

4.10 Matrices

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS dimensions 维数 • matrix 矩阵 • determinant 行列式

Objective

Build the skills to answer exam questions on **matrices**.

You must be able to:

- state the **dimensions** 维数 of a **matrix** 矩阵
- add matrices and multiply a matrix by a scalar

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Matrices

A matrix is a rectangular array of numbers with dimensions rows $\times$ columns. Add matrices of the **same size** entrywise; multiply by a scalar entrywise.

■ Example

$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ is 2×2 . Adding $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ gives $\begin{bmatrix} 2 & 2 \\ 3 & 5 \end{bmatrix}$.

2 Practice

2.1 State the dimensions of a matrix with 2 rows and 3 columns. [1]

2.2 State when two matrices can be added. [1]

2.3 Add $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} + \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$. [2]

3 Exam-style questions

3.1 A matrix with 3 rows and 2 columns is [1]

- **A** 2×3
- **B** 3×2
- **C** 6×1
- **D** 2×2

3.2 Two matrices can be added only if they [1]

- **A** are square
- **B** have the same dimensions
- **C** are diagonal
- **D** have determinant 0

3.3 $A = \begin{bmatrix} 2 & 0 \\ 1 & 3 \end{bmatrix}$.

(a) State the dimensions. [1]

(b) Find $2A$. [1]

(c) Find $A + \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$. [1]

Solutions

2.1 2×3 .

2.2 when they have the same dimensions.

2.3 $\begin{bmatrix} 1 & 3 \\ 4 & 4 \end{bmatrix}$.

3.1 B.

3.2 B.

3.3 (a) 2×2 . (b) $\begin{bmatrix} 4 & 0 \\ 2 & 6 \end{bmatrix}$. (c) $\begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$.