feasible region

[redacted]

[redacted]

[redacted]

The function $f(x) = 4x^3 - 7x^2$ has point(s) of local minima at:

1. $x = 0$
2. $x = 0, -\frac{7}{6}$
3. $x = \frac{7}{6}$
4. $x = \frac{7}{6}$

[redacted]

The function $f(x) = x + \frac{1}{x}$ has

1. local maxima at $x = -1$
2. local minima at $x = -1$
3. local maxima at $x = 1$.
4. neither local maxima nor local minima

[redacted]

[redacted]

If the difference between mean and variance of a Binomial distribution is 1 and the difference of their squares is 5, then the probability of success is

1. $\frac{2}{3}$
2. $\frac{1}{3}$
3. $\frac{2}{5}$
4. $\frac{3}{5}$

[redacted]

In a Binomial distribution, the probability of getting a success is $\frac{3}{4}$ and the variance is $\frac{3}{8}$ then the probability of no success is:

1. $\frac{1}{4}$
2. $\frac{3}{4}$
3. $\frac{1}{16}$
4. $\frac{3}{16}$

[redacted]

[redacted]

Components of Time Series are:

(A) Secular Trend Component

(B) Seasonal Component

(C) Moving Average Component

(D) Cyclical Component

Choose the correct answer from the options given below:

1. (B) and (C) only
2. (A), (B) and (D) only
3. (A) and (D) only
4. (A) and (C) only

[redacted]

Question: On which of the following components, the pattern and behavior of the data in any time series is based?

(A). Secular trend component

(B). Seasonal component

(C). Cyclical component

(D). Regular component

Choose the correct answer from the options given below:

1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (C) and (D) only

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

The value of $\int \frac{(x^4 - x)^{1/4}}{x^5} dx$ is equal to (where C is an arbitrary constant):

1. $\frac{4}{15}\left(1 - \frac{1}{x^3}\right)^{5/4} + C$
2. $\frac{4}{15}\left(1 + \frac{1}{x^3}\right)^{5/4} + C$
3. $\frac{4}{15}\left(1 - \frac{1}{x^3}\right)^{4/5} + C$
4. $\frac{4}{15}\left(1 + \frac{1}{x^3}\right)^{4/5} + C$

[redacted]

$$\int \frac{(x^4 - x)^{1/4}}{x^5} dx \text{ is equal to}$$

1. $\frac{4}{15}\left(1 - \frac{1}{x^3}\right)^{5/4} + C : C$ is a constant of integration
2. $\frac{4}{3}\left(1 - \frac{1}{x^3}\right)^{5/4} + C : C$ is a constant of integration
3. $\frac{4}{15}\left(1 - \frac{1}{x^3}\right)^{3/4} + C : C$ is a constant of integration
4. $\frac{4}{15}\left(1 - \frac{1}{x^3}\right)^{1/5} + C : C$ is a constant of integration

[redacted]

[redacted]

The projection of the vector $2\hat{i} - \hat{j} + 3\hat{k}$ on the vector $3\hat{i} + 2\hat{j} + 6\hat{k}$ is:

1. $\frac{22}{7}$
2. $\frac{26}{49}$
3. $\frac{22}{49}$
4. $-\frac{22}{7}$

[redacted]

The projection vector of the vector $2\hat{i} + 3\hat{j} + \hat{k}$ on $2\hat{i} + \hat{j} - 2\hat{k}$ is

1. $\frac{5}{3}(2\hat{i} + \hat{j} - 2\hat{k})$
2. $\frac{5}{9}(2\hat{i} + \hat{j} - 2\hat{k})$
3. $\frac{5}{14}(2\hat{i} + 3\hat{j} + \hat{k})$
4. $\frac{5}{3}$

[redacted]

[redacted]

$$\int \frac{dx}{\sqrt{5-4x-x^2}} \text{ is equal to:}$$

1. $\sin^{-1}\left(\frac{x+2}{3}\right)+C$: C is an arbitrary constant
2. $\sin^{-1}(x+2)+C$: C is an arbitrary constant
3. $3\sin^{-1}\left(\frac{x+2}{3}\right)+C$: C is an arbitrary constant
4. $-\sin^{-1}(x+2)+C$: C is an arbitrary constant

[redacted]

For $x \in \left(0, \frac{\pi}{2}\right)$, $\int \frac{\sin x+\cos x}{\sqrt{\sin 2x}}\,dx$ is equal to

1. $\sin^{-1}(\sin 2x)+C,\ C$ is an arbitrary constant
2. $\sin^{-1}(\cos x-\sin x)+C,\ C$ is an arbitrary constant
3. $\sin^{-1}(\sin x-\cos x)+C,\ C$ is an arbitrary constant
4. $\sin^{-1}(\sin x+\cos x)+C,\ C$ is an arbitrary constant

[redacted]

[redacted]

$$\int \frac{\sin 2x\,dx}{\sqrt{9-\cos^4 x}} \text{ equals}$$

1. $\sin^{-1}\left(\frac{\cos^2 x}{3}\right)+C$: C is an arbitrary constant
2. $\cos^{-1}\left(\frac{\sin^2 x}{3}\right)+C$: C is an arbitrary constant
3. $\sin\left(\frac{\cos^2 x}{3}\right)+C$: C is an arbitrary constant
4. $-\sin^{-1}\left(\frac{\cos^2 x}{3}\right)+C$: C is an arbitrary constant

[redacted]

[redacted]

$$\int \frac{dx}{2\sin^2 x+5\cos^2 x} \text{ is equal to}$$

1. $\frac{1}{\sqrt{10}}\tan^{-1}\left(\frac{\tan x}{\sqrt{5}}\right)+C$; C is an arbitrary constant
2. $\frac{1}{\sqrt{5}}\tan^{-1}\left(\frac{2\tan x}{\sqrt{5}}\right)+C$; C is an arbitrary constant
3. $\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{\sqrt{2}\tan x}{\sqrt{5}}\right)+C$; C is an arbitrary constant
4. $\frac{1}{\sqrt{10}}\tan^{-1}\left(\frac{\sqrt{2}\tan x}{\sqrt{5}}\right)+C$; C is an arbitrary constant

[redacted]

[redacted]

A vector $\vec{a}$ of magnitude $3\sqrt{2}$ making an angle of $\frac{\pi}{3}$ with $\hat{i}$, $\frac{\pi}{4}$ with $\hat{j}$ and an acute angle θ with $\hat{k}$, is:

1. $3\sqrt{2}\left(\frac{1}{\sqrt{2}}\hat{i}+\frac{1}{\sqrt{2}}\hat{j}+\frac{1}{\sqrt{2}}\hat{k}\right)$
2. $3\sqrt{2}\left(\frac{1}{2}\hat{i}+\frac{1}{\sqrt{2}}\hat{j}+\frac{1}{2}\hat{k}\right)$
3. $3\sqrt{2}\left(\frac{1}{\sqrt{2}}\hat{i}+\frac{1}{\sqrt{2}}\hat{j}+\frac{1}{\sqrt{2}}\hat{k}\right)$
4. $3\sqrt{2}\left(\frac{1}{2}\hat{i}-\frac{1}{2}\hat{j}+\frac{1}{2}\hat{k}\right)$

[redacted]

If θ is an acute angle and the vector $\vec{a}=(\sin\theta)\hat{i}+(\cos\theta)\hat{j}$ is perpendicular to the vector $\vec{b}=\hat{i}-\sqrt{3}\hat{j}$ then θ is equal to

1. $\frac{\pi}{6}$
2. $\frac{\pi}{3}$
3. $\frac{\pi}{4}$
4. $\frac{\pi}{2}$

[redacted]

[redacted]

Let $\vec{a} = 3\hat{i} + \hat{j} - 4\hat{k}$ and $\vec{b} = 6\hat{i} + 5\hat{j} - 2\hat{k}$ be two vectors.

Then a vector perpendicular to both $\vec{a}$ and $\vec{b}$ with magnitude 3 units is:

1. $2\hat{i} + 2\hat{j} - \hat{k}$
2. $2\hat{i} - 2\hat{j} + \hat{k}$
3. $-(2\hat{i} - 2\hat{j} + \hat{k})$
4. $-(2\hat{i} + 2\hat{j} - \hat{k})$

[redacted]

Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + 3\hat{k}$, then a unit vector perpendicular to both vectors $(\vec{a} + \vec{b})$ and $(\vec{a} - \vec{b})$ is equal to

1. $\frac{1}{\sqrt{6}}(-\hat{i} + 2\hat{j} - \hat{k})$
2. $\frac{1}{\sqrt{6}}(\hat{i} - 2\hat{j} - \hat{k})$
3. $\frac{1}{\sqrt{3}}(\hat{i} + \hat{j} + \hat{k})$
4. $\frac{1}{\sqrt{6}}(\hat{i} + 2\hat{j} + \hat{k})$

[redacted]

[redacted]

The function $f(x) = 4 - 3x + 3x^2 - x^3$ is (Here $\mathbb{R}$ is the set of real numbers)

(1) decreasing on $\mathbb{R}$

(2) increasing on $\mathbb{R}$

(3) increasing on $(0, \infty)$

(4) neither increasing nor decreasing on $(-\infty, 0)$

[redacted]

The function $f(x) = x^3 + 3x^2 + 4x + 4, x \in \mathbb{R}$ (set of real numbers) :

1. is increasing on $\mathbb{R}$
2. is decreasing on $\mathbb{R}$
3. is decreasing on $(-\infty, 0)$
4. is neither increasing nor decreasing on $(0, \infty)$

[redacted]

[redacted]

Question: Which of the following is NOT correct about the Central Limit Theorem?

1. When the sample size increases, the mean of the sample of data becomes close to the mean of the overall population.
2. When the sample size increases, the sampling distribution of the mean approaches a normal distribution, regardless of the shape of the parent population.
3. A sample size of less than 30 is considered to be sufficient to hold the Central Limit Theorem.
4. A sample size of 30 or more is considered to be sufficient to hold the Central Limit Theorem.

[redacted]

[redacted]

[redacted]

[redacted]

The interval in which the function $g(x) = x^2 e^{-x}$ is increasing is:

1. $(-\infty, \infty)$
2. $(-2, 0)$
3. $(2, \infty)$
4. $(0, 2)$

[redacted]

The interval, on which the function $f(x) = x^2 e^{-x}$ is increasing, is equal to

1. $(-\infty, \infty)$
2. $(-\infty, 2) \cup (2, \infty)$
3. $(-2, 0)$
4. $(0, 2)$

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

A random variable X has the following probability distribution:

[redacted]

The variance of X will be

1. 4.8
2. 1.29
3. 5.1
4. 4.9

[redacted]

[redacted]

A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is four. The probability that it is actu

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

(2) $\frac{7}{8}$

(3) $\frac{3}{8}$

(4) $\frac{1}{8}$

[redacted]

Probability that a man speaks truth is $\frac{3}{4}$. He throws a die and reports that it is a six. The probability that it is actually a six is

1. $\frac{1}{3}$
2. $\frac{3}{8}$
3. $\frac{5}{8}$
4. $\frac{2}{3}$

[redacted]

[redacted]

The value of which of the following integrals is zero?

(A) $\int_0^1 x\,dx$

(B) $\int_{-1}^1 x\,dx$

(C) $\int_{-1}^1 x^2\,dx$

(D) $\int_0^1 \log\left(\frac{x}{1-x}\right) dx$

Choose the correct answer from the options given below:

1. (B) and (D) only
2. (A), (B) and (C) only
3. (B) only
4. (C) and (D) only

[redacted]

[redacted]

If $\int e^x \left(\frac{x-1}{(x+1)^3}\right) dx = \frac{Ae^x}{(x+1)^B} + C$, where C is constant of integration, then which of the following are correct?

(A) $A = -1$

(B) $A = 1$

(C) $B = 3$

(D) $B = 2$

Choose the correct answer from the options given below:

1. (A) and (C) only
2. (B) only
3. (B) and (D) only
4. (A) and (D) only

[redacted]

[redacted]

[redacted]

$$\int \frac{x^3-1}{x^2}\,dx \text{ is equal to}$$

1. $\frac{x^2}{2}+x+c,$ where c is constant of integration

2. $\frac{x^2}{2}-\frac{1}{x}+c,$ where c is constant of integration

3. $\frac{x^2}{2}-x+c,$ where c is constant of integration

4. $\frac{x^2}{2}+\frac{1}{x}+c,$ where c is constant of integration

[redacted]

The integral $I=\int e^x(\frac{x-1}{3x^2})dx$ is equal to

1. $\frac{1}{3}(\frac{x^2}{2}-x)+C$, where C is constant of integration

2. $(\frac{x^2}{2}-x)e^x+C$, where C is constant of integration

3. $\frac{1}{3x^2}e^x+C$, where C is constant of integration

4. $\frac{1}{3x}e^x+C$, where C is constant of integration

[redacted]

$$\int \frac{f'(x)}{f(x)\log_e[f(x)]}dx \text{ is equal to}$$

1. $f(x).\log_e[f(x)]+C : C$ is a constant of integration

2. $\frac{\log_e[f(x)]}{f(x)}+C : C$ is a constant of integration

3. $\log_e(\log_e[f(x)])+C : C$ is a constant of integration

4. $\frac{\log_e(\log_e[f(x)])}{f(x)}+C : C$ is a constant of integration

[redacted]

For $x > 1$, $\int \frac{e^{7\log x} - e^{5\log x}}{e^{5\log x} - e^{4\log x}} dx$ equals.

1. $\frac{x^3}{3} + \frac{x^2}{2} + C : C$ is a constant of integration

2. $\frac{x^3}{3} - \frac{x^2}{2} + C : C$ is a constant of integration

3. $\frac{x^3}{6} + \frac{x^2}{4} + C : C$ is a constant of integration

4. $\frac{x^3}{6} - \frac{x^2}{4} + C : C$ is a constant of integration

[redacted]

[redacted]

For the linear programming problem (LPP),

Maximize $Z = 4x + y$

Subject to:

$x + y \leq 5$

$3x + y \leq 9$

$x, y \geq 0$

Which of the following are \textbf{NOT} true?

(A) The given LPP has unbounded feasible region.
(B) The corner points of the feasible region are (0, 0), (0, 5), (3, 2) and (3, 0).
(C) The optimal value of the objective function is 12.
(D) The given LPP has a unique optimal solution.

Choose the \textbf{correct} answer from the options given below:

1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A) and (B) only
4. (C) and (D) only

[redacted]

Consider the linear programming problem (LPP):

Maximize $Z = 6x + 3y$

subject to the conditions

$4x + y \geq 80$

$x + 5y \geq 115$

$3x + 2y \leq 150$

$x \geq 0,\ y \geq 0$

In reference to the above LPP, which of the following are correct?

(A) The feasible region is bounded.

(B) The corner points of the feasible region are $(15, 20)$, $(40, 15)$ and $(0, 75)$.

(C) The maximum value of the objective function is 285.

(D) The LPP does not have optimal solution.

Choose the correct answer from the options given below:

1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A) and (C) only
4. (B) and (D) only

[redacted]

[redacted]

[redacted]

If $A = [a_{ij}]_{2\times2}$ where $a_{ij} = \begin{cases} 1, & i \neq j \\ 0, & i = j \end{cases}$ and I is the identity matrix of order 2, then $(A^2 - 3A + 4I)$ is:

(A) Symmetric Matrix

(B) Skew-symmetric Matrix

(C) Non-singular Matrix

(D) Square Matrix

Choose the **correct** answer from the options given below:

1. (B) and (D) only
2. (A), (B) and (C) only
3. (A), (C) and (D) only
4. (A) and (D) only

[redacted]

Let $A = [a_{ij}]$ be a square matrix, where $a_{ij} = \begin{cases} 0, & \text{when } i = j \\ 1, & \text{otherwise} \end{cases}$

If $|\text{adj } A| = |A|^2$, then which of the following statements are correct?

(A) A is a skew-symmetric matrix.

(B) A is a non-singular matrix.

(C) A is a square matrix of order 4.

(D) A is a symmetric matrix.

Choose the correct answer from the options given below:

1. (A), (B) and (C) only
2. (B) and (D) only
3. (A) and (C) only
4. (B), (C) and (D) only

[redacted]

If $A = [a_{ij}]_{3\times2}$, where $a_{ij} = i + j$, then

(A) A is a square matrix

(B) $a_{21} + a_{32} = 8$

(C) Number of elements in A is 6

(D) Transpose of A $= \begin{bmatrix} 2 & 3 \\ 3 & 4 \\ 4 & 5 \end{bmatrix}$

Choose the \textbf{correct} answer from the options given below:

1. (A) and (B) only
2. (B) and (C) only
3. (C) and (D) only
4. (A) and (D) only

[redacted]

[redacted]

If the probability of two successes is 9 times the probability of 3 successes in 3 trials of a binomial distribution, then the p

1. $\frac{1}{4}$
2. $\frac{1}{8}$
3. $\frac{3}{4}$
4. $\frac{1}{3}$

[redacted]

In 5 trials of binomial distribution, the probability of 3 successes is 4 times the probability of 2 successes.

The probability of success in each trial is:

1. $\frac{1}{5}$
2. $\frac{4}{5}$
3. $\frac{3}{4}$
4. $\frac{2}{3}$

[redacted]

[redacted]

[redacted]

If A and B are matrices of same order, then $(AB^{T} - BA^{T})$ is always

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

If A and B are two square symmetric matrices of same order, then AB-BA is

1. a symmetric matrix

2. a skew-symmetric matrix

3. neither a symmetric nor a skew-symmetric

4. always a diagonal matrix

[redacted]

If A and B are symmetric matrices of order 3×3 then the matrix $2AB - BA$ is:

1. a symmetric matrix
2. a skew-symmetric matrix
3. both symmetric and skew-symmetric matrix
4. neither symmetric nor skew-symmetric matrix

[redacted]

[redacted]

[redacted]

In which of the following intervals, the function $f(x) = -x^2 - 2x + 15$ is decreasing ?

1.$(-1, \infty)$

2.$(-\infty, -1)$

3.$(-\infty, 2)$

4.$(0, -1)$

[redacted]

In which of the following intervals, the function $f(x) = \frac{x}{\log x}$ is decreasing?

1. $(-\infty, e)$
2. $(0, e)$
3. $(0, e) - \{1\}$
4. (e, ∞)

[redacted]

[redacted]

Let A and B are square matrices of order 3 such that $A + B = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$. If A is a symmetric matrix, then the val

1. 0
2. 1
3. 3
4. 27

[redacted]

Let A be a square matrix of order 2 such that

$$\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} A \begin{bmatrix} -3 & 2 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Then A is:

1. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
2. $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$
3. $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$
4. $\begin{bmatrix} 1 & -1 \\ 1 & 0 \end{bmatrix}$

[redacted]

[redacted]

If a line makes angles α, β, γ with the positive directions of x-axis, y-axis, z-axis respectively, then the value of $\cos 2\alpha + \cos 2\beta + \cos 2\gamma$ is equal to

1. 1
2. -1
3. $\frac{1}{2}$
4. $-\frac{1}{2}$

[redacted]

If a line makes angles α, β and γ with positive x-axis, y-axis and z-axis respectively, then the value of

$$\sin^2\frac{\alpha}{2}\cos^2\frac{\alpha}{2} + \sin^2\frac{\beta}{2}\cos^2\frac{\beta}{2} + \sin^2\frac{\gamma}{2}\cos^2\frac{\gamma}{2} \text{ is}$$

1. 1
2. $\frac{1}{2}$
3. 2
4. $\frac{1}{4}$

[redacted]

[redacted]

If a line makes angles α, β and γ with the positive directions of coordinate axes respectively, then

$\cos 2\alpha + \cos 2\beta + \cos 2\gamma$ is equal to

1. 1
2. -1
3. 2
4. -2

[redacted]

If a line makes angles α, β, γ with the positive directions of the coordinate axes, then the value of $\cos 2\alpha + \cos 2\beta + \cos 2\gamma$ is

1. 1
2. 2
3. -1
4. -2

[redacted]

[redacted]

$$\int \frac{dx}{9x^2-16} \text{ is equal to}$$

1. $\frac{1}{24}\log_e\left|\frac{3x+4}{3x-4}\right|+C$, Where C is constant of integration
2. $\frac{3}{8}\log_e\left|\frac{3x+4}{3x-4}\right|+C$, Where C is constant of integration
3. $\frac{3}{8}\log_e\left|\frac{3x-4}{3x+4}\right|+C$, Where C is constant of integration
4. $\frac{1}{24}\log_e\left|\frac{3x-4}{3x+4}\right|+C$, Where C is constant of integration

[redacted]

[redacted]

For $x \in \left(0, \frac{\pi}{2}\right)$, $\int \frac{1}{\sin^2 x + \sin 2x} dx$ is equal to

1. $\frac{1}{2}\log\left|\frac{\tan x+2}{\tan x-2}\right|+C,$ where C is constant of integration
2. $\frac{1}{2}\log\left|\frac{\tan x}{\tan x+2}\right|+C,$ where C is constant of integration
3. $\frac{1}{2}\log\left|\frac{\tan x+2}{\tan x}\right|+C,$ where C is constant of integration
4. $\frac{1}{2}\log\left|\frac{\tan x+1}{\tan x+2}\right|+C,$ where C is constant of integration

[redacted]

[redacted]

Let the matrix $A = [a_{ij}]_{3\times3}$ be defined by

$$a_{ij} = \begin{cases} 2i+3j, & i<j \\ 5, & i=j \\ 3i-2j, & i>j \end{cases}$$

The number of elements in the matrix A which are greater than 7, is:

1. 2
2. 3
3. 4
4. 5

[redacted]

Let $A = [a_{ij}]_{3\times3}$ be a matrix, defined by $a_{ij} = \begin{cases} 2i+3j & , i<j \\ 6 & , i=j \\ 3i-2j & , i>j \end{cases}$. The number of elements in A which are greater than 6, is

1. 6
2. 5
3. 4
4. 3

[redacted]

[redacted]

Let $\vec{a}=\hat{i}+\hat{j}, \vec{b}=\hat{i}-\hat{j}$ and $\vec{c}=\hat{i}+\hat{j}+\hat{k}$. If $\hat{m}$ is a unit vector perpendicular to both $\vec{a}$ and $\vec{b}$, then $|\vec{c}\cdot\hat{m}|$ is equal to

1. 4
2. 2
3. 0
4. 1

[redacted]

Let $\vec{a}=\hat{i}+4\hat{j}, \vec{b}=4\hat{j}+\hat{k}$ and $\vec{c}=\hat{i}-2\hat{k}$. If $\vec{d}$ is a vector perpendicular to both $\vec{a}$ and $\vec{b}$ such that $\vec{c}\cdot\vec{d}=16,$ then $|\vec{d}|$ is equal to

1. $\sqrt{33}$
2. $2\sqrt{33}$
3. $3\sqrt{33}$
4. $4\sqrt{33}$

[redacted]

Let $\vec{a}=2\hat{i}-\hat{j}, \vec{b}=-4\hat{j}+\hat{k}$ and $\vec{c}=\hat{i}+2\hat{k}$. If $\vec{d}$ is a vector perpendicular to both $\vec{a}$ and $\vec{b}$ such that $\vec{c}\cdot\vec{d}=34,$ then $|\vec{d}|$ is equal to

1. $\sqrt{69}$
2. $2\sqrt{69}$
3. $3\sqrt{69}$
4. $4\sqrt{69}$

[redacted]

[redacted]

If a person A speaks the truth in 80% cases and the person B speaks the truth in 75% cases, then the probability that they contradict each other in a statement is

1. $\frac{2}{5}$
2. $\frac{13}{20}$
3. $\frac{3}{5}$
4. $\frac{7}{20}$

[redacted]

If A speaks truth in 75\% cases and B speaks truth in 80\% cases, then the probability that they contradict each other in a statement, is:

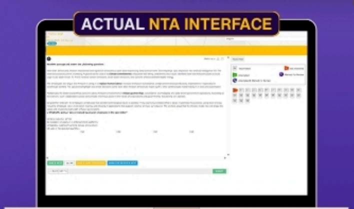
1. $\frac{13}{20}$
2. $\frac{11}{20}$
3. $\frac{7}{20}$
4. $\frac{9}{20}$

[redacted]

'A' speaks the truth in 80\% of the cases while 'B' in 90\% of the cases. The probability that they contradict each other in stating the same statement is

1. $\frac{37}{50}$
2. $\frac{13}{50}$
3. $\frac{18}{25}$
4. $\frac{9}{25}$

[redacted]



[redacted]

Consider the function $f(x) = \sin x$ in the interval $[\pi, 2\pi]$, then which of the following statements are correct?

(A) $x = \frac{3\pi}{2}$ is its stationary point.

(B) Its maximum value is 1

(C) Its minimum value is -1

(D) It attains its maximum value at π and 2π

Choose the correct answer from the options given below:

1. (A), (B) and (D) only
2. (A) and (C) only
3. (A), (C) and (D) only
4. (B), (C) and (D) only

[redacted]

For the function, $f(x) = \frac{-3}{4}x^4 - 8x^3 - \frac{45}{2}x^2 - 350$, which of the following statements are correct?

(A) x = -3 and x = -5 are the only critical points of the given function.

(B) x = -3 is a point of local minimum.

(C) The local minimum value at x = -3 is 231.

(D) x = -5 is a point of local maximum.

Choose the correct answer from the options given below:

1. (A), (B) and (D) only
2. (B) and (D) only
3. (C) and (D) only
4. (A), (B) and (C) only

[redacted]

Consider $f(x) = \sin(3x) + 4,\ \forall x \in \mathbb{R}$

(A) Maximum value of $f(x)$ is 5

(B) Minimum value of $f(x)$ is 3

(C) Maximum value of $f(x)$ is attained at $x = \frac{\pi}{3}$

(D) Minimum value of $f(x)$ is attained at $x = 0$

Choose the correct answer from the options given below:

1. (A), (B) and (C) only

2. (A), (B) and (D) only

3. (C) and (D) only

4. (B) and (D) only

[redacted]

[redacted]

[redacted]

If $\hat{a}$ is a unit vector perpendicular to both the vectors $\vec{b} = \hat{j} + 2\hat{k}$ and $\vec{c} = \hat{i} + 2\hat{j},$ then $\hat{a}$ is equal to

1. $\dfrac{-4\hat{i} + 2\hat{j} + \hat{k}}{\sqrt{21}}$

2. $\dfrac{4\hat{i} + 2\hat{j} - \hat{k}}{\sqrt{21}}$

3. $\dfrac{-4\hat{i} + 2\hat{j} - \hat{k}}{\sqrt{21}}$

4. $\dfrac{-4\hat{i} - 2\hat{j} - \hat{k}}{\sqrt{21}}$

[redacted]

A unit vector perpendicular to the vectors $\hat{i} - \hat{j}$ and $\hat{i} + \hat{j}$ is

1. $\hat{k}$

2. $-\left(\dfrac{\hat{i} + \hat{j}}{\sqrt{2}}\right)$

3. $\dfrac{\hat{i} - \hat{j}}{\sqrt{2}}$

4. $\dfrac{\hat{i} + \hat{j}}{\sqrt{2}}$

[redacted]

[redacted]

The solution of the differential equation $\log_e\left(\frac{dy}{dx}\right) = 3x + 4y$ is given by

1. $4e^{3x} + 3e^{-4y} + C = 0,$ where C is constant of integration

2. $3e^{3x} + 4e^{-4y} + C = 0,$ where C is constant of integration

3. $4e^{-3x} + 3e^{4y} + C = 0,$ where C is constant of integration

4. $3e^{-3x} + 4e^{4y} + C = 0,$ where C is constant of integration

[redacted]

[redacted]

The particular solution of the differential equation \[$log\left(\frac{dy}{dx}\right) = 3x + 4y$ satisfying $y = 0$ when $x = 0$ is:

1. $3e^{3x} + 4e^{-4y} + 7 = 0$
2. $3e^{3x} - 4e^{-4y} - 7 = 0$
3. $4e^{3x} + 3e^{-4y} - 7 = 0$
4. $4e^{3x} - 3e^{-4y} + 7 = 0$

[redacted]

[redacted]

[redacted]

Let A $= [a_{ij}]_{n\times n}$ be a matrix. Then

[redacted]

List-I	List-II
(A) $A^T = A$	(I) A is a singular matrix
(B) $A^T = -A$	(II) A is a non-singular matrix
(C) $\|A\| = 0$	(III) A is a skew symmetric matrix
(D) $\|A\| \neq 0$	(IV) A is a symmetric matrix

[redacted]

1. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
2. (A) - (IV), (B) - (III), (C) - (I), (D) - (II)
3. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
4. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)

[redacted]

Let $A = [a_{ij}]_{n\times n}$ be a matrix, then match \textbf{List-I} with \textbf{List-II}

\textbf{List-I}	\textbf{List-II}
(A) $\|A\| = 0$	(I) A is a symmetric matrix
(B) $\|A\| \neq 0$	(II) A is a skew-symmetric matrix
(C) $A^T = A$	(III) A is a singular matrix
(D) $A^T = -A$	(IV) A is a non-singular matrix

Choose the \textbf{correct} answer from the options given below:

1. (A) - (IV), (B) - (III), (C) - (I), (D) - (II)
2. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
3. (A) - (III), (B) - (I), (C) - (IV), (D) - (II)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

[redacted]

[redacted]

If A is a square matrix and I is the identity matrix of same order such that $A^2 = I,$ then $(A - I)^3 + (A + I)^3 - 3A$ is equ

1. A
2. 2A
3. 3A
4. 5A

[redacted]

[redacted]

If A is a square matrix such that $A^2 = A$ and I is the identity matrix of same order as $A,$ then the matrix $(2I + A)^3 - 19A - 3I$ is equal

1. $5I$
2. $5A$
3. $7I$
4. $7A$

[redacted]

[redacted]

If A is a square matrix such that $A^2 = A$ and I is the identity matrix of same order as $A,$ then the value of

$(A - 2I)^2 - (2A + I)^2 + 11A$ is:

1. I
2. $2I$
3. $3I$
4. $-I$

[redacted]

[redacted]

If the maximum value of the function $f(x) = \frac{\log_e x}{x}, x > 0$ occurs at $x = a$, then $a^2 f''(a)$ is equal to

1. $-\frac{5}{e}$

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

3. $-\frac{1}{e^3}$

4. $-5e^3$

[redacted]

If the maximum value of the function $f(x) = \frac{2\log_e x}{x}, x > 0$ occurs at $x = e$, then $e^3 f''(e)$ is equal to

1. -2

2. $-\frac{2}{e}$

3. $-e$

4. $-5e^3$

[redacted]

[redacted]

If a line makes angles α, β, γ with the positive directions of x-axis, y-axis and z-axis respectively, then $\sin^2\alpha + \sin^2\beta + \sin^2\gamma$ is equal to

1. 1
2. 2
3. 3
4. -2

[redacted]

If a line makes angles α, β and γ with the positive directions of x-axis, y-axis and z-axis respectively, then $\sin^2\alpha + \sin^2\beta + \sin^2\gamma$ is equal to

1. -2
2. 1
3. 2
4. 3

[redacted]

[redacted]

Let $A = \begin{bmatrix} 1 & 2 & 1 \\ -1 & 3 & 2 \\ 2 & 4 & 1 \end{bmatrix}$ and M_{ij}, A_{ij} respectively denote the minor, co-factor of an element a_{ij} of matrix A, then which of the following are true?

(A) $M_{22} = -1$

(B) $A_{23} = 0$

(C) $A_{32} = 3$

(D) $M_{23} = 1$

(E) $M_{32} = -3$

[redacted]

1. (A) and (B) only
2. (A), (B), (C) and (E) only
3. (A), (D) and (E) only
4. (A), (C) and (E) only

[redacted]

Let M_{ij} and A_{ij} denote respectively minors and co-factors of the element in the ith row and jth column of the matrix

$$A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 2 & 3 \\ 4 & -1 & 0 \end{bmatrix}. \text{ Then}$$

$(A)\ M_{32} = 6$

$(B)\ M_{23} = 9$

$(C)\ A_{32} = -6$

$(D)\ A_{23} = -9$

Choose the correct answer from the options given below:

1. (A) and (C) only
2. (A), (C) and (D) only
3. (B) and (D) only
4. (A) and (D) only

[redacted]

[redacted]

Let the matrix $\mathbf{A} = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$. Then which of the following are true?

(A) $\text{adj}\mathbf{A} = \begin{bmatrix} 4 & -3 \\ -1 & 2 \end{bmatrix}$

(B) $\det(\mathbf{A}) = 5$

(C) $\det(\text{adj}\mathbf{A}) = 25$

(D) If $\mathbf{A}^3 = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then $a + b = c + d$

Choose the correct answer from the options given below:

1. (A) and (D) only
2. (A), (B) and (C) only
3. (B) and (D) only
4. (A), (B) and (D) only

[redacted]

Let $A = \begin{bmatrix} 2 & -1 & 3 \\ 1 & 2 & -1 \\ 4 & 1 & 2 \end{bmatrix}$. M_{ij} and A_{ij} respectively denote the minor and cofactor of an element a_{ij} of matrix $A = [a_{ij}]$.

(A) $M_{23} = 6$

(B) $A_{22} = -8$

(C) $A_{13} = 7$

(D) $M_{32} = -5$

Choose the \textbf{correct} answer from the options given below:

1. (A), (C) and (D) only
2. (B) and (D) only
3. (C) and (D) only
4. (A), (B) and (D) only

[redacted]

[redacted]

Let $y=\sin(\cos x^2)$, then the value of $\frac{dy}{dx}$ at $x=\frac{\sqrt{\pi}}{2}$ is equal to

1. $-\frac{\sqrt{\pi}}{2}\cos\left(\frac{1}{\sqrt{2}}\right)$

2. $-\sqrt{\frac{\pi}{2}}\cos\left(\frac{1}{\sqrt{2}}\right)$

3. $-\sqrt{\frac{\pi}{2}}\sin\left(\frac{1}{\sqrt{2}}\right)$

4. $\sqrt{\frac{\pi}{2}}\sin\left(\frac{1}{\sqrt{2}}\right)$

[redacted]

If $x=a\sin 2t(1+\cos 2t)$ and $y=b\cos 2t(1-\cos 2t)$, then $\left(\frac{dy}{dx}\right)_{x=\frac{\pi}{4}}$ is equal to

1. ab
2. $\frac{b}{a}$
3. $\frac{a}{b}$
4. $\frac{1}{ab}$

[redacted]

[redacted]

Let $y=\cos(\sin x^2)$, then the value of $\frac{dy}{dx}$ at $x=\frac{\sqrt{\pi}}{2}$ is equal to

1. $-\sqrt{\frac{\pi}{2}}\sin\left(\frac{1}{\sqrt{2}}\right)$
2. $-\frac{\sqrt{\pi}}{2}\sin\left(\frac{1}{\sqrt{2}}\right)$
3. $-\sqrt{\frac{\pi}{2}}\cos\left(\frac{1}{\sqrt{2}}\right)$
4. $\sqrt{\frac{\pi}{2}}\cos\left(\frac{1}{\sqrt{2}}\right)$

[redacted]

[redacted]

List-I	List-II
(A) The minimum value of $f(x) = (2x-1)^2 + 3$	(I) 4
(B) The maximum value of $f(x) = -\|x+1\| + 4$	(II) 10
(C) The minimum value of $f(x) = \sin(2x) + 6$	(III) 3
(D) The maximum value of $f(x) = -(x-1)^2 + 10$	(IV) 5

[redacted]

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (III), (B) - (II), (C) - (I), (D) - (IV)
3. (A) - (III), (B) - (I), (C) - (IV), (D) - (II)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

[redacted]

Match \textbf{List-I} with \textbf{List-II}

\textbf{List-I}	\textbf{List-II}
(A) The maximum value of $f(x) = \sin(3x) + 6$	(I) 2
(B) The maximum value of $f(x) = -\|x+2\| + 4$	(II) 5
(C) The minimum value of $f(x) = (3x+1)^2 + 5$	(III) 7
(D) The minimum value of $f(x) = 2\cos x + 4$	(IV) 4

Choose the \textbf{correct} answer from the options given below:

1. (A) - (IV), (B) - (III), (C) - (I), (D) - (II)
2. (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
3. (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
4. (A) - (III), (B) - (II), (C) - (I), (D) - (IV)

[redacted]

[redacted]

If A is square matrix of order 3×3 and $|\text{adj } A| = 64,$ then the value of $|5A|$ is

1. 100

2. ± 1000

3. 320

4. ± 320

[redacted]

If A is a 3×3 matrix such that $|\text{adj } A| = 9$ and $|kA^{-1}| = 9,$ then the value of k are:

1. ± 1

2. $\pm \frac{1}{3}$

3. ± 3

4. $\pm \frac{1}{9}$

[redacted]

[redacted]

[redacted]

$\begin{bmatrix} 2 & 1 \\ 0 & -1 \end{bmatrix}$ [redacted]

[redacted]

$\begin{bmatrix} 0 & 1 \\ 4 & -1 \end{bmatrix}$ [redacted]

[redacted]

$\begin{bmatrix} 1 & 2 \\ -3 & -1 \end{bmatrix}$ [redacted]

[redacted]

$\begin{bmatrix} 4 & -2 \\ 3 & 0 \end{bmatrix}$ [redacted]

Match List-I with List-II

Choose the correct answer from the options given below:

1. (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
2. (A)-(I), (B)-(II), (C)-(IV), (D)-(III)
3. (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
4. (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

[redacted]

Question: Match the Matrix in List-I with its Adjoint's Determinant in List-II.

List-I (Matrix A):

[redacted]

$(A)\ \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$ [redacted]

$(B)\ \begin{bmatrix} 5 & -1 \\ 4 & 2 \end{bmatrix}$ [redacted]

$(C)\ \begin{bmatrix} 6 & -1 \\ 2 & 1 \end{bmatrix}$ [redacted]

$(D)\ \begin{bmatrix} 4 & 1 \\ 3 & 3 \end{bmatrix}$ [redacted]

Choose the correct answer from the options given below:

1. (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

2. (A)-(II), (B)-(IV), (C)-(I), (D)-(III)

3. (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

4. (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

[redacted]

[redacted]

If $A = [a_{ij}]$ is a square matrix of order 3 such that $a_{ij} = i + j$ for all i, j, then which of the following are correct?

(A) A is a skew-symmetric matrix.

(B) A is a non-singular matrix.

(C) The inverse of A does not exist.

(D) A is a symmetric matrix.

Choose the correct answer from the options given below:

1. (A), (B) and (C) only
2. (B) and (D) only
3. (A) and (C) only
4. (C) and (D) only

[redacted]

Which of the following are correct?

(A) If A and B are symmetric matrices such that $AB = BA$, then AB is symmetric.

(B) If A and B are symmetric matrices of the same order, then $(A + B)$ is a symmetric matrix.

(C) If A and B are symmetric matrices of the same order, then $(AB - BA)$ is a symmetric matrix.

(D) If A and B are symmetric matrices of the same order, then $(AB + BA)$ is a skew-symmetric matrix.

Choose the correct answer from the options given below:

1. (A) and (B) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (C) and (D) only

[redacted]

[redacted]

Match \textbf{List-I} with \textbf{List-II}

[.] denotes the greatest integer function.

List-I	List-II
(A) $\int_0^3 [x]dx$	(I) $\frac{1}{2}$
(B) $\int_0^1 [2x]dx$	(II) 1
(C) $\int_0^1 [3x]dx$	(III) $\frac{3}{2}$
(D) $\int_0^1 [4x]dx$	(IV) 3

Choose the \textbf{correct} answer from the options given below:

1. (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
2. (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
3. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)
4. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

[redacted]

Match \textbf{List-I} with \textbf{List-II}

\textbf{List-I}	\textbf{List-II}
(A) $\int_{-a}^{a} f(x)dx = 0$	(I) 0
(B) $\int_0^{2a} f(x)dx = 2\int_0^a f(x)dx$	(II) 1
(C) $\int_{-\pi}^{\pi} \cos x dx$	(III) f is an odd function
(D) $\int_{-1}^{1} x^{101} dx + 1$	(IV) $f(2a - x) = f(x)$

Choose the \textbf{correct} answer from the options given below:

1. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

2. (A) - (III), (B) - (IV), (C) - (II), (D) - (I)

3. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)

4. (A) - (IV), (B) - (III), (C) - (I), (D) - (II)

[redacted]

[redacted]

The interval on which the function $f(x) = x^4 - \frac{x^3}{3}$ is strictly decreasing, is:

1. $(4, \infty)$
2. $(\frac{1}{4}, \infty)$
3. $(-\infty, \frac{1}{4})$
4. $(0, \frac{1}{4})$

[redacted]

The interval on which the function $f(x) = x^3 + 2x^2 - 1$ is decreasing, is

1. $(-\infty, -4/3)$
2. $[0, \infty)$
3. $[-4/3, 0]$
4. $[-4/3, \infty)$

[redacted]

[redacted]

The function $f(x) = x^2 - 4x + 6$ is

(A) Strictly decreasing on $(-\infty, 2) \cup (2, \infty)$

(B) Strictly increasing on $(2, \infty)$

(C) Strictly increasing on $(-\infty, \infty)$

(D) Strictly decreasing on $(-\infty, 2)$

Choose the correct answer from the options given below:

1. (A) and (B) only
2. (B) and (D) only
3. (A), (B) and (C) only
4. (C) and (D) only

[redacted]

[redacted]

Function $f(x) = x^3 - 3x + 3$ is

(A) Increasing in the interval $(-1, 1)$

(B) Increasing in the interval $(1, \infty)$

(C) Decreasing in the interval $(-1, 1)$

(D) Increasing in the interval $(-\infty, -1) \cup (1, \infty)$

Choose the \textbf{correct} answer from the options given below:

1. (A), (C) and (D) only

2. (B), (C) and (D) only

3. (A) and (B) only

4. (A), (B) and (D) only

[redacted]

[redacted]

[redacted]

If the function defined by $f(x) = \begin{cases} kx^2 + 1, & \text{if } x \leq 1 \\ 2, & \text{if } x > 1 \end{cases}$ is continuous at $x = 1,$ then k is equal to

1. 2
2. 3
3. -1
4. 1

[redacted]

[redacted]

For what value of $\alpha,$ the function f defined by $f(x) = \begin{cases} \alpha(x^2 - 2x + 1), & \text{if } x \leq 0 \\ 2x + 1, & \text{if } x > 0 \end{cases}$ is continuous at $x = 0$?

1. $\alpha = 1$
2. $\alpha = 2$
3. $\alpha = -1$
4. $\alpha = 0$

[redacted]

[redacted]

[redacted]

For the principal value branch, the value of $\sin\left(\frac{\pi}{2} - \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right)$ is

1. $\frac{1}{\sqrt{2}}$
2. $\frac{\sqrt{3}}{2}$
3. $\frac{1}{2}$
4. $-\frac{\sqrt{3}}{2}$

[redacted]

[redacted]

$$\sin^{-1}\left(\cos\frac{3\pi}{5}\right) \text{ equals}$$

1. $\frac{3\pi}{5}$
2. $-\frac{\pi}{10}$
3. $\frac{\pi}{10}$
4. $-\frac{3\pi}{10}$

[redacted]

[redacted]

If a matrix has 12 elements, then the possible orders it can have, are

(A) 1×12

(B) 4×3

(C) 6×3

(D) 6×2

Choose the correct answer from the options given below:

1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (B), (C) and (D) only
4. (C) and (D) only

[redacted]

[redacted]

If a matrix has 8 elements then the possible order(s) it may have

(A) 8×1

(B) 5×3

(C) 6×2

(D) 2×4

Choose the \textbf{correct} answer from the options given below:

1. (A) and (D) only
2. (B) and (C) only
3. (A) only
4. (A), (B), (C) and (D)

[redacted]

[redacted]

If $\vec{a}$ is a non-zero vector, then always

1. $\vec{a} \cdot \vec{a} = 0$
2. $\vec{a} \cdot \vec{a} > 0$
3. $\vec{a} \cdot \vec{a} < 0$
4. $\vec{a} \cdot \vec{a} = 1$

[redacted]

If $\vec{a} \cdot \vec{b} = \vec{a} \cdot \vec{c},\ \vec{a} \times \vec{b} = \vec{a} \times \vec{c}$ and $\vec{a} \neq \vec{0},$ then the vector $\vec{b}$ is equal to:

1. $\vec{0}$
2. $\vec{c}$
3. $\vec{a}$
4. $(\vec{a} + \vec{c})$

[redacted]

[redacted]

[redacted]

Match \textbf{List-I} with \textbf{List-II}

[redacted]

List-I	List-II
Inverse Trigonometric function	Principal values of arguments
(A) $\sin^{-1}\left(-\frac{1}{2}\right)$	(I) $-\frac{\pi}{3}$
(B) $\cos^{-1}\left(-\frac{1}{2}\right)$	(II) $\frac{3\pi}{4}$
(C) $\tan^{-1}(-\sqrt{3})$	(III) $-\frac{\pi}{6}$
(D) $\sec^{-1}(-\sqrt{2})$	(IV) $\frac{2\pi}{3}$

[redacted]

Choose the correct answer from the options given below:

1. $(A)-(III)$, $(B)-(IV)$, $(C)-(I)$, $(D)-(II)$
2. $(A)-(III)$, $(B)-(IV)$, $(C)-(II)$, $(D)-(I)$
3. $(A)-(IV)$, $(B)-(III)$, $(C)-(II)$, $(D)-(I)$
4. $(A)-(IV)$, $(B)-(III)$, $(C)-(I)$, $(D)-(II)$

[redacted]

[redacted]

Match List-I with List-II

[redacted]

List-I	List-II
(Inverse Trigonometric Function)	(Principal Value)
(A) $\sin^{-1}\left(-\frac{1}{2}\right)$	(I) $\pi/6$
(B) $\cos^{-1}\left(-\frac{1}{2}\right)$	[redacted] (II) $-\pi/6$
(C) $\tan^{-1}(-\sqrt{3})$	(III) $2\pi/3$
(D) $\cot^{-1}(\sqrt{3})$	(IV) $-\pi/3$

Choose the correct answer from the options given below:

1. (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
2. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
3. (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

[redacted]

[redacted]

A letter is known to have come either from KOLKATA or TATANAGAR. On the envelope just two consecutive letters are visible. The probability that letter has come from TATANAGAR is

1. $\frac{2}{5}$
2. $\frac{3}{5}$
3. $\frac{1}{4}$
4. $\frac{2}{3}$

[redacted]

A letter is known to have come from either TATAPUR or from CHAKRATA. On the envelope, only two letters "TA" are visible consecutively. The probability that the letter has come from CHAKRATA is:

1. $\frac{1}{10}$
2. $\frac{3}{10}$
3. $\frac{1}{7}$
4. $\frac{1}{3}$

[redacted]

[redacted]

Match \textbf{List-I} with \textbf{List-II}

List-I	List-II
(A) $\cos^{-1} x + \cos^{-1}(-x)$	(I) $\frac{\pi}{3}$
(B) $\text{cosec}^{-1}(-x) + \sec^{-1}(-x)$	(II) $-\frac{\pi}{3}$
(C) $\tan^{-1}\sqrt{3} - \sec^{-1}(-2)$	(III) π
(D) $\tan^{-1}\left(\tan \frac{4\pi}{3}\right)$	(IV) $\frac{\pi}{2}$

Choose the \textbf{correct} answer from the options given below:

1. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
2. (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
3. (A) - (III), (B) - (II), (C) - (IV), (D) - (I)
4. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)

[redacted]

Arrange the principal values of the following functions in ascending order

(A) $\text{cosec}^{-1}(2)$

(B) $\tan^{-1}(-\sqrt{3})$

(C) $\tan^{-1}(1)$

(D) $\tan^{-1}\left(\cos \frac{3\pi}{2}\right)$

Choose the \textbf{correct} answer from the options given below:

1. (A), (B), (C), (D)
2. (A), (D), (B), (C)
3. (B), (D), (A), (C)
4. (D), (A), (B), (C)

[redacted]

[redacted]

The corner points of the bounded feasible region determined by the system of linear constraints are $(0,0)$, $(5,0)$, $(6,5)$, $(6,8)$, $(4,10)$, $(0,8)$. Let $Z = 3x - 4y$ be the objective function. The minimum value of Z occurs at

1. $(0,0)$
2. $(5,0)$
3. $(0,8)$
4. $(4,10)$

[redacted]

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1. $(0,0)$
2. $(0,8)$
3. $(5,0)$
4. $(4,10)$

[redacted]

[redacted]

[redacted]

If A and B are symmetric matrices of same order, then which of the following are correct?

(A) AB-BA is a skew-symmetric matrix.

(B) AB+BA is a skew-symmetric matrix.

(C) $AB^T - BA^T$ is a skew-symmetric matrix.

(D) AB+BA is a symmetric matrix.

Choose the \textbf{correct} answer from the options given below:

1. (A), (C) and (D) only
2. (A), (B) and (C) only
3. (C) and (D) only
4. (A) and (D) only

[redacted]

If A and B are symmetric matrices of the same order, then which of the following are true?

(A) $AB - BA$ is a skew symmetric matrix

(B) AB is a symmetric matrix

(C) AB is a scalar matrix

(D) $AB + BA$ is a symmetric matrix

Choose the correct answer from the options given below:

1. (A), (B) and (C) only
2. (A) and (D) only
3. (C) and (D) only
4. (B), (C) and (D) only

[redacted]

[redacted]

The area (in square units) bounded by the curve $y = \cos x$ between $x = 0$ and $x = 2\pi$ in first quadrant is equal to:

1. 4

2. 2

3. 1

4. 3

[redacted]

The area (in sq. units) bounded by the curve $y = \cos x$ and x-axis between $x = 0$ and $x = \frac{3\pi}{2}$ is

1. 1
2. 2
3. 3
4. 4

[redacted]

[redacted]

Let $\mathbf{A}$ be any square matrix of order n, then which of the following are true?

(A) $|\text{adj}\mathbf{A}| = |\mathbf{A}|^{n-1}$

(B) $|\mathbf{A}^{-1}| = \dfrac{1}{|\mathbf{A}|}$

(C) $|\text{adj}\mathbf{A}| = |\mathbf{A}|^{n}$

(D) $(\mathbf{A}^{\mathrm{T}})^{-1} = (\mathbf{A}^{-1})^{\mathrm{T}}$

Choose the correct answer from the options given below:

1. (A) and (B) only
2. (A), (B) and (D) only
3. (C) and (D) only
4. (B), (C) and (D) only

[redacted]

Let A be a square matrix of order n, then which of the following are TRUE?

(A) $|\text{adj } A| = |A|^{n-1}$

(B) $|A.\,\text{adj } A| = |A|^{n}$

(C) $A.\,(\text{adj } A) = |A|$

(D) $|KA| = K|A|$

(E) $|A^{-1}| = \dfrac{1}{|A|}, |A| \neq 0$

Choose the \textbf{correct} answer from the options given below:

1. (A), (B) and (E) only
2. (A), (B), (C) and (E) only
3. (B), (C) and (D) only
4. (C), (D) and (E) only

[redacted]

[redacted]

Bag I contains 3 black and 2 white balls, Bag II contains 2 black and 4 white balls. A bag is selected at random

and then a ball is drawn from it. The probability that the ball drawn is black is:

1. $\frac{7}{15}$
2. $\frac{11}{15}$
3. $\frac{14}{15}$
4. $\frac{13}{15}$

[redacted]

[redacted]

Let box I contains 3 black and 4 white balls, box II contains 2 black and 2 white balls, box III contains 4 black and 3 white balls. A box is selected at random and then a ball is randomly drawn from the selected box. If the color of the ball is black, then the probability that the ball is drawn from box III, is:

1. $\frac{1}{7}$
2. $\frac{4}{21}$
3. $\frac{8}{21}$
4. $\frac{9}{21}$

[redacted]

[redacted]

[redacted]

The value of $\cot\left(\cos^{-1}\frac{7}{25}\right)$ is

1. $\frac{25}{24}$

2. $\frac{24}{25}$

3. $\frac{7}{25}$

4. $\frac{7}{24}$

[redacted]

[redacted]

The value of $\cos\left(2\cos^{-1}x+\sin^{-1}x\right)$ at $x=\frac{1}{5}$ is

1. $\sqrt{\frac{25}{24}}$

2. $-\sqrt{\frac{24}{25}}$

3. $\sqrt{\frac{24}{25}}$

4. $-\sqrt{\frac{25}{24}}$

[redacted]

[redacted]

[redacted]

The function $f(x) = \frac{x}{3} + \frac{3}{x}$ is increasing in the interval:

1. $(-\infty, -3) \cup (3, \infty)$
2. $(-3, 0) \cup (0, 3)$
3. $(-\infty, \infty)$
4. $(0, \infty)$

[redacted]

[redacted]

The function, $f(x) = x - \frac{1}{x}$ is

1. increasing for all $x \in (-\infty, 0) \cup (0, \infty)$
2. decreasing for all $x \in (-\infty, 0) \cup (0, \infty)$
3. increasing for all $x \in (-\infty, \infty)$
4. neither increasing nor decreasing for $x \in (-\infty, \infty)$

[redacted]
