Choose the correct answer :

Question ID: 481221

If $\Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$ and A_{ij} is co-factor of a_{ij}, then value of Δ is equal to

(A) $a_{11}A_{31} + a_{12}A_{32} + a_{13}A_{33}$

(B) $a_{11}A_{11} + a_{12}A_{21} + a_{13}A_{31}$

(C) $a_{21}A_{11} + a_{22}A_{12} + a_{23}A_{13}$

(D) $a_{11}A_{11} + a_{21}A_{21} + a_{31}A_{31}$

Answer (D)

Sol. $\Delta = a_{11}A_{11} + a_{21}A_{21} + a_{31}A_{31}$

Question ID: 481222

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

(A) 6

(B) 12

(C) 18

(D) 2

Answer (B)

Sol. $y = 0$ and $3x = 6$

So, $6x + y = 12$

Question ID: 481223

If $\begin{vmatrix} 3 & -4 \\ 2 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 5 \\ 1 & x \end{vmatrix}$ then $|x|$ is equal to

(A) $\sqrt{\frac{5}{2}}$ (B) 4

(C) $2\sqrt{2}$ (D) 2

Answer (C)

Sol. $\begin{vmatrix} 3 & -4 \\ 2 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 5 \\ 1 & x \end{vmatrix}$

$\Rightarrow \quad 11 = 2x^2 - 5$

$\Rightarrow \quad x^2 = 8$

$\Rightarrow \quad |x| = 2\sqrt{2}$

Question ID: 481224

Which of the following statements are true?

A. A square matrix A is said to be non-singular If $|A| = 0$

B. A square matrix A is invertible if and only if A is non-singular matrix.

C. If elements of a row are multiplied with cofactors of any other row, then their sum is zero.

D. A is square matrix of order 3 then $|\text{Adj.}(A)| = |A|^3$

Choose the correct answer from the options given below

(A) A and C only (B) B and C only

(C) C and D only (D) B and D only

Answer (B)

Sol. Statement A is incorrect as for singular matrices $|A| = 0$

Statement B is correct as A is invertible if $|A| \neq 0$

Statement C is correct

Statement D is incorrect as $|\text{Adj}(A)| = |A|^2$

Question ID: 481225

The interval in which $y = x^2 e^{2x}$ is increasing is

(A) $(-\infty, -1)$

(B) $(-1, \infty)$

(C) $(-\infty, -1) \cup (0, \infty)$

(D) $(-\infty, 0) \cup (1, \infty)$

Answer (C)

Sol. $\frac{dy}{dx} = x^2 \cdot 2e^{2x} + 2x \cdot e^{2x} = 2xe^{2x}(x+1)$

$\frac{dy}{dx} > 0$ for $x \in (-\infty, -1) \cup (0, \infty)$

Question ID: 481226

If $x = t^3$, $y = t^4$ then $\frac{d^2y}{dx^2}$ at $t = 2$ is

(A) $\frac{8}{3}$ (B) $\frac{1}{9}$

(C) $\frac{2}{9}$ (D) $\frac{9}{16}$

Answer (B)