

## Unit 1

# Matrices and Determinants



## Exercise 1.1

Q1. Find the order of the following matrices.

$$A = \begin{bmatrix} 2 & 3 \\ -5 & 6 \end{bmatrix},$$

$$B = \begin{bmatrix} 2 & 0 \\ 3 & 5 \end{bmatrix},$$

$$C = [2 \quad 4],$$

$$D = \begin{bmatrix} 4 \\ 0 \\ 6 \end{bmatrix},$$

$$E = \begin{bmatrix} a & d \\ b & e \\ c & f \end{bmatrix},$$

$$f = [2],$$

$$G = \begin{bmatrix} 2 & 3 & 0 \\ 1 & 2 & 3 \\ 2 & 4 & 5 \end{bmatrix},$$

$$H = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 0 & 6 \end{bmatrix}$$

**Solution:**

**Order of the Matrix:**

The number of rows and columns in a Matrix specifies its order.

**Ans. (i)** Matrix A has two rows and two columns

So, its order = number of rows x number of columns = 2-by-2.

**Ans. (ii)** Matrix B has two rows and two columns

So, its order = number of rows x number of columns = 2-by-2.

**Ans. (iii)** Matrix C has one row and two columns

So, its order = number of rows x number of columns = 1-by-2.

**Ans. (iv)** Matrix D has three rows and one column

So, its order = number of rows x number of columns = 3-by-1.

**Ans. (v)** Matrix E has three rows and two columns

So, its order = number of rows x number of columns = 3-by-2.



# 9th Mathematics Exercise 1.1 Notes

**Ans. (vi)** Matrix F has one row and one column

So, its order = number of rows x number of columns = 1-by-1.

**Ans. (vii)** Matrix G has three rows and three columns

So, its order = number of rows x number of columns = 3-by-3.

**Ans. (viii)** Matrix A has two rows and three columns

So, its order = number of rows x number of columns = 2-by-3.

**Q2. Which of the following matrices are equal?**

$$A = [3],$$

$$B = [3 \ 5],$$

$$C = [2 \ 4],$$

$$D = \begin{bmatrix} 4 \\ 0 \\ 6 \end{bmatrix},$$

$$E = \begin{bmatrix} 4 & 0 \\ 6 & 2 \end{bmatrix},$$

$$f = \begin{bmatrix} 2 \\ 6 \end{bmatrix},$$

$$G = \begin{bmatrix} 2 & 3 & 0 \\ 1 & 2 & 3 \\ 2 & 4 & 5 \end{bmatrix},$$

$$H = \begin{bmatrix} 4 & 0 \\ 6 & 2 \end{bmatrix},$$

$$I = [3 \ 3 + 2],$$

$$J = \begin{bmatrix} 2 + 2 & 2 - 2 \\ 2 + 4 & 2 + 0 \end{bmatrix}$$

**Solution:**

Matrices are said to be equal if

- (i) They are of same order
- (ii) Their corresponding values are equal

So, according to this definition

**Ans. (a)** Matrices A and C are equal  $A = C$ .

**(b)** Matrices B and I are equal  $B = I$ .

**(c)** Matrices E, H and J are equal  $E = H = J$ .

**(d)** Matrices F and G are equal  $F = G$ .

**Q3. Find the values of a, b, c, and d which satisfy the matrix equation.**

$$\begin{bmatrix} a + c & a + 2b \\ c - 1 & 4d - 6 \end{bmatrix} = \begin{bmatrix} 0 & -7 \\ 3 & 2d \end{bmatrix}$$

**Solution:**



## 9th Mathematics Exercise 1.1 Notes

$$\text{As, } \begin{bmatrix} a+c & a+2b \\ c-1 & 4d-6 \end{bmatrix} = \begin{bmatrix} 0 & -7 \\ 3 & 2d \end{bmatrix}$$

By comparing the corresponding elements

$$\text{So, } a+c=0$$

$$a=-c \quad \text{-----(i)}$$

$$a+2b=-7$$

$$2b=-(a+7) \quad \text{-----(ii)}$$

$$c-1=3$$

$$c=3+1$$

$$\mathbf{c=4} \quad \text{-----(iii)}$$

By putting the value of "c" in equation (i), we will get

$$\mathbf{a=-4} \quad \text{-----(iv)}$$

By putting the value of "c" in equation (ii), we will get

$$2b=-(-4+7)$$

$$2b=-(-3)$$

$$b=-(3/2)$$

$$\mathbf{b=-1.5} \quad \text{-----(v)}$$

Similarly,

$$4d-6=2d$$

$$4d-2d=6$$

$$2d=6$$

$$d=6/2$$

$$\mathbf{d=3} \quad \text{-----(vi)}$$

From equations (iii), (iv), (v) and (vi) we get

$$\mathbf{a=-4,}$$

$$\mathbf{b=-1.5,}$$

## 9th Mathematics Exercise 1.1 Notes

$$c = 4$$

$$d = 3$$

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