Maxprap. Chapter wise Series Class 12th – Determinants

Class : 12th **Subject: Mathematics**

Max. Marks : …… **Duration : …………**

NCERT Based Questions

	Determinants Examples	
1.	Evaluate $\begin{vmatrix} x & x+1 \\ x-1 & x \end{vmatrix}$	[1]
2.	Evaluate the determinant $\Delta = \begin{vmatrix} 1 & 2 & 4 \\ -1 & 3 & 0 \\ 4 & 1 & 0 \end{vmatrix}$	[1]
3.	Evaluate $\Delta = \begin{vmatrix} 0 & \sin\alpha & -\cos\alpha \\ -\sin\alpha & 0 & \sin\beta \\ \cos\alpha & -\sin\beta & 0 \end{vmatrix}$	[2]
4.	Find the area of Δ whose vertices are (3, 8) (– 4, 2) and (5, 1).	[3]
5.	Find values of x for which $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$.	[1]
6.	Find minors and cofactors of all the elements of the determinant $\begin{vmatrix} 1 & -2 \\ 4 & 3 \end{vmatrix}$	[1]
7.	Find adj A for $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$.	[1]
8.	If A = $\begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ then verify that A adj A = | A| I. Also find A^{-1} .	[2]
9.	Solve the system of equations $\begin{array}{l} 2x + 5y = 1 \\ 3x + 2y = 7 \end{array}$	[2]
10.	Solve the following system of equations by matrix method: 3x – 2y + 3z = 8; 2x + y – z = 1; 4x – 3y + 2z = 4	[2]
11.	The sum of three numbers is 6. If we multiply third number by 3 and add second number to it, we get 11. By adding first and third numbers, we get double of the second number. Represent it algebraically and find the numbers using matrix method.	[5]
12.	Use product $\begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & 3 \\ 3 & 2 & 4 \end{bmatrix}\begin{bmatrix} 2 & 0 & 1 \\ 9 & 2 & 3 \\ 6 & 1 & 2 \end{bmatrix}$ to solve the system of equations	[2]

	x – y + 2z = 1, 2y – 3z = 1, 3x – 2y + 4z = 2	
	Determinants Exercise	
13.	Evaluate the determinant $\begin{vmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{vmatrix}$	**[1]**
14.	Evaluate the determinant $\begin{vmatrix} x^2 - x + 1 & x - 1 \\ x + 1 & x + 1 \end{vmatrix}$	**[2]**
15.	If$A = \begin{vmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{vmatrix}$ then show that |3A| = 27|A|	**[2]**
16.	If$A = \begin{bmatrix} 1 & 2 \\ 4 & 2 \end{bmatrix}$, then show that |2A| = 4|A|	**[1]**
17.	Evaluate the determinant $\begin{vmatrix} 3 & -4 & 5 \\ 1 & 1 & -2 \\ 2 & 3 & 1 \end{vmatrix}$	**[1]**
18.	Evaluate the determinant $\begin{vmatrix} 0 & 1 & 2 \\ -1 & 0 & -3 \\ -2 & 3 & 0 \end{vmatrix}$	**[1]**
19.	Evaluate the determinant $\begin{vmatrix} 2 & -1 & -2 \\ 0 & 2 & -1 \\ 3 & -5 & 0 \end{vmatrix}$	**[1]**
20.	Find value of x, if $\begin{vmatrix} 2 & 4 \\ 5 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 4 \\ 6 & x \end{vmatrix}$	**[1]**
21.	Find values of x, if $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$	**[2]**
22.	If $\begin{vmatrix} x & 2 \\ 18 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 18 & 6 \end{vmatrix}$, then x is equal to a) 6 b) ± 6 c) – 6 d) 0	**[1]**
23.	Find area of the triangle with vertices at the point given(2, 7), (1, 1), (10, 8)	**[2]**
24.	Find the area of the triangle with vertices at the points given (– 2, – 3), (3, 2) and (– 1 , – 8).	**[2]**
25.	Show that points A(a, b + c), B(b, c + a), c(c, a + b)are collinear.	**[2]**
26.	Find value of k if area of triangle is 4 sq. units and vertices are :(k ,0), (4, 0), (0,2).	**[2]**
27.	Find values of k if area of triangle is 4 sq. units and vertices are:(– 2, 0),(0, 4),(0, k).	**[2]**

28.	Find equation of line joining (3, 1) and (9, 3) using determinants.	**[2]**
29.	Find the equation of line joining (1, 2) and (3, 6) using determinants.	**[3]**
30.	If area of triangle is 35 sq units with vertices (2, – 6), (5, 4) and (k, 4). Then k is a) – 2 b) 12 c) 12, – 2 d) 2, – 2	**[1]**
31.	Write minors and cofactors of the elements of $\begin{vmatrix} a & c \\ b & d \end{vmatrix}$.	**[1]**
32.	Write minors and cofactors of the element of $\begin{vmatrix} 1 & 0 & 4 \\ 3 & 5 & -1 \\ 0 & 1 & 2 \end{vmatrix}$	**[3]**
33.	Find adjoint of the matrix $\begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$	**[2]**
34.	Find adjoint of the matrix $\begin{vmatrix} 1 & -1 & 2 \\ 2 & 3 & 5 \\ -2 & 0 & 1 \end{vmatrix}$	**[5]**
35.	Verify A (adj. A) = (adj. A) A = |A|I: $\begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & -2 \\ 1 & 0 & 3 \end{bmatrix}$	**[5]**
36.	Verify A (adj. A) = (adj. A) A= |A|I: $\begin{bmatrix} 2 & 3 \\ -4 & -6 \end{bmatrix}$	**[3]**
37.	Find the inverse of the matrix (if it exists) given $\begin{bmatrix} 2 & -2 \\ 4 & 3 \end{bmatrix}$	**[1]**
38.	Find the inverse of the matrix (if it exists) given $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 4 \\ 0 & 0 & 5 \end{bmatrix}$	**[3]**
39.	Find the inverse of the matrix (if it exists) given $\begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 0 \\ -7 & 2 & 1 \end{bmatrix}$	**[3]**
40.	Find the inverse of the matrix (if it exists) given $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$	**[3]**
41.	Find the inverse of the matrix (if it exists) given $\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\alpha & \sin\alpha \\ 0 & \sin\alpha & -\cos\alpha \end{bmatrix}$	**[5]**
42.	Let $A = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 8 \\ 7 & 9 \end{bmatrix}$ verify that $(AB)^{-1} = B^{-1} A^{-1}$	**[5]**
43.	If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ Show that $A^2 - 5A + 7I = 0$. Hence find A^{-1}	**[5]**

44.	For the matrix $A = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$, find the numbers a and b such that $A^2 + aA + bI = 0$.	**[5]**
45.	For the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$, show that $A^3 - 6A^2 + 5A + 11I = 0$. Hence find A^{-1}.	**[5]**
46.	Let A be a non – singular square matrix of order 3× 3. Then |adj A| is equal to a) $\|A\|^3$ b) $3\|A\|$ c) $\|A\|^2$ d) $\|A\|$	**[1]**
47.	If A is an invertible matrix of order 2, then det (A^{-1}) is equal to a) 1 b) det (A) c) $\frac{1}{\det(A)}$ d) 0	**[1]**
48.	Examine the consistency of the system of equation $x + 2y = 2$; $2x + 3y = 3$	**[1]**
49.	Examine the consistency of the system of equation $x + y + z = 1$; $2x + 3y + 2z = 2$; $ax + ay + 2az = 4$	**[3]**
50.	Examine the consistency of the system of equation $3x - y - 2z = 2;\ 2y - z = -1; 3x - 5y = 3$	**[2]**
51.	Solve the system of linear equation, using matrix method $5x + 2y = 4$; $7x + 3y = 5$	**[2]**
52.	Solve the system of linear equation, using matrix method $2x - y = -2$; $3x + 4y = 3$	**[2]**
53.	Solve the system of linear equation, using matrix method $4x - 3y = 3$; $3x - 5y = 7$	**[2]**
54.	Solve the system of linear equation, using matrix method $x - y + z = 4$; $2x + y - 3z = 0$; $x + y + z = 2$	**[2]**
55.	Solve the system of linear equation, using matrix method $2x + 3y + 3z = 5$; $x - 2y + z = -4$; $3x - y - 2z = 3$	**[2]**
56.	Solve the system of linear equation, using matrix method $x - y + 2z = 7$; $3x + 4y - 5z = -5$; $2x - y + 3z = 12$	**[3]**
57.	If $A = \begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$ find A^{-1}, using A^{-1} solve the system of equations $2x - 3y + 5z = 11$ $3x + 2y - 4z = -5$ $x + y - 2z = -3$	**[5]**

58.	The cost of 4kg onion, 3kg wheat and 2kg rice is Rs. 60. The cost of 2kg onion, 4kg wheat and 6kg rice is Rs. 90. The cost of 6kg onion 2kg wheat and 3kg rice is Rs. 70. Find the cost of each item per kg by matrix method.	**[5]**
59.	Prove that the determinant $\begin{vmatrix} x & \sin\theta & \cos\theta \\ -\sin\theta & -x & 1 \\ \cos\theta & 1 & x \end{vmatrix}$ is independent of θ .	**[2]**
60.	If $A^{-1} = \begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ find $(AB)^{-1}$	**[3]**
61.	Let A = $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 3 & 1 \\ 1 & 1 & 5 \end{bmatrix}$. verify that $[\text{adj } A]^{-1} = \text{adj}(A^{-1})$	**[3]**
62.	Let A = $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 3 & 1 \\ 1 & 1 & 5 \end{bmatrix}$. verify that $(A^{-1})^{-1} = A$	**[3]**
63.	Solve the system of equations $\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4;\ \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1;\ \frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2$	**[5]**