

Matrices as objects: notation, shapes, special matrices

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Practice problems

1. Given the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$, what is the value of the entry a_{23} ?
2. Write out the 3×3 diagonal matrix D where $d_{11} = 2$, $d_{22} = -1$, and $d_{33} = 4$.
3. If a matrix M is a 4×2 matrix, how many total entries does it have, and is it a square matrix?

Solutions

1. Given the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$, what is the value of the entry a_{23} ?

- Locate the second row of the matrix, which is $[4, 5, 6]$.
- Locate the third column of that row, which is the value 6.

Answer: 6

2. Write out the 3×3 diagonal matrix D where $d_{11} = 2$, $d_{22} = -1$, and $d_{33} = 4$.

- Start with a 3×3 matrix of zeros.
- Place 2 at row 1, column 1.
- Place -1 at row 2, column 2.
- Place 4 at row 3, column 3.

Answer: $\begin{bmatrix} 2 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 4 \end{bmatrix}$

3. If a matrix M is a 4×2 matrix, how many total entries does it have, and is it a square matrix?

- The total number of entries is the product of the number of rows and columns: $4 \times 2 = 8$.
- A square matrix must have the same number of rows and columns. Since $4 \neq 2$, it is not square.

Answer: 8 entries; not square