

Chapter: Determinants

One mark questions:

No. of Teaching Hours	Part A	Part B	Part C	Part D	Part E		Total Marks
	(1 Marks)	(2 Marks)	(3 Marks)	(5 Marks)	6 Marks	4 Marks	
13	1	1		1		1	12

1. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then find $|2A|$. (Mar 2014)

Sol: Given $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then $|A| = \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix} = (1)(4) - (3)(2) = -2$

Wkt A is a Matrix of order n and k be any non zero real, then $|kA| = k^n|A|$

$$\therefore |2A| = 2^2|A| = 4(-2) = -8$$

2. If $A = \begin{bmatrix} 1 & 2 \\ 4 & 2 \end{bmatrix}$ then find the value of $|2A|$. (Jun 2014)

Sol: Given $A = \begin{bmatrix} 1 & 2 \\ 4 & 2 \end{bmatrix}$ then $|A| = \begin{vmatrix} 1 & 2 \\ 4 & 2 \end{vmatrix} = 2 - 8 = -6$

$$\therefore |2A| = 2^2|A| = 4(-6) = -24$$

3. Find the value of x for which $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$. (Jun 2015)(Jun 2017)

Sol: Given $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$

$$\Rightarrow 3 - x^2 = 3 - 8$$

$$\Rightarrow x^2 = 8$$

$$\Rightarrow x = \pm\sqrt{8} = \pm 2\sqrt{2}$$

4. Find $|3A|$ if $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix}$. (Mar 2015)

Sol: Given $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix}$ then $|A| = (1)(1)(4) = 4$ (Lower triangle elements are zero)

$$\therefore |3A| = 3^3|A| = 27(4) = 108$$

5. Find the value of x if $\begin{vmatrix} x & 2 \\ 18 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 18 & 6 \end{vmatrix}$. (Mar 2016)(J – 2018)

Sol: Given $\begin{vmatrix} x & 2 \\ 18 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 18 & 6 \end{vmatrix}$

$$\Rightarrow x^2 - 36 = 36 - 36$$

$$\Rightarrow x^2 = 36$$

$$\Rightarrow x = \pm 6$$

6. Find the value of x for which $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$.
(Jun 2016)

Sol: Given $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$

$$\Rightarrow 10 - 12 = 5x - 6x$$

$$\Rightarrow -2 = -x$$

$$\Rightarrow x = 2$$

7. If A is a square matrix with $|A| = 8$ then find the value of $|AA^t|$. (Mar 2017)

Sol: WKT $|A| = |A^t|$ Given $|A| = 8$

$$\text{Then } |AA^t| = |A||A^t| = 8 \times 8 = 64 \because |AB| = |A||B|$$

8. If A is an invertible matrix of order 2 then find $|A^{-1}|$. (Mar-2018)

Sol: $|A^{-1}| = \frac{1}{|A|}$

9. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, find $|A^{-1}|$

Sol: Given $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then $|A| = 4 - 6 = -2$

$$\text{WKT } |A^{-1}| = \frac{1}{|A|} = -\frac{1}{2}$$

10. If A is a square matrix of order 3 and $|A| = 4$ find $|\text{adj}A|$.

Sol: WKT $|\text{adj}A| = |A|^{n-1} = 4^2 = 16$ (Here $n = 3$)

11. If A and B are matrices of order 3 and $|A| = 5, |B| = 3$ then find $|3AB|$.

Sol: WKT $|3AB| = 3^3 |A||B| = 3(5)(3) = 45$

TRY Ur Self

12. If A is a square matrix of order 3 and $|A| = 4$ find the value of $|2A|$.

13. Define adjoint of matrix.

14. Define invertible matrix.

15. Define consistent system.