

4-2 Operations of Matrices

Objective: Add and Subtract Matrices
Multiply by a Matrix by a scalar

Addition: $A + B$

Ex 1) $A = \begin{bmatrix} 6 & 4 \\ -1 & 0 \end{bmatrix}$ $B = \begin{bmatrix} -3 & 1 \\ 0 & 3 \end{bmatrix}$

$A + B = \begin{bmatrix} 6+3 & 4+1 \\ -1+0 & 0+3 \end{bmatrix} = \begin{bmatrix} 9 & 5 \\ -1 & 3 \end{bmatrix}$ ← Answer

****Must be same size or can't add**

$C = \begin{bmatrix} 4 & -2 & 0 \\ 1 & 5 & -1 \end{bmatrix}$ $D = \begin{bmatrix} -6 & 7 \\ -9 & 3 \end{bmatrix}$

$C + D = \text{DNE}$ — Does not exist

Subtraction: $A - B$

Ex 2) $A = \begin{bmatrix} 9 & 2 \\ -4 & 7 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 6 \\ 8 & 2 \end{bmatrix}$

$A - B = \begin{bmatrix} 9-3 & 2-6 \\ -4-8 & 7-2 \end{bmatrix} = \begin{bmatrix} 6 & -4 \\ -12 & 5 \end{bmatrix}$ ← Answer

Scalar Multiplication: $K[A]$

Ex3) $A = \begin{bmatrix} 2 & 8 & -3 \\ 5 & -9 & 2 \end{bmatrix}$ Find $3A$

$3A = 3 \begin{bmatrix} 2 & 8 & -3 \\ 5 & -9 & 2 \end{bmatrix} = \begin{bmatrix} 3 \cdot 2 & 3 \cdot 8 & 3 \cdot -3 \\ 3 \cdot 5 & 3 \cdot -9 & 3 \cdot 2 \end{bmatrix} = \begin{bmatrix} 6 & 24 & -9 \\ 15 & -27 & 6 \end{bmatrix}$ Answer

Ex4) $A = \begin{bmatrix} 2 & 1 \\ -1 & 3 \\ 0 & 5 \end{bmatrix}$ Find $\frac{1}{2}A$

$\frac{1}{2}A = \begin{bmatrix} 1 & \frac{1}{2} \\ -\frac{1}{2} & 1.5 \\ 0 & 2.5 \end{bmatrix}$ ← Answer

* Properties For Addition *
 *A, B, C same dimensions and any scalar c, then

- * Commutative: $A+B = B+A$
 * Associative: $(A+B)+C = A + (B+C)$
 * Distributive: $k(A+B) = kA + kB$

*Will be a true/false question.

Ex5) $A = \begin{bmatrix} 2 & 3 \\ -1 & 0 \end{bmatrix}$ $B = \begin{bmatrix} -2 & 1 \\ 0 & -1 \end{bmatrix}$ Find $4A - 3B$

$$4A - 3B = \begin{bmatrix} 8 & 12 \\ -4 & 0 \end{bmatrix} - \begin{bmatrix} -6 & 3 \\ 0 & -3 \end{bmatrix} = \begin{bmatrix} 14 & 9 \\ -4 & 3 \end{bmatrix}$$

Answer