

Matrices

- A matrix is a collection of numbers, called elements, which are arranged in horizontal rows & vertical columns. The collection of numbers is surrounded by brackets.

27	35	47
86	65	39
72	48	51
79	55	42

- Each element in a matrix is named using a lowercase letter that matches the name of the matrix, followed by 2 small numbers below & to the right of the letter such as a_{13} .

$a_{13} = 179$

127	135	179	168
219	199	227	235
155	167	197	153

Adding and Subtracting Matrices

- To add and subtract matrices, both matrices must have the same number of rows & columns.

Examples ▽

Add

$$A = \begin{bmatrix} 1 & 2 & -5 \\ -2 & 4 & 6 \\ 5 & -8 & 15 \end{bmatrix} \quad B = \begin{bmatrix} 3 & -6 & 9 \\ 5 & 8 & 11 \\ -4 & -7 & -5 \end{bmatrix} \rightarrow A+B = \begin{bmatrix} 1+3 & 2+(-6) & -5+9 \\ -2+5 & 4+8 & 6+11 \\ 5+(-4) & -8+(-7) & 15+(-5) \end{bmatrix}$$

Subtract

$$X = \begin{bmatrix} 12 & 8 & 7 \\ 6 & -3 & 6 \\ -2 & 10 & -4 \end{bmatrix} \quad Y = \begin{bmatrix} 6 & 2 & -5 \\ 12 & 7 & 14 \\ -8 & -9 & 10 \end{bmatrix} \rightarrow X-Y = \begin{bmatrix} 12-6 & 8-2 & 7-(-5) \\ 6-12 & -3-7 & 6-14 \\ -2-(-8) & 10-(-9) & -4-10 \end{bmatrix}$$

Multiplying a Matrix By a Scalar

Examples ▽

Positive

$$A = \begin{bmatrix} 1 & -5 & 9 \\ 2 & 3 & -6 \\ -4 & 8 & 7 \end{bmatrix}, \quad 2A \begin{bmatrix} 2 \times 1 & 2 \times (-5) & 2 \times 9 \\ 2 \times 2 & 2 \times 3 & 2 \times (-6) \\ 2 \times (-4) & 2 \times 8 & 2 \times 7 \end{bmatrix} \rightarrow 2A = \begin{bmatrix} 2 & -10 & 18 \\ 4 & 6 & -12 \\ -8 & 16 & 14 \end{bmatrix}$$