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Dept. of Mathematics 2026 – 2027
Class XII – Mathematics
Work Sheet – Determinants

1	If A and B are square matrices of order 3 such that $\|A\| = -1$, $\|B\| = 3$, then det $(3AB)$ is equal to (a) -9 (b) -27 (c) -81 (d) 81
2	If a, b, c are distinct, then the value of x satisfying $\begin{vmatrix} 0 & x^2-a & x^3-b \\ x^2+a & 0 & x^2+c \\ x^4+b & x-c & 0 \end{vmatrix} = 0$ (a) c (b) a (c) b (d) 0
3	The equations $x+y=2, 2x+2y=3$ have (a) no solution (b) a unique solution (c) finitely many more than one solutions (d) infinitely many solutions
4	Which of the following is not correct in a given determinant of A, where $A=[a_{ij}]_{3\times3}$ (a) Order of minor is less than order of the det (A) (b) Minor of an element can never be equal to cofactor of the same element (c) Value of a determinant is obtaind by multiplying elements of a row or column by corresponding cofactors. (d) Order of minors and cofactors of elements of A is same
5	If A and B are square matrix of order n, then det (λA) is equal to (λ being a scalar) (a) $\lambda \det A$ (b) $\|\lambda\|^n \det A$ (c) $\lambda^n \det A$ (d) None of these
6	If A and B are square matrices of order 2, then det $(A+B) = 0$ is possible only when (a) det $(A) = 0$ or det $(B) = 0$ (b) det (A) + det $(B) = 0$ (c) det $(A) = 0$ and det $(B) = 0$ (d) $A + B = 0$
7	If A is square matrix such that $A^2 = I$, then A^{-1} is equal to (a) I (b) O (c) A (d) $I + A$
8	If $A=\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$ and C_{ij} is cofactor of a_{ij} in A, then the value of $\|A\|$ is given by (a) $a_{11}c_{31} + a_{12}c_{32} + a_{13}c_{33}$ (b) $a_{11}c_{11} + a_{12}c_{21} + a_{13}c_{31}$ (c) $a_{21}c_{11} + a_{22}c_{12} + a_{23}c_{13}$ (d) $a_{11}c_{11} + a_{21}c_{21} + a_{31}c_{31}$

9	If A is square matrix of order 2, then det $(adj\ A)$ = (a) I (b) $\det A$ (c) $(\det A)^2$ (d) None of these
10	If A is non-singular matrix of order 3, then $adj\ (adj\ A)$ = (a) I (b) $\lvert A \rvert I$ (c) A (d) $(\det A)A$
11	If A is any of square matrix of order n, then A (adj A) is equal to (a) I (b) $\lvert A \rvert I_n$ (c) 0 (d) $\lvert A \rvert^n$
12	A square matrix A is invertible iff det A is equal to (a) 0 (b) 1 (c) non-zero (d) -1
13	If A, B, C, are three square matrices of the same order such that $A = B + C$, then det A is equal to (a) det B + det C (b) det B (c) det C (d) None of these
14	The value of det $\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ is equal to (a) cos2θ (b) 1 (c) 0 (d) None of these
15	Which of the following is not correct? (a) $\lvert A \rvert = \lvert A^T \rvert$, where $A = [a_{ij}]_{3\times 3}$ (b) $\lvert KA \rvert = K^3 \lvert A \rvert$, where $A = [a_{ij}]_{3\times 3}$ (c) If A is a skew-symmetric matrix of odd order, then $\lvert A \rvert = 0$ (d) $\begin{vmatrix} a+b & c+d \\ e+f & g+h \end{vmatrix} = \begin{vmatrix} a & c \\ e & g \end{vmatrix} + \begin{vmatrix} b & d \\ f & h \end{vmatrix}$
16	Determinant of the matrix $A = [1\ -3\ -5]$ is (a) 1 + 3 + (–5) (b) 1 × 3 × (–5) (c) not defined (d) None of these
17	Evaluate the determinant $\Delta = \begin{vmatrix} 1 & 2 & 4 \\ -1 & 3 & 0 \\ 4 & 1 & 0 \end{vmatrix}$
18	Find values of x for which $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$
19	Using matrices solve the following system of equations: $2x - y + 2z = 3$; $2x + y + z = -1$; $x - 3y + 2z = 6$.

20	Using matrices solve the following system of equations: $3x - y + z = 5;\ 2x - 2y + 3z = 7;\ x + y - z = -1.$
21	Using matrices solve the following system of equations: $x + 2y + z = 1;\ 2x - y + z = 5;\ 3x + y - z = 0.$
22	Using matrices solve the following system of equations: $x + y + z = 3;\ x - 2y + 3z = 2;\ 2x - y + z = 2.$
23	Show that the matrix $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ satisfies the equation $A^2 - 5A + 7I = 0$. Hence find A^{-1}.
24	Solve for x, y : $\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4;\ \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1;\ \frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2.$
25	Using matrix method solve the following system of equations for x, y, z; $\frac{2}{x} - \frac{3}{y} + \frac{3}{z} = 10;\ \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 10;\ \frac{3}{x} - \frac{1}{y} + \frac{2}{z} = 13.$
26	Using determinants, find the area of the triangle whose vertices (–2, 4), (2, –6) and (5, 4). Are the given points collinear?
27	The points (3, –2), (x, 2), (8, 8) are collinear, find x using determinants.
28	If $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & -1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$, find A^2 and show that $A^2 = A^{-1}$
29	If $A = \begin{bmatrix} 3 & 2 \\ 7 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 7 \\ 8 & 9 \end{bmatrix}$, verify that $(AB)^{-1} = B^{-1}A^{-1}$.
30	If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, find $\lvert\ A.(adjA)\rvert$.
31	For what value of x makes the following pairs of determinants equal? $\begin{vmatrix} 2x & 3 \\ 5 & x \end{vmatrix}, \begin{vmatrix} 16 & 3 \\ 5 & 2 \end{vmatrix}$.

32	Write the adjoint of the matrix $\begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$.
33	A is a square matrix of order 3 and $\lvert A\rvert = 7$. Write the value of $\lvert \text{adj A} \rvert$.
34	Find the value of x, from the following: $\begin{vmatrix} x & 4 \\ 2 & 2x \end{vmatrix} = 0$.
35	Write the value of the determinant $\begin{vmatrix} 2 & 3 & 4 \\ 5 & 6 & 8 \\ 6x & 9x & 12x \end{vmatrix}$.
36	If A is an invertible matrix of order 3 and $\lvert A\rvert = 5$ then find $\lvert \text{adj A}\rvert$
37	If $\begin{vmatrix} x+2 & 3 \\ x+5 & 4 \end{vmatrix} = 3$, find the value of x.
38	Find the cofactor of a_{12} in the following: $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$
39	Using matrices, solve the system of equations: $2x - 3y + 5z = 11$ $3x + 2y - 4z = -5$ $x + y - 2z = -3$
40	Using matrices, solve the system of equations: $x - y + z = 6$ $x + 2z = 7$ $3x + y + z = 12$

Answers

1	C
5	C
9	B
13	D

2	D
6	D
10	D
14	B

3	A
7	C
11	B
15	D

4	B
8	D
12	C
16	C

19	$x=-1, y=-1, z=2.$
22	$x=1, y=1, z=1.$
25	$x=\frac{1}{2}, y=\frac{1}{3}, z=\frac{1}{5}.$
30	$\lvert A(adj\ A)\rvert = (ad-bc)^2$
33	$\lvert A\rvert^2 = 7^2 = 49$
36	25
39	1 $x=1, y=2, z=3$

20	$x=1, y=-1, z=1.$
23	$\frac{1}{7}\begin{bmatrix} 2 & -1 \\ 1 & 3 \end{bmatrix}$
26	Area $= \frac{1}{2}\begin{vmatrix} -2 & 4 & 1 \\ 2 & -6 & 1 \\ 5 & 4 & 1 \end{vmatrix} = 35$ sq. cm
31	$x^2 = 16 \Rightarrow x = \pm 4$
34	$x^2 = 4 \Rightarrow x = \pm 2.$
37	$x = 10$
40	$x=3, y=1, z=2.$

21	$x=1, y=-1, z=2.$
24	$x=2, y=3, z=5.$
27	$\begin{vmatrix} 3 & -2 & 1 \\ x & 2 & 1 \\ 8 & 8 & 1 \end{vmatrix} = 0 \Rightarrow x = 5.$
32	adj A $= \begin{bmatrix} 3 & 1 \\ -4 & 2 \end{bmatrix}$
35	0.
38	46.