CBSE CLASS 12 MATHS · CHAPTER 4 · 2026-27

Determinants Class 12 Important Questions

10 questions · 27 marks · no calculator · step-marked answers

Name _____ Date _____ Score / 27

- Original questions in the board paper's question types, from 1-mark MCQs to a case study. Try every question before you look at the answers.
- No calculator: as in the CBSE board exam, everything works by hand.
- Worked answers with step marks for 5 questions start after the questions. The other 5 open free on the chapter page with a free account (no card): the link is next to each one.
- Online, with more practice: cbsemathrevision.com/class-12/determinants

Section A · Multiple choice and assertion–reason (1 mark each)

1. 1 mark · Evaluating determinants

If $\begin{vmatrix} x & 3 \\ 4 & x \end{vmatrix} = \begin{vmatrix} 5 & 2 \\ 1 & 1 \end{vmatrix}$, then x equals

(a) $\pm\sqrt{15}$ (b) ± 3

(c) 15 (d) $\pm\sqrt{3}$

2. 1 mark · Adjoint and inverse

A is a 3×3 matrix with $|A| = 4$. Then $|\text{adj } A|$ equals

(a) 4 (b) 16

(c) 64 (d) 8

3. 1 mark · Adjoint and inverse

In the following question, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

Assertion (A): The matrix $\begin{bmatrix} 2 & 4 \\ 3 & 6 \end{bmatrix}$ has no inverse.

Reason (R): A square matrix is invertible if and only if its determinant is non-zero.

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

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

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

Section B · Short answer (2 marks each)

4. **2 marks · Area of a triangle**

Using determinants, find the area of the triangle with vertices $(1, 2)$, $(4, 6)$ and $(7, 2)$.

5. **2 marks · Area of a triangle**

The area of the triangle with vertices $(k, 0)$, $(6, 0)$ and $(0, 3)$ is 6 square units. Find the possible values of k.

Section C · Short answer (3 marks each)

6. **3 marks · Adjoint and inverse**

Find the adjoint and the inverse of $A = \begin{bmatrix} 3 & -2 \\ 4 & 1 \end{bmatrix}$.

7. **3 marks · Evaluating determinants**

Expand $|A|$ along its first row for $A = \begin{bmatrix} 2 & -1 & 3 \\ 0 & 4 & 1 \\ 5 & 2 & -2 \end{bmatrix}$, showing the three cofactors you use.

Section D · Long answer (5 marks each)

8. **5 marks · Solving linear systems**

Use the matrix method to solve: $x + y + z = 6$, $2x - y + z = 3$, $x + 2y - z = 2$.

9. **5 marks · Adjoint and inverse**

For $A = \begin{bmatrix} 1 & 2 & 0 \\ 0 & 1 & 3 \\ 2 & 0 & 1 \end{bmatrix}$, find (a) $|A|$, (b) $\operatorname{adj} A$, (c) A^{-1}, and (d) verify that $(\operatorname{adj} A)A = |A|\, I$.

Section E · Case study (4 marks)

10. **4 marks · Area of a triangle**

Village wells. Three wells in a village are at $P(1, 1)$, $Q(4, 5)$ and $R(7, 3)$ on a map grid (units in hundreds of metres).

i. Find the area of triangle PQR. *[1 mark]*

ii. Show that P, Q and $S(7, 9)$ are collinear. *[1 mark]*

iii. A pump is placed at $T(k, 3)$ so that triangle PQT has area 6 square units. Find k. *[2 marks]*

Answers and worked solutions

Question 1

1 mark

$x^2 - 12 = 5 - 2 = 3 \Rightarrow x^2 = 15 \Rightarrow x = \pm\sqrt{15}$ **A1**

Correct option: (a) $\pm\sqrt{15}$

Question 2

1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-12/determinants#iq-2

Question 3

1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-12/determinants#iq-3

Question 4

2 marks

Answer: 12 square units

$\Delta = \frac{1}{2}\begin{vmatrix} 1 & 2 & 1 \\ 4 & 6 & 1 \\ 7 & 2 & 1 \end{vmatrix} = \frac{1}{2}[1(6-2) - 2(4-7) + 1(8-42)]$ **M1**

$= \frac{1}{2}(4 + 6 - 34) = -12$; area $= 12$ square units **A1**

Question 5

2 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-12/determinants#iq-5

Question 6

3 marks

Answer: $A^{-1} = \frac{1}{11}\begin{bmatrix} 1 & 2 \\ -4 & 3 \end{bmatrix}$

$|A| = 3 + 8 = 11 \neq 0$ **A1**

$\operatorname{adj} A = \begin{bmatrix} 1 & 2 \\ -4 & 3 \end{bmatrix}$ **A1**

$A^{-1} = \frac{1}{11}\begin{bmatrix} 1 & 2 \\ -4 & 3 \end{bmatrix}$ **A1**

Question 7

3 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-12/determinants#iq-7

Question 8

5 marks

Answer: $x = 1$, $y = 2$, $z = 3$

$AX = B$ with $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & -1 & 1 \\ 1 & 2 & -1 \end{bmatrix}$;

$|A| = 1(1-2) - 1(-2-1) + 1(4+1) = 7 \neq 0$ **A1**

Cofactors give $\operatorname{adj} A = \begin{bmatrix} -1 & 3 & 2 \\ 3 & -2 & 1 \\ 5 & -1 & -3 \end{bmatrix}$ **M1**

$A^{-1} = \frac{1}{7}\operatorname{adj} A$ **A1**

$X = A^{-1}B = \frac{1}{7}\begin{bmatrix} -6+9+4 \\ 18-6+2 \\ 30-3-6 \end{bmatrix}$ **M1**

$= \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$: $x = 1$, $y = 2$, $z = 3$ **A1**

Question 9

5 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-12/determinants#iq-9

Question 10

4 marks

i. $\frac{1}{2}|1(5-3) - 1(4-7) + 1(12-35)| = \frac{1}{2}|-18| = 9$ square units **A1**

ii. $\begin{vmatrix} 1 & 1 & 1 \\ 4 & 5 & 1 \\ 7 & 9 & 1 \end{vmatrix} = -4 + 3 + 1 = 0$, so the area is 0: collinear **A1**

iii. $\frac{1}{2}|10 - 4k| = 6$ **M1**

$10 - 4k = \pm 12 \Rightarrow k = -\frac{1}{2}$ or $k = \frac{11}{2}$ **A1**

More on this chapter, free: revision notes, a Route to 95 and practice with instant feedback at cbsemathrevision.com/class-12/determinants

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