

ADDITION AND SUBTRACTION OF MATRICES

Created: Wednesday, 23 November 2011 12:06 | Published: Wednesday, 23 November 2011 12:06 | Written by [Super User](#) | [Print](#)

Addition of Matrices

$$A+B = \begin{bmatrix} a_{11}+b_{11} & a_{12}+b_{12} & \cdots & a_{1n}+b_{1n} \\ a_{21}+b_{21} & a_{22}+b_{22} & \cdots & a_{2n}+b_{2n} \\ \vdots & \vdots & & \vdots \\ a_{p1}+b_{p1} & a_{p2}+b_{p2} & \cdots & a_{pn}+b_{pn} \end{bmatrix}$$

$$\begin{bmatrix} a_1 & a_2 \\ a_3 & a_4 \end{bmatrix} - \begin{bmatrix} b_1 & b_2 \\ b_3 & b_4 \end{bmatrix} = \begin{bmatrix} a_1-b_1 & a_2-b_2 \\ a_3-b_3 & a_4-b_4 \end{bmatrix}$$

The sum of two [matrices](#) is obtained by adding the corresponding elements of both the matrices. While adding two matrices, their order must be the same.

In general, if $A = [a_{ij}]$ and $B = [b_{ij}]$ are two matrices of same order then the sum of A and B is given by matrix $C = [c_{ij}]$ where $c_{ij} = a_{ij} + b_{ij}$ for all possible values of i and j.

For example: If $A = \begin{bmatrix} 1 & -4 & 5 \\ -8 & 2 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -2 & 4 \\ 5 & 7 & 0 \end{bmatrix}$ then

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

Properties of Matrix addition

- i) [Commutative](#) Law: If A and B are any two matrices of same order then $A+B = B+A$
- ii) [Associative](#) Law: If A, B and C are any three matrices of same order then $A+(B+C) = (A+B)+C$
- iii) Existence of [additive identity](#): Let A be a matrix of order m x n and 0 be an m x n zero matrix, then $A+0 = 0+A$.
- iv) Existence of [additive inverse](#): Let A be any matrix, then we can find another matrix $-A$ such that $A+(-A) = 0$. So additive inverse of A is $-A$.

Difference of two matrices

If A and B are two matrices of same order, then the difference $A-B$ is obtained by subtracting the corresponding elements of A and B.

For example: If $A = \begin{bmatrix} 1 & 2 \\ -8 & 3 \\ 9 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 5 \\ 1 & -6 \\ 8 & -4 \end{bmatrix}$

Then compute $3A - B$

$$3A - B = \begin{bmatrix} 3 & 6 \\ -24 & 9 \end{bmatrix} - \begin{bmatrix} 2 & 5 \\ 1 & -6 \end{bmatrix} = \begin{bmatrix} 3-2 & 6-5 \\ -24-1 & 9-(-6) \end{bmatrix}$$

Find $2A + B$

2. If $A = \begin{pmatrix} -1 & 2 & 0 \\ 0 & 3 & 6 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & -4 & 3 \\ 9 & -4 & -3 \end{pmatrix}$

Find $A - B$

3. Find the values of x and y given the following equation:

$$\begin{pmatrix} -3 & x \\ 2y & 0 \end{pmatrix} + \begin{pmatrix} 4 & 6 \\ -3 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 7 \\ -5 & 1 \end{pmatrix}$$

Now try it yourself! Should you still need any help, [click here](#) to schedule live online session with e Tutor!

About eAge Tutoring:

[eAgeTutor.com](#) is the premium online tutoring provider. Using materials developed by highly qualified educators and leading content developers, a team of top-notch software experts, and a group of passionate educators, eAgeTutor works to ensure the success and satisfaction of all of its students.

[Contact us](#) today to learn more about our tutoring programs and discuss how we can help make the dreams of the student in your life come true!

Reference Links:

[\(http://en.wikipedia.org/wiki/Matrix_\)](http://en.wikipedia.org/wiki/Matrix_) (mathematics)

<http://en.wikipedia.org/wiki/Commutativity>

<http://en.wikipedia.org/wiki/Associativity>

http://en.wikipedia.org/wiki/Additive_identity

http://en.wikipedia.org/wiki/Additive_inverse

Category:ROOT

[Joomla SEF URLs by Artio](#)