

Board - Foundation

Class - 10th

Topic - Operations on Matrices

1. If

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

what is $A + B$?

(a) $\begin{bmatrix} 3 & 1 \\ 5 & 9 \end{bmatrix}$

(b) $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

(c) $\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$

(d) $\begin{bmatrix} 4 & 1 \\ 5 & 9 \end{bmatrix}$

2. What is the order of the product of a 2×3 matrix and a 3×4 matrix?

(a) 2×4

(b) 3×2

(c) 4×3

(d) 3×3

3. If

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix},$$

what is $2A$?

(a) $\begin{bmatrix} 2 & 4 & 6 \\ 8 & 10 & 12 \\ 14 & 16 & 18 \end{bmatrix}$

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

(c) $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

(d) $\begin{bmatrix} 3 & 6 & 9 \\ 12 & 15 & 18 \\ 21 & 24 & 27 \end{bmatrix}$

4. Which of the following operations is NOT defined for all matrices?
- (a) Addition of two matrices of the same order
 - (b) Multiplication of any two matrices
 - (c) Scalar multiplication
 - (d) Subtraction of two matrices of the same order

5. If

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, \quad B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix},$$

what is AB ?

- (a) $\begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix}$
 - (b) $\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$
 - (c) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$
 - (d) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
6. If A is a 3×3 matrix and B is a 3×3 matrix, which of the following is true?
- (a) $A + B$ is defined
 - (b) $A - B$ is defined
 - (c) AB is defined
 - (d) All of the above

7. If

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix},$$

what is the transpose A^T ?

- (a) $\begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$
- (b) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$
- (c) $\begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix}$
- (d) $\begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix}$

8. For matrices A (2×3) and B (3×2), the product AB will be of order:

- (a) 2×2
- (b) 3×3
- (c) 2×3
- (d) 3×2

9. If

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

what is the element in the second row, third column of A ?

- (a) 1
- (b) 2
- (c) 3
- (d) 0

10. If A and B are both 3×3 matrices, which of the following statements is true?

- (a) $AB = BA$ always
- (b) AB and BA are both defined
- (c) AB is not defined
- (d) $A + B$ is not defined

11. If

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

what is $A - 2A$?

- (a) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$
- (b) $\begin{bmatrix} 0 & -1 \\ -2 & -3 \end{bmatrix}$
- (c) $\begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$
- (d) $\begin{bmatrix} 0 & 2 \\ 4 & 6 \end{bmatrix}$

12. If

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, \quad B = \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix},$$

what is $A + B$?

(a) $\begin{bmatrix} 6 & 8 \\ 10 & 12 \end{bmatrix}$

(b) $\begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix}$

(c) $\begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}$

(d) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

13. Which property does NOT always hold for matrices of the same dimension M, N and scalar c ?

(a) $M + N = N + M$

(b) $c(M + N) = cM + cN$

(c) $MN = NM$

(d) $M - N = -(N - M)$

14. If

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & 2 \\ 2 & 1 \\ 3 & 0 \end{bmatrix},$$

what will be the order of AB ?

(a) 2×2

(b) 3×3

(c) 2×3

(d) 3×2

15. If

$$A = \begin{bmatrix} 1 & 0 & 2 \\ -1 & 3 & 1 \\ 0 & 2 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 2 & 1 & 0 \\ 1 & 0 & 1 \\ 3 & 2 & 1 \end{bmatrix},$$

what is the value of the element in the second row, first column of the matrix $(A + B)$?

(a) 1

(b) 0

(c) 2

(d) 3