Matrices

EXERCISE 3.1

1. In the matrix

$$A = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$$

write:

(i) The order of the matrix,
(ii) The number of elements,
(iii) Write the elements $a_{13}, a_{21}, a_{33}, a_{24}, a_{23}$.

2. If a matrix has 24 elements, what are the possible orders it can have? What if it has 13 elements?
3. If a matrix has 18 elements, what are the possible orders it can have? What if it has 5 elements?
4. Construct a 2×2 matrix, $A = [a_{ij}]$, whose elements are given by:

(i) $a_{ij} = \frac{(i+j)^2}{2}$
(ii) $a_{ij} = \frac{i}{j}$
(iii) $a_{ij} = \frac{(i+2j)^2}{2}$

5. Construct a 3×4 matrix, whose elements are given by:

(i) $a_{ij} = \frac{1}{2}|-3i + j|$
(ii) $a_{ij} = 2i - j$

6. Find the values of x, y and z from the following equations:

(i)

$$\begin{bmatrix} 4 & 3 \\ x & 5 \end{bmatrix} = \begin{bmatrix} y & z \\ 1 & 5 \end{bmatrix}$$

(ii)

$$\begin{bmatrix} x+y & 2 \\ 5+z & xy \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$$

(iii)

$$\begin{bmatrix} x+y+z \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$$

7. Find the value of a, b, c and d from the equation:

$$\begin{bmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$$

8. $A = [a_{ij}]_{m\times n}$ is a square matrix, if

   (A) $m < n$
   (B) $m > n$
   (C) $m = n$
   (D) None of these

9. Which of the given values of x and y make the following pair of matrices equal:

$$\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix}, \quad \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$$

   (A) $x = -\frac{1}{3}, y = 7$
   (B) Not possible to find
   (C) $y = 7, x = -\frac{2}{3}$
   (D) $x = -\frac{1}{3}, y = -\frac{2}{3}$

10. The number of all possible matrices of order 3×3 with each entry 0 or 1 is:

(A) 27
(B) 18
(C) 81
(D) 512
