Matrices Order Problems

Problems Based on the Order of a Matrix with Examples

The **order** of a matrix is defined as **m × n**, where:

- **m** = Number of rows
- **n** = Number of columns

Examples and Problems:

1. Identify the Order of the Matrix

Problem: Determine the order of the following matrices:

(a) $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$

(b) $B = \begin{bmatrix} 7 & 8 \\ 9 & 10 \\ 11 & 12 \\ 13 & 14 \end{bmatrix}$

Solution:

- (a) A has **2 rows** and **3 columns**, so its order is **2 × 3**.
- (b) B has **4 rows** and **2 columns**, so its order is **4 × 2**.

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2. Finding the Number of Elements in a Matrix

Problem: Find the total number of elements in a **5 × 7** matrix.

Solution:
The total number of elements in a matrix of order **m × n** is given by:

$$\text{Total elements} = m \times n$$

For a **5 × 7** matrix:

$$5 \times 7 = 35$$

Thus, the matrix has **35 elements**.

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3. Determining Order from a Given Matrix Representation

Problem: Given the matrix

$$C = \begin{bmatrix} 2 & 4 & 6 & 8 \\ 1 & 3 & 5 & 7 \end{bmatrix}$$

Find its order.

Solution:
Matrix C has **2 rows** and **4 columns**, so its order is **2 × 4**.

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4. Identifying Square and Rectangular Matrices

Problem: Identify whether the given matrices are square or rectangular:

(a) $D = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$

(b) $E = \begin{bmatrix} 10 & 11 & 12 \\ 13 & 14 & 15 \end{bmatrix}$

Solution:

- (a) D has order **3 × 3**, meaning it has equal rows and columns, so it is a **square matrix**.
- (b) E has order **2 × 3**, meaning it has different rows and columns, so it is a **rectangular matrix**.

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5. Constructing a Matrix with a Given Order

Problem: Construct a **3 × 2** matrix using elements from the set {1, 2, 3, 4, 5, 6}.

Solution: A **3 × 2** matrix has **3 rows** and **2 columns**. One possible matrix is:

$$F = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$$

These problems cover fundamental concepts related to the order of matrices.