PRACTICE PAPER 01 (2026-27)
CHAPTER 04 : DETERMINANTS

SUBJECT: MATHEMATICS	**MAX. MARKS:** 40
CLASS: XII	**DURATION:** 1½ hrs

General Instructions:

(i) All questions are compulsory.

(ii) This question paper contains 20 questions divided into five Sections A, B, C, D and E.

(iii) Section A comprises 10 MCQs of 1 mark each (Q9 and Q10 are Assertion–Reason questions). Section B comprises 4 questions of 2 marks each. Section C comprises 3 questions of 3 marks each. Section D comprises 1 question of 5 marks with an internal choice. Section E comprises 2 case study based questions of 4 marks each, with internal choice in the last sub-part.

(iv) There is no overall choice. Internal choices have been provided where indicated.

(v) Use of calculators is not permitted.

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. If A is a 3×3 matrix and $|A| = -2$, then $|3A|$ is equal to

(a) -6 (b) -54 (c) -18 (d) 54

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

(a) ± 3 (b) $\pm\sqrt{5}$ (c) ± 5 (d) $\pm\sqrt{13}$

3. The cofactor of the element 4 in the determinant $\begin{vmatrix} 2 & -1 & 3 \\ 4 & 0 & 5 \\ 1 & 2 & -2 \end{vmatrix}$ is

(a) 4 (b) -4 (c) 8 (d) -8

4. If A and B are square matrices of order 3 with $|A| = 2$ and $|B| = -3$, then $|ABA'|$ is equal to

(a) 12 (b) -6 (c) 6 (d) -12

5. If A is a skew-symmetric matrix of odd order, then $|A|$ is equal to

(a) 1 (b) 0 (c) -1 (d) depends on the entries of A

6. The matrix $A = \begin{bmatrix} k & 3 \\ 4 & k+1 \end{bmatrix}$ is singular for

(a) $k = 3$ only (b) $k = -4$ only (c) $k = 3$ or $k = -4$ (d) $k = 4$ or $k = -3$

7. The adjoint of the matrix $\begin{bmatrix} 2 & -3 \\ 5 & 1 \end{bmatrix}$ is

(a) $\begin{bmatrix} 1 & -3 \\ 5 & 2 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 3 \\ -5 & 2 \end{bmatrix}$ (c) $\begin{bmatrix} 2 & 3 \\ -5 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 2 & -5 \\ 3 & 1 \end{bmatrix}$

8. The value of the determinant $\begin{vmatrix} \cos 75^\circ & -\sin 75^\circ \\ \sin 15^\circ & \cos 15^\circ \end{vmatrix}$ is

(a) ½ (b) 0 (c) 1 (d) $\sqrt{3}/2$

For Q9 and Q10, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

9. Assertion (A): A square matrix whose determinant is 0 does not have an inverse.

Reason (R): Every square matrix has a unique inverse.

10. Assertion (A): The area of the triangle with vertices (1, 2), (2, 4) and (3, 6) is zero.

Reason (R): A determinant in which every element of a row is zero has the value zero.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Using properties of determinants, show that

$$\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0.$$

12. Using a determinant, find the area of the triangle whose vertices are $(2, -1)$, $(5, 3)$ and $(-1, 4)$.

13. If A is a square matrix of order 3 with $|A| = -4$, find the values of $|\text{adj } A|$ and $|2A^{-1}|$.

14. Find the value(s) of k if the area of the triangle with vertices (k, 0), (4, 0) and (0, 2) is 4 square units.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Using properties of determinants, prove that

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c).$$

16. Find the adjoint of the matrix $A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -1 \\ 1 & 0 & 1 \end{bmatrix}$ and hence find A^{-1}.

17. Using determinants, find the equation of the line joining the points (1, 2) and $(3, -4)$.

SECTION – D

Question 18 carries 5 marks.

18. Using the matrix method, solve the following system of equations:

$2x + y = 3,\quad x + 3y + z = 2,\quad y + z = 2.$

OR

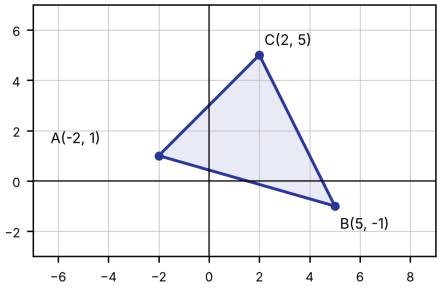
Using the inverse of a suitable matrix, solve the system:

$x + 4y + 3z = 3,\quad 2x + 3y + 2z = 3,\quad x + 2y + z = 1.$

SECTION – E (Case Study Based Questions)

Questions 19 and 20 carry 4 marks each.

19. A triangular garden ABC is marked on a grid in which each unit represents 10 m. The corners are A(−2, 1), B(5, −1) and C(2, 5), as shown in the figure.



Based on the above information, answer the following questions:

(i) Write the determinant that gives the area of triangle ABC (in grid units). (1)

(ii) Find the area of the garden in m². (1)

(iii) Using determinants, find the equation of the straight path BC. (2)

OR

(iii) A tree is planted at D(k, 3). Find k if D lies on the straight path BC. (2)

20. In a shop, three customers buy pens, notebooks and files. If the price of a pen is ₹x, of a notebook ₹y and of a file ₹z, the purchases are:

Customer	Pens	Notebooks	Files	Amount paid (₹)
Customer 1	2	3	2	32
Customer 2	1	2	1	19
Customer 3	2	2	4	32

It is given that $A^{-1} = \frac{1}{2}\begin{bmatrix} 6 & -8 & -1 \\ -2 & 4 & 0 \\ -2 & 2 & 1 \end{bmatrix}$, where A is the coefficient matrix of the system.

Based on the above information, answer the following questions:

(i) Write the system of equations in the matrix form AX = B. (1)

(ii) Find |A|. Does the system have a unique solution? (1)

(iii) Using A^{-1}, find the price of each item. (2)

OR

(iii) If the same three customers later paid ₹22, ₹13 and ₹22 respectively for the same purchases (prices having changed), find the new prices. (2)

— End of Question Paper —