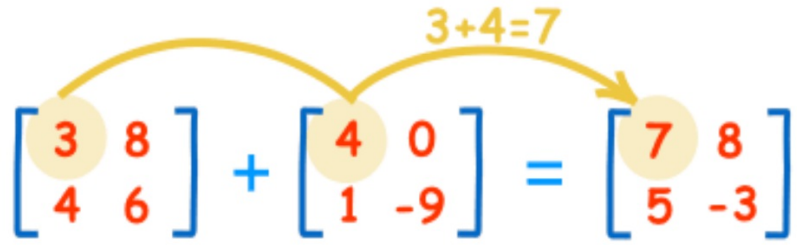
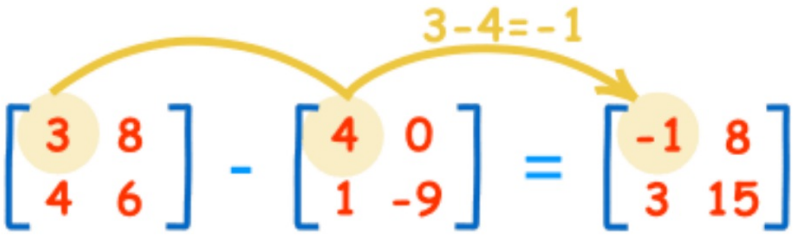
Lesson 2
Adding & Subtracting Matrices

Introduction to Matrices - Adding and Subtracting Matrices

Two matrices can be added or subtracted **ONLY** if they have the same dimensions. They must have the same number of rows & columns.

To add or subtract matrices, add or subtract the elements in the matching positions.





Example 1

D + F

$$D = \begin{bmatrix} 6 & -2 \\ 3 & 7 \end{bmatrix} \qquad F = \begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix}$$

2 x 2 2 x 2

$$D + F = \begin{bmatrix} 7 & -4 \\ 0 & 11 \end{bmatrix}$$

Example 2

$A + C$

$$A = \begin{bmatrix} -5 & 2 & 0 \\ 7 & -3 & 4 \\ -1 & 3 & 2 \end{bmatrix} \quad 3 \times 3$$

$$C = \begin{bmatrix} 0 & -1 & 8 \\ 6 & -14 & 2 \\ 9 & 5 & 1 \end{bmatrix} \quad 3 \times 3$$

$$A + C = \begin{bmatrix} -5 & 1 & 8 \\ 13 & -17 & 6 \\ 8 & 8 & 3 \end{bmatrix}$$

Example 3

F - D

$$D = \begin{bmatrix} 6 & -2 \\ 3 & 7 \end{bmatrix} \qquad F = \begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix}$$

$$F - D = \begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix} + \begin{bmatrix} -6 & +2 \\ -3 & -7 \end{bmatrix}$$

$$= \begin{bmatrix} -5 & 0 \\ -6 & -3 \end{bmatrix}$$

Example 4

A - C

$$A = \begin{bmatrix} -5 & 2 & 0 \\ 7 & -3 & 4 \\ -1 & 3 & 2 \end{bmatrix} + C = \begin{bmatrix} 0 & +1 & -8 \\ -6 & +14 & -2 \\ -9 & -5 & -1 \end{bmatrix}$$

$$A - C = \begin{bmatrix} -5 & 3 & -8 \\ 1 & 11 & 2 \\ -10 & -2 & 1 \end{bmatrix}$$

Example 5 $(A + C) + (C - A)$

$$A = \begin{bmatrix} -5 & 2 & 0 \\ 7 & -3 & 4 \\ -1 & 3 & 2 \end{bmatrix} \qquad C = \begin{bmatrix} 0 & -1 & 8 \\ 6 & -14 & 2 \\ 9 & 5 & 1 \end{bmatrix}$$

$$\left(\begin{bmatrix} -5 & 2 & 0 \\ 7 & -3 & 4 \\ -1 & 3 & 2 \end{bmatrix} + \begin{bmatrix} 0 & -1 & 8 \\ 6 & -14 & 2 \\ 9 & 5 & 1 \end{bmatrix} \right) + \left(\begin{bmatrix} 0 & -1 & 8 \\ 6 & -14 & 2 \\ 9 & 5 & 1 \end{bmatrix} + \begin{bmatrix} +5 & -2 & 0 \\ -7 & +3 & -4 \\ +1 & -3 & -2 \end{bmatrix} \right)$$

$$= \begin{bmatrix} -5 & 1 & 8 \\ 13 & -17 & 6 \\ 8 & 8 & 3 \end{bmatrix} + \begin{bmatrix} 5 & -3 & 8 \\ -1 & -11 & -2 \\ 10 & 2 & -1 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & -2 & 16 \\ 12 & -28 & 4 \\ 18 & 10 & 2 \end{bmatrix}$$