Determinants - Class XII

Related Questions with Solutions

Questions

Quetion: 01

A 3×3 square matrix $M = [a_{ij}]$ is taken, where value of each element is determined as $a_{ij} = i \times j$, then the largest value of the minors of given elements is

A. -1
B. 0
C. 1
D. 4

Quetion: 02

The value of $\begin{vmatrix} 1 & 2 & 3 \\ -4 & 3 & 6 \\ 2 & -7 & 9 \end{vmatrix}$ is

A. 213
B. -231
C. 231
D. 39

Quetion: 03

Let $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then $|2A|$ is equal to

A. $4\cos 2\theta$
B. 1
C. 2
D. 4

Quetion: 04

The value of the determinant $\begin{vmatrix} 1 & \log_b a \\ \log_a b & 1 \end{vmatrix}$ is equal to

A. 1
B. $\log_a b$
C. $\log_b a$
D. 0

Quetion: 05

If $\begin{vmatrix} e^x & \sin x \\ \cos x & \ln(1+x) \end{vmatrix} = A + Bx + Cx^2 + \ldots\ldots$, then find the value of $A + B$.

A. 2
B. -1
C. 0
D. -2

Solutions

Solution: 01

Clearly, $M = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 9 \end{bmatrix}$

Since minor of each element is 0, therefore largest value of the minors is 0.

Solution: 02

$$\begin{vmatrix} 1 & 2 & 3 \\ -4 & 3 & 6 \\ 2 & -7 & 9 \end{vmatrix} = 1\begin{vmatrix} 3 & 6 \\ -7 & 9 \end{vmatrix} - 2\begin{vmatrix} -4 & 6 \\ 2 & 9 \end{vmatrix} + 3\begin{vmatrix} -4 & 3 \\ 2 & -7 \end{vmatrix}$$

= [27 + 42] – 2[–36 – 12] + 3[28 – 6] = 231

Solution: 03

$|A| = \cos^2\theta + \sin^2\theta = 1, |2A| = 2^2 \cdot |A| = 4$

Solution: 04

$\Delta = 1.1 - \log_b a \times \log_a b$

= 1 – 1 = 0

Solution: 05

Given: $\begin{vmatrix} e^x & \sin x \\ \cos x & ln(1+x) \end{vmatrix} = A + Bx + Cx^2 + \ldots\ldots$

$\Rightarrow e^x \cdot \ln(1+x) - \cos x \cdot \sin x = A + Bx + Cx^2 + \ldots\ldots$

$\Rightarrow (1 + x + \ldots)\left(x - \dfrac{x^2}{2} + \ldots\right) - \dfrac{1}{2}\sin 2x = A + Bx + Cx^2 + \ldots$

$\Rightarrow (1 + x + \ldots)\left(x - \dfrac{x^2}{2} + \ldots\right) - \dfrac{1}{2}\left(2x - \dfrac{(2x)^3}{3!} + \ldots\right) =$

$A + Bx + Cx^2 \ldots$

On comparing constant term, $A = 0$ On comparing coefficient of x, $B = 0$

Correct Options

Answer:01
Correct Options: B
Answer:02
Correct Options: C
Answer:03
Correct Options: D
Answer:04
Correct Options: D
Answer:05
Correct Options: C