QUICK DRILL · CBSE CLASS 12

Algebra (Matrices and Determinants)

Applied Mathematics · Chapter 2 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

DATE	TOTAL MARKS	DURATION	MARKING	TARGET
_____	15	20 min	+1 / 0	⩾ 12/15

OBJECTIVES

Reinforce the four core topics of Algebra (Matrices and Determinants) via 15 PYQ-derived MCQs. Identify weak sub-topics via concept-node IDs (see answer key). Build per-question time budget habit.

INSTRUCTIONS

Attempt all 15. Time budget shown per Q (use it as pacing guide). Mark answers (A/B/C/D) in the margin. Answer key + explanations on the last page. **Don't peek — score yourself honestly.**

SECTION · QUICK DRILL

Q 1–15 · 20 MIN

Q1. The order of the matrix [[1,2,3],[4,5,6]] is:

(A) 3 × 2 **(B)** 2 × 3
(C) 6 × 1 **(D)** 2 × 2

PYQ 2021 · Delhi · 1m · ? 20s

Q2. If [[x+2, 4],[3, y]] = [[5, 4],[3, 7]], then the values of x and y are:

(A) x = 3, y = 7 **(B)** x = 5, y = 7
(C) x = 3, y = 4 **(D)** x = 7, y = 3

PYQ 2022 · Outside Delhi · 2m · ? 30s

Q3. For matrices, in general:

(A) AB = BA always **(B)** AB ≠ BA in general
(C) AB = 0 implies A = 0 or B = 0 **(D)** A + B ≠ B + A

PYQ 2023 · Delhi · 1m · ? 20s

Q4. If A is of order 2 × 3 and B is of order 3 × 4, then the order of AB is:

(A) 2 × 4 **(B)** 3 × 3
(C) 4 × 2 **(D)** AB is not defined

PYQ 2021 · All India · 1m · ? 20s

Q5. If A = [[1,2],[3,4]], then 2A is:

(A) [[2,4],[6,8]] **(B)** [[1,2],[3,4]]
(C) [[2,2],[3,4]] **(D)** [[3,4],[5,6]]

PYQ 2022 · Delhi · 1m · ? 20s

Q6. The product [[1,2],[3,4]] · [[1,0],[0,1]] equals:

(A) [[1,2],[3,4]] **(B)** [[0,0],[0,0]]
(C) [[2,2],[4,4]] **(D)** [[4,3],[2,1]]

PYQ 2020 · Outside Delhi · 2m · ? 25s

Q7. For any matrices A and B for which AB is defined, (AB)' equals:

(A) A'B' **(B)** B'A'
(C) AB **(D)** BA

PYQ 2023 · All India · 1m · ? 20s

Q8. A square matrix A is skew-symmetric if:

(A) A' = A **(B)** A' = −A
(C) A = I **(D)** A^2 = A

PYQ 2024 · Delhi · 1m · ? 20s

Q9. Every diagonal entry of a skew-symmetric matrix is:

(A) 1 **(B)** −1
(C) 0 **(D)** equal to the trace

PYQ 2022 · All India · 1m · ? 20s

Q10. The value of the determinant |[[3,4],[2,5]]| is:

(A) 7 **(B)** 23
(C) −7 **(D)** 8

PYQ 2021 · Delhi · 1m · ? 25s

Q11. The cofactor C_{12} of the element in row 1, column 2 carries the sign:

(A) + **(B)** –
(C) It depends on the value **(D)** Always 0

PYQ 2023 · Outside Delhi · 1m · 20s

Q12. A square matrix A is invertible if and only if:

(A) A is symmetric **(B)** $|A| \neq 0$
(C) $|A| = 0$ **(D)** A is a diagonal matrix

PYQ 2024 · All India · 1m · 20s

Q13. For A = [[2,3],[1,4]], the adjoint adj(A) is:

(A) [[4,–3],[–1,2]] **(B)** [[2,3],[1,4]]
(C) [[4,3],[1,2]] **(D)** [[–4,3],[1,–2]]

PYQ 2022 · Delhi · 2m · 30s

Q14. The inverse of A = [[2,0],[0,4]] is:

(A) [[1/2, 0],[0, 1/4]] **(B)** [[2,0],[0,4]]
(C) [[4,0],[0,2]] **(D)** [[1/4,0],[0,1/2]]

PYQ 2023 · All India · 3m · 40s

Q15. For the system 2x + y = 7, x + y = 4 written as AX = B with A = [[2,1],[1,1]], the value of |A| is:

(A) 1 **(B)** 3
(C) –1 **(D)** 0

PYQ 2024 · Outside Delhi · 2m · 30s

ANSWER KEY & EXPLANATIONS

Q 1–15 · MARK YOUR SCORE

Q1. Answer: B
Order = (number of rows) × (number of columns) = 2 rows × 3 columns = 2 × 3 → option B.

Q2. Answer: A
Equating corresponding entries: x + 2 = 5 ⇒ x = 3; y = 7. → option A.

Q3. Answer: B
Matrix multiplication is not commutative: AB ≠ BA in general. (Addition IS commutative, and AB = 0 does not force A or B to be zero.) → option B.

Q4. Answer: A
Inner dimensions match (3 = 3); the product has order (rows of A) × (cols of B) = 2 × 4 → option A.

Q5. Answer: A
Scalar multiplication multiplies every entry by 2: [[2,4],[6,8]] → option A.

Q6. Answer: A
Multiplying by the identity matrix I leaves a matrix unchanged: A·I = A = [[1,2],[3,4]] → option A.

Q7. Answer: B
The transpose of a product reverses the order: (AB)' = B'A' → option B.

Q8. Answer: B
Skew-symmetric means A' = –A (and consequently every diagonal entry is zero) → option B.

Q9. Answer: C
From A' = –A we get a(i,i) = –a(i,i), so 2·a(i,i) = 0, hence every diagonal entry is 0 → option C.

Q10. Answer: A
ad – bc = (3)(5) – (4)(2) = 15 – 8 = 7 → option A.

Q11. Answer: B
Cofactor sign = (–1)^(i+j) = (–1)^(1+2) = $(-1)^3$ = – → option B.

Q12. Answer: B
An inverse exists exactly when the determinant is non-zero (A is non-singular): $|A| \neq 0$ → option B.

Q13. Answer: A
For a 2×2, adj[[a,b],[c,d]] = [[d,–b],[–c,a]] = [[4,–3],[–1,2]] → option A.

Q14. Answer: A
$|A| = 8 \neq 0$; adj(A) = [[4,0],[0,2]]; $A^{-1} = (1/8)[[4,0],[0,2]] = [[1/2,0],[0,1/4]]$ → option A.

Q15. Answer: A

|A| = (2)(1) − (1)(1) = 2 − 1 = 1. Since |A| = 1 ≠ 0, the system has a unique solution → option A.