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CBSE Class 12 · Maths

Matrices

10 most probable questions for Boards 2027

Q1. 1 mark · Multiple choice

Which notation represents a general row matrix of order 1 × n? (A) $B = [b_{ij}]_{n\times 1}$ (B) $B = [b_{ij}]_{1\times n}$ (C) $B = [b_{ij}]_{n\times n}$ (D) $B = [b_{ij}]_{1\times 1}$

Answer

(B) $B = [b_{ij}]_{1\times n}$ — In general, $B = [b_{ij}]_{1\times n}$ is a row matrix of order 1 × n.

Q2. 2 marks · Short answer

Write the numbers 4, −2 and 7 as a matrix with exactly one row, and state its order.

Answer

A row matrix is a matrix that has only one row.
[4 −2 7]
∴ Order = 1 × 3

Q3. 3 marks · Medium answer

A spreadsheet records quantities of two products as the row matrix Q = [4 3] and their unit costs as the column matrix C = [5; 8]. Calculate the total cost using matrix multiplication.

Answer

[4 3] [5
       8]
= [4 × 5 + 3 × 8]
= [20 + 24]
∴ Total cost = 44

Q4. 5 marks · Long answer

Explain how matrix dimensions determine whether the operations in a matrix equation are defined. Describe how, once two matrices are equal, their corresponding entries can be equated to find unknowns. In your explanation, define a matrix as an ordered rectangular array and describe the order of a matrix.

Answer

A matrix is an ordered rectangular array of numbers or functions, and its order specifies its number of rows and columns.
1. An m × n matrix has m rows and n columns. Matrix addition and subtraction are defined only when the matrices have the same order, so their corresponding entries can be combined.
2. For a product AB to be defined, the number of columns of A must equal the number of rows of B. If A is m × n and B is n × p, then AB has order m × p.
3. The two sides of a matrix equation must have the same order for the matrices to be equal.

Matrices of different orders cannot be equal.
4. Two matrices of the same order are equal exactly when their corresponding entries are equal. Equating those entries gives equations that can be solved to find unknowns.
Thus, matrix orders determine which operations are defined, while entrywise equality helps determine unknowns.

Q5. 8 marks · Very long answer

Let A = [[1, 2], [0, −1]], B = [[2, 1], [3, 0]] and C = [[1, 0], [−2, 4]]. Calculate A(B + C), AB + AC, (A + B)C and AC + BC. Hence verify both distributive laws A(B + C) = AB + AC and (A + B)C = AC + BC.

Answer

A(B + C) = [1 2
0 −1]([2 1
3 0] + [1 0
−2 4])

= [1 2
0 −1][3 1
1 4]

= [5 9
−1 −4]

AB = [1 2
0 −1][2 1
3 0]

= [8 1
−3 0]

AC = [1 2
0 −1][1 0
−2 4]

= [−3 8
2 −4]

AB + AC = [8 1
−3 0] + [−3 8
2 −4]

= [5 9
−1 −4]

∴ A(B + C) = AB + AC.

(A + B)C = ([1 2
0 −1] + [2 1
3 0])[1 0
−2 4]

= [3 3

3 −1][1 0
−2 4]

= [−3 12
5 −4]

AC + BC = [−3 8
2 −4] + [2 1
3 0][1 0
−2 4]

= [−3 8
2 −4] + [0 4
3 0]

= [−3 12
5 −4]

∴ (A + B)C = AC + BC.

Q6. 12 marks · Multiple choice

For matrices A and B of suitable orders and a scalar k, which option gives the correct set of transpose properties?
(A) (A′)′ = A; (kA)′ = kA′; (A + B)′ = A′ + B′; (AB)′ = B′A′
(B) (A′)′ = A′; (kA)′ = A′; (A + B)′ = A′ + B; (AB)′ = A′B′
(C) (A′)′ = A; (kA)′ = A′; (A + B)′ = A′ + B′; (AB)′ = A′B′
(D) (A′)′ = A; (kA)′ = kA′; (A + B)′ = A′ + B′; (AB)′ = A′B′

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/matrices

Q7. 1 mark · Multiple choice

Which condition characterises an identity matrix $A = [a_{ij}]_{n\times n}$? (A) $a_{ij} = 0$ for all i, j (B) $a_{ij} = 1$ for all i, j (C) $a_{ij} = 1$ when i = j and 0 when i ≠ j (D) $a_{ij} = 0$ when i = j and 1 when i ≠ j

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/matrices

Q8. 2 marks · Short answer

If A = [1 2 3], find AA^{T}.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/matrices

Q9. 3 marks · Medium answer

For A = [1 2 3; 4 5 6], identify a_{23} and calculate the total number of entries in A.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/matrices

Q10. 5 marks · Long answer

Represent the vertices P(1, 0), Q(3, 2), R(1, 3), S(−1, 2) of a quadrilateral as a 2 × 4 matrix, with the vertices as columns. Also find all possible orders of a matrix with 8 entries.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/matrices

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