



QUICK DRILL · CBSE CLASS 12

Matrices

Mathematics · Chapter 3 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

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

Reinforce the four core topics of Matrices 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. If a matrix has 18 elements, the number of possible orders it can have is:

- (A) 4 (B) 6
(C) 8 (D) 9

PYQ 2018 · Delhi · 1m · 30s

Q2. The order of the product AB , where A is 3×2 and B is 2×5 , is:

- (A) 2×2 (B) 3×5
(C) 5×3 (D) Not defined

PYQ 2019 · All India · 1m · 30s

Q3. If $[[x + y, 2], [5, x - y]] = [[6, 2], [5, 2]]$, then (x, y) is:

- (A) (4, 2) (B) (2, 4)
(C) (6, 0) (D) (3, 3)

PYQ 2020 · Delhi · 2m · 45s

Q4. A scalar matrix of order 3 with diagonal entry 4 is the same as:

- (A) 4 times the identity matrix I_3 (B) the zero matrix
(C) the identity matrix (D) an upper triangular matrix only

PYQ 2022 · Delhi · 1m · 30s

Q5. For matrices A and B , $(AB)^T$ equals:

- (A) $A^T B^T$ (B) $B^T A^T$
(C) AB (D) BA

PYQ 2019 · Delhi · 1m · 20s

Q6. If A is a skew-symmetric matrix, then every diagonal element of A is:

- (A) 1 (B) 0
(C) -1 (D) undetermined

PYQ 2024 · All India · 1m · 30s

Q7. Which condition makes the product BA defined when A is 2×3 ?

- (A) B must be $3 \times k$ for some k (B) B must be $k \times 2$ for some k
(C) B must be 2×3 (D) BA is never defined

PYQ 2020 · Delhi · 1m · 30s

Q8. If $A = [[1, 2], [3, 4]]$ and $B = [[0, 1], [1, 0]]$, then AB equals:

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

PYQ 2023 · All India · 2m · 60s

Q9. The transpose of the symmetric part of $A = [[3, 5], [1, -1]]$ is:

- (A) $[[3, 3], [3, -1]]$ (B) $[[0, 2], [-2, 0]]$
(C) $[[3, 1], [5, -1]]$ (D) $[[5, 1], [3, -1]]$

PYQ 2023 · Delhi · 2m · 60s

Q10. If $A = [[2, 3], [1, 2]]$, then A^{-1} equals:

- (A) $[[2, -3], [-1, 2]]$ (B) $[[2, 3], [1, 2]]$
(C) $[[-2, 3], [1, -2]]$ (D) $[[1, 0], [0, 1]]$

PYQ 2019 · All India · 5m · 120s

Q11. A square matrix A is invertible by elementary operations only if:

(A) A is symmetric

(B) $|A| = 0$

(C) $|A| \neq 0$

(D) A is diagonal

PYQ 2022 · Delhi · 1m · 20s

Q12. The skew-symmetric part of $A = \begin{bmatrix} 3 & 5 \\ 1 & -1 \end{bmatrix}$ is:

(A) $\begin{bmatrix} 3 & 3 \\ 3 & -1 \end{bmatrix}$

(B) $\begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} 0 & 4 \\ -4 & 0 \end{bmatrix}$

(D) $\begin{bmatrix} 3 & 1 \\ 5 & -1 \end{bmatrix}$

PYQ 2020 · Delhi · 3m · 90s

Q13. Which of the following is always true for square matrices A and B?

(A) $AB = BA$

(B) $(A + B)^T = A^T + B^T$

(C) $(AB)^T = A^T B^T$

(D) $A^T = A$

PYQ 2022 · All India · 1m · 30s

Q14. If A is 2×2 and $3A = \begin{bmatrix} 6 & 9 \\ 3 & 12 \end{bmatrix}$, then A equals:

(A) $\begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$

(B) $\begin{bmatrix} 6 & 9 \\ 3 & 12 \end{bmatrix}$

(C) $\begin{bmatrix} 18 & 27 \\ 9 & 36 \end{bmatrix}$

(D) $\begin{bmatrix} 3 & 3 \\ 3 & 3 \end{bmatrix}$

PYQ 2023 · All India · 2m · 45s

Q15. The matrix $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$ has an inverse:

(A) Yes, $\begin{bmatrix} 4 & -2 \\ -2 & 1 \end{bmatrix}$

(B) Yes, the identity

(C) No, because $|A| = 0$

(D) No, because it is not square

PYQ 2024 · Delhi · 2m · 45s

ANSWER KEY & EXPLANATIONS

Q 1-15 · MARK YOUR SCORE

Q1. Answer: B

$mn = 18 \Rightarrow (1,18), (18,1), (2,9), (9,2), (3,6), (6,3)$ — 6 ordered pairs.

Q2. Answer: B

Inner dimensions $2 = 2$ match; product order is (rows of A) $\times$ (cols of B) = 3×5 .

Q3. Answer: A

$x + y = 6, x - y = 2 \Rightarrow 2x = 8, x = 4, y = 2$.

Q4. Answer: A

A scalar matrix with $k = 4$ is $4I$, i.e. 4's on the diagonal, 0 elsewhere.

Q5. Answer: B

Reversal law of transpose: the transpose of a product reverses the order.

Q6. Answer: B

$A^T = -A$ gives $a_{ii} = -a_{ii} \Rightarrow 2a_{ii} = 0 \Rightarrow a_{ii} = 0$.

Q7. Answer: B

BA needs (cols of B) = (rows of A) = 2, so B must be $k \times 2$.

Q8. Answer: A

Row 1: $[1 \cdot 0 + 2 \cdot 1, 1 \cdot 1 + 2 \cdot 0] = [2, 1]$; Row 2: $[3 \cdot 0 + 4 \cdot 1, 3 \cdot 1 + 4 \cdot 0] = [4, 3]$.

Q9. Answer: A

Symmetric part $P = \frac{1}{2}(A + A^T) = \begin{bmatrix} 3 & 3 \\ 3 & -1 \end{bmatrix}$; since $P^T = P$, its transpose is itself.

Q10. Answer: A

$|A| = 1$; by elementary row operations $A^{-1} = \begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$; $A \cdot A^{-1} = I$.

Q11. Answer: C

An inverse exists iff A is non-singular, i.e. $|A| \neq 0$.

Q12. Answer: B

$Q = \frac{1}{2}(A - A^T) = \frac{1}{2} \begin{bmatrix} 0 & 4 \\ -4 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix}$.

Q13. Answer: B

Transpose distributes over addition; the others fail in general.

Q14. Answer: A

Scalar multiplication is entrywise; $A = (1/3)(3A) = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$.

Q15. Answer: C

$|A| = 1 \cdot 4 - 2 \cdot 2 = 0$, so A is singular and has no inverse.