CBSE CLASS 12 MATHS · CHAPTER 3 · 2026-27

Matrices 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/matrices

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

1. 1 mark · Order and types of matrices

A has order 3×2 and B has order 2×4. Which statement is true?

(a) AB exists and has order 3×4.

(b) AB exists and has order 2×2.

(c) BA exists and has order 4×3.

(d) Neither AB nor BA exists.

2. 1 mark · Transpose, symmetric and skew-symmetric matrices

The matrix $\begin{bmatrix} 2 & x \\ 3 & 4 \end{bmatrix}$ is symmetric. Then x equals

(a) 2 (b) 3

(c) 4 (d) -3

3. 1 mark · Transpose, symmetric and skew-symmetric matrices

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

Assertion (A): For every square matrix A, the matrix $A + A'$ is symmetric.

Reason (R): For matrices of the same order, $(A')' = A$ and $(A + B)' = A' + B'$.

(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 · Operations on matrices

Show that $A = \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}$ satisfies $A^2 - 5A = kI$ for some number k, and find k.

5. 2 marks · Order and types of matrices

Find x and y if $\begin{bmatrix} x+y & 2 \\ 5 & x-y \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 2 \end{bmatrix}$.

Section C · Short answer (3 marks each)

6. 3 marks · Transpose, symmetric and skew-symmetric matrices

Write $A = \begin{bmatrix} 6 & -2 \\ 8 & 1 \end{bmatrix}$ as $P + Q$, where P is symmetric and Q is skew-symmetric.

7. 3 marks · Transpose, symmetric and skew-symmetric matrices

For $A = \begin{bmatrix} 2 & -1 \\ 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 4 \\ 0 & -2 \end{bmatrix}$, verify that $(AB)' = B'A'$.

Section D · Long answer (5 marks each)

8. **5 marks · Invertible matrices**

Let $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$. (a) Show that $A^2 - 5A + 7I = O$. (b) Use this to find A^{-1}.

9. **5 marks · Operations on matrices**

Shop P sold 10 pens, 5 notebooks and 2 bags in a day; shop Q sold 8 pens, 6 notebooks and 3 bags. The selling prices are ₹10 a pen, ₹40 a notebook and ₹200 a bag, and the cost prices are ₹8, ₹30 and ₹150. Using matrices, find each shop's takings and each shop's profit for the day.

Section E · Case study (4 marks)

10. **4 marks · Operations on matrices**

Canteen orders. A school canteen records orders in $O = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$ (rows: day 1, day 2; columns: sandwiches, juices). A sandwich costs ₹40 and a juice ₹25, written as $P = \begin{bmatrix} 40 \\ 25 \end{bmatrix}$.

i. Write the order of the matrix OP. *[1 mark]*

ii. Find the bill for day 1. *[1 mark]*

iii. Find the total bill for both days, and say whether O is symmetric. *[2 marks]*

Answers and worked solutions

Question 1 — 1 mark

$(3 \times 2)(2 \times 4)$: inner orders match, so AB is 3×4; $(2 \times 4)(3 \times 2)$: $4 \neq 3$, so BA does not exist **A1**

Correct option: (a) AB exists and has order 3×4.

Question 2 — 1 mark

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

Question 3 — 1 mark

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

Question 4 — 2 marks

Answer: $k = -7$

$A^2 = \begin{bmatrix} 3 & 5 \\ -5 & 8 \end{bmatrix}$ and $5A = \begin{bmatrix} 10 & 5 \\ -5 & 15 \end{bmatrix}$ **M1**

$A^2 - 5A = \begin{bmatrix} -7 & 0 \\ 0 & -7 \end{bmatrix} = -7I$, so $k = -7$ **A1**

Question 5 — 2 marks

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

Question 6 — 3 marks

Answer: $\begin{bmatrix} 6 & 3 \\ 3 & 1 \end{bmatrix} + \begin{bmatrix} 0 & -5 \\ 5 & 0 \end{bmatrix}$

$P = \frac{1}{2}(A + A') = \frac{1}{2}\begin{bmatrix} 12 & 6 \\ 6 & 2 \end{bmatrix} = \begin{bmatrix} 6 & 3 \\ 3 & 1 \end{bmatrix}$, and $P' = P$ **A1**

$Q = \frac{1}{2}(A - A') = \frac{1}{2}\begin{bmatrix} 0 & -10 \\ 10 & 0 \end{bmatrix} = \begin{bmatrix} 0 & -5 \\ 5 & 0 \end{bmatrix}$, and $Q' = -Q$ **A1**

$P + Q = \begin{bmatrix} 6 & -2 \\ 8 & 1 \end{bmatrix} = A$ **A1**

Question 7 — 3 marks

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

Question 8 — 5 marks

Answer: $A^{-1} = \frac{1}{7}\begin{bmatrix} 2 & -1 \\ 1 & 3 \end{bmatrix}$

(a) $A^2 = \begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix}$ **A1**

$-5A + 7I = \begin{bmatrix} -15+7 & -5 \\ 5 & -10+7 \end{bmatrix} = \begin{bmatrix} -8 & -5 \\ 5 & -3 \end{bmatrix}$, so $A^2 - 5A + 7I = O$ **A1**

(b) Multiply by A^{-1}: $A - 5I + 7A^{-1} = O$ **M1**

$A^{-1} = \frac{1}{7}(5I - A)$ **A1**

$= \frac{1}{7}\begin{bmatrix} 2 & -1 \\ 1 & 3 \end{bmatrix}$ **A1**

Question 9 — 5 marks

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

Question 10 — 4 marks

i. $(2 \times 2)(2 \times 1)$ gives 2×1 **A1**

ii. $2 \times 40 + 1 \times 25 = ₹105$ **A1**

iii. Day 2: $40 + 75 = ₹115$; total $₹220$ **M1**

$O' = O$, so O is symmetric **A1**

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