

Matrices
Assignment

1. Give $A = \begin{bmatrix} 2 & -1 \\ 2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$, find the matrix X , such that $A + X = 2B + C$.
2. If $X = \begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$, show that $6X - X^2 = 9I$ is the unit matrix.
3. If $A = \begin{bmatrix} 3 & x \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 16 \\ 0 & -y \end{bmatrix}$, find x , and y when $A^2 = B$.
4. Find x, y if $\begin{bmatrix} -2 & 0 \\ 3 & 1 \end{bmatrix} \begin{bmatrix} -1 \\ 2x \end{bmatrix} + 3 \begin{bmatrix} -2 \\ 1 \end{bmatrix} = 2 \begin{bmatrix} y \\ 3 \end{bmatrix}$.
5. Evaluate $\begin{bmatrix} 4 \sin 30^\circ & 2 \cos 60^\circ \\ \sin 90^\circ & 2 \cos 0^\circ \end{bmatrix} \begin{bmatrix} 4 & 5 \\ 5 & 4 \end{bmatrix}$.
6. If $\begin{bmatrix} x - y & 2x + z \\ 2x - y & 3z + w \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$, find the values of x, y, z and w .
7. If $\begin{bmatrix} -3 & 2 \\ 0 & -5 \end{bmatrix} \begin{bmatrix} x \\ 2 \end{bmatrix} \begin{bmatrix} -5 \\ y \end{bmatrix}$, find the values of x and y .
8. If $\begin{bmatrix} x - 2 & 5 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} 4 & 2 \\ y & 5 \end{bmatrix} + \begin{bmatrix} -4 & 1 \\ -1 & 2 \end{bmatrix}$, find the values of x and y .
9. If $\begin{bmatrix} a & -b \\ -b & -a \end{bmatrix} \begin{bmatrix} -a & b \\ b & a \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$, find the value of $a^2 + b^2$.
10. If $\begin{bmatrix} 8 & -2 \\ 1 & 4 \end{bmatrix} X = \begin{bmatrix} 12 \\ 10 \end{bmatrix}$, write down:
 - (i) the order of the matrix X .
 - (ii) the matrix X .
11. If $A = \begin{bmatrix} 0 & 1 & -2 \\ 5 & -1 & -4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -3 & -1 \\ 0 & -2 & 5 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & -5 & 1 \\ -4 & 0 & 6 \end{bmatrix}$, compute $5A - 3B + 4C$.
12. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 4 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 5 & 1 \\ 7 & 4 \end{bmatrix}$, compute (i) $A(B + C)$ (ii) $(B + C)A$.
13. If $A = \begin{bmatrix} -1 & 1 & -1 \\ 3 & -3 & 3 \\ 5 & -5 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{bmatrix}$ compute $A^2 - B^2$
14. Find the 2×2 matrix X , which satisfies the equation $\begin{bmatrix} 3 & 7 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} 0 & 2 \\ 5 & 3 \end{bmatrix} + 2X = \begin{bmatrix} 1 & -5 \\ -4 & 6 \end{bmatrix}$.
15. Given $A = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$, evaluate $A^2 - 4A$.

Answers

1. $\begin{bmatrix} -7 & 5 \\ 6 & 2 \end{bmatrix}$

2. $9I$

3. $x = 4$ and $y = -1$

4. $x = 30$ and $y = -2$

5. $\begin{bmatrix} 13 & 14 \\ 14 & 13 \end{bmatrix}$

6. $x = 1, y = 2, z = 3$ and $w = 4$

7. $x = 3$ and $y = -10$

8. $x = 2$ and $y = 4$

9. 1

10. (i) It is 2×1 (ii) $\begin{bmatrix} 2 \\ 2 \end{bmatrix}$.

11. $\begin{bmatrix} 5 & -6 & -3 \\ 9 & 1 & -11 \end{bmatrix}$

12. (i) $\begin{bmatrix} 29 & 14 \\ 65 & 30 \end{bmatrix}$ (ii) $\begin{bmatrix} 13 & 22 \\ 29 & 46 \end{bmatrix}$.

13. $\begin{bmatrix} -2 & 1 & -1 \\ 3 & -4 & 3 \\ 5 & -5 & 4 \end{bmatrix}$.

14. $\begin{bmatrix} -17 & -6 \\ -12 & -5 \end{bmatrix}$

15. $\begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$.
