

EXAM-DAY · 90-MIN REVISION CARD

Matrices

Print this · Fold it · Carry to the exam-hall gate · Revise once · Then walk in.

FORMULAS & KEY RESULTS

Order: an $m \times n$ matrix has m rows, n columns, mn entries

Entry a_{ij} sits in row i , column j

Equality: $A = B$ iff same order
AND $a_{ij} = b_{ij}$ for all i, j

Row matrix: $1 \times n$; Column matrix: $m \times 1$; Square: $m \times m$

Diagonal matrix: $a_{ij} = 0$ for $i \neq j$

Scalar matrix: diagonal matrix with all diagonal entries equal to k

Identity I : scalar matrix with $k = 1$ ($a_{ii} = 1$, else 0)

Zero matrix O : every entry 0

Addition/subtraction: only for matrices of the SAME order, entrywise

Scalar mult: $(kA)_{ij} = k \cdot a_{ij}$

Product defined: $A(m \times n) \cdot B(n \times p) = (m \times p)$; inner dimensions match

Multiplication is NOT commutative: $AB \neq BA$ in general

Associative: $(AB)C = A(BC)$;
Distributive: $A(B+C) = AB + AC$

Identity law: $AI = IA = A$

Transpose: $(A^T)_{ij} = a_{ji}$

$(A^T)^T = A$

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

$(kA)^T = k A^T$

$(AB)^T = B^T A^T$ (order reverses)

Symmetric: $A^T = A$; Skew-symmetric: $A^T = -A$ (diagonal all 0)

Any square $A = \frac{1}{2}(A + A^T) + \frac{1}{2}(A - A^T)$ = symmetric + skew-symmetric

Inverse by elementary ops: $A = IA$ (row ops) until left = $I \Rightarrow$ right = A^{-1}

TOP 5 PYQ PATTERNS

1 Order of a matrix / possible orders from element count

1 mark · 80% of years

$mn = N \rightarrow$ list all ordered factor pairs $\rightarrow$ count

2 Unknown entries via equality of matrices

2 marks · 70% of years

Equate corresponding entries $\rightarrow$ solve the small linear system

3 Verify $(AB)^T = B^T A^T$ or test symmetry

3 marks · 65% of years

Compute both sides; remember transpose reverses product order

4 Express A as symmetric + skew-symmetric

4 marks · 55% of years

$P = \frac{1}{2}(A + A^T)$, $Q = \frac{1}{2}(A - A^T)$; verify $A = P + Q$

5 Inverse by elementary row operations

5 marks · 45% of years

$A = IA$; ROW ops only until left = I ; right is A^{-1} ; verify

90-MIN REVISION FLOW

0-15 min

Memorise types of matrices + the order/equality rules; redraw the order grid

15-35 min

Drill 8 MCQs on order, equality, and matrix multiplication compatibility

35-55 min

Practice all five transpose properties; verify $(AB)^T = B^T A^T$ on a 2×2 example

55-75 min

Do one symmetric/skew-symmetric decomposition + one inverse by row operations

75-90 min

Review the 7 misconceptions; redo any error; lock the inverse method steps

Invertible $\Leftrightarrow A \neq 0$ (non-singular)		
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Confidence, not anxiety. You've practised this all year. Trust your steps. Don't change strategy on exam morning. Helpline: +91 70330 05444 · readyforboards.com
