
MATRICES

Matrix - a rectangular array of numbers enclosed in parentheses

Example:

$$\begin{pmatrix} 2 & 1 & 13 \\ 6 & -2 & 8 \end{pmatrix}$$

Each number in a matrix is called an "entry".

A matrix is made up of "rows" and "Columns".

The Dimensions of a matrix state the size of it.

ROWS X COLUMNS

$$\begin{pmatrix} 2 & 1 & 13 \\ 6 & -2 & 8 \end{pmatrix}$$

The dimensions of the above matrix is: 2 x 3

The entry in row 2 column 3 is: 8

2x2

$$\begin{pmatrix} 2 & 4 \\ -1 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 2 & 5 & 9 & 11 \end{pmatrix}$$

1x4

3x2

$$\begin{pmatrix} 8 & 1 \\ -3 & 0 \\ 4 & 6 \end{pmatrix}$$

-3

$$\begin{pmatrix} 8 & 6 & -1 \\ 4 & -5 & 0 \\ 3 & 2 & 1 \\ 2 & 0 & 0 \\ 5 & -5 & 4 \end{pmatrix}$$

1. The entry in row 3 column 2 is the number 0.

False. 2

2. The entry in r5c2 is -5.

True

3. The dimensions of the matrix are 3x5.

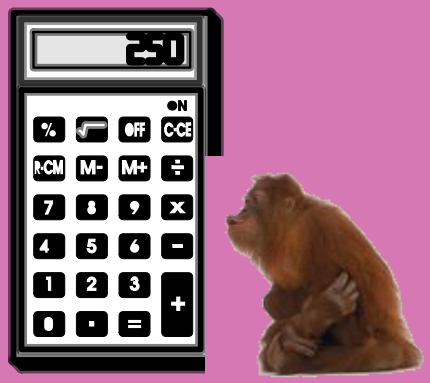
False 5x3

4. The number 4 is located in r2c1 and r5c2.

False

Can you spot the mistakes?

Addition and Subtraction of Matrices!



1

$$\begin{pmatrix} 2 & 4 \\ 1 & 6 \end{pmatrix} + \begin{pmatrix} 4 & 3 \\ -2 & 5 \end{pmatrix}$$

When adding and subtracting matrices you add the corresponding entries.

$$= \begin{pmatrix} 6 & 7 \\ -1 & 11 \end{pmatrix}$$

2.

$$\begin{pmatrix} 2 \\ -5 \\ -3 \end{pmatrix} + \begin{pmatrix} 0 \\ 6 \\ -1 \end{pmatrix}$$

$$= \begin{pmatrix} 2 \\ 1 \\ -4 \end{pmatrix}$$

3.

$$\begin{pmatrix} 2 & 1 \\ 3 & 8 \end{pmatrix} + \begin{pmatrix} 1 \\ 3 \end{pmatrix}$$

To add and subtract matrices
the ***dimensions***
of each matrix
must be the ***same***.

Not Possible

4. $\begin{pmatrix} -1 & 2 \\ 3 & -8 \end{pmatrix} - \begin{pmatrix} 3 & -4 \\ 2 & -1 \end{pmatrix}$?

When subtracting matrices, "add the opposite".

same opposite

$$\begin{pmatrix} -1 & 2 \\ 3 & -8 \end{pmatrix} + \begin{pmatrix} -3 & +4 \\ -2 & +1 \end{pmatrix}$$

$$= \begin{pmatrix} -4 & 6 \\ 1 & -7 \end{pmatrix}$$

5. $\begin{pmatrix} -2 \\ -3 \end{pmatrix} - \begin{pmatrix} 1 & 8 \\ -5 & 4 \end{pmatrix}$

Not Possible !!

6. $\begin{pmatrix} -2 & 4 \\ -4 & -3 \\ -8 & 2 \end{pmatrix} + \begin{pmatrix} +4 & +4 \\ -6 & -5 \\ -3 & -1 \end{pmatrix}$

$= \begin{pmatrix} 2 & 8 \\ -10 & -8 \\ -11 & 1 \end{pmatrix}$

$$A=\begin{pmatrix}3 & -1\\ 0 & 4\end{pmatrix} \quad B=\begin{pmatrix}0 & 1\\ 3 & 0\end{pmatrix} \quad C=\begin{pmatrix}-3 & 0\\ -1 & -2\end{pmatrix}$$

Find B+C

$$\begin{pmatrix}0 & 1\\ 3 & 0\end{pmatrix}+\begin{pmatrix}-3 & 0\\ -1 & -2\end{pmatrix}$$

$$=\begin{pmatrix}-3 & 1\\ 2 & -2\end{pmatrix}$$

State the Negative (opposite) Matrix

$$\begin{pmatrix} 2 & 7 & 5 \\ 3 & -5 & 2 \\ 5 & 1 & -2 \end{pmatrix}$$

$$\begin{pmatrix} -2 & -7 & -5 \\ -3 & +5 & -2 \\ -5 & -1 & +2 \end{pmatrix}$$

What are x, y, & z

$$\begin{pmatrix} 2 & 6 & 8 \\ -2 & 5 & z \end{pmatrix} = \begin{pmatrix} x & 6 & 8 \\ -2 & y & 6 \end{pmatrix}$$

x=2 y=5 z=6

Solve for x in each of the following

a) $$x+\begin{pmatrix}3 & -3\\ 6 & 2\end{pmatrix}=\begin{pmatrix}8 & 2\\ 9 & 1\end{pmatrix}$$

$$\begin{pmatrix}5 & 5\\ 3 & -1\end{pmatrix}+\begin{pmatrix}3 & -3\\ 6 & 2\end{pmatrix}=\begin{pmatrix}8 & 2\\ 9 & 1\end{pmatrix}$$

$$X=\begin{pmatrix}5 & 5\\ 3 & -1\end{pmatrix}$$

b) $\begin{pmatrix} 0 & -3 \\ 6 & 2 \end{pmatrix} - X = \begin{pmatrix} 6 & 5 \\ -1 & -4 \end{pmatrix}$ $+X$

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

$$\begin{pmatrix} 0 & -3 \\ 6 & 2 \end{pmatrix} = \begin{pmatrix} 6 & 5 \\ -1 & -4 \end{pmatrix} + \begin{pmatrix} -6 & -8 \\ 7 & 6 \end{pmatrix}$$

$$X = \begin{pmatrix} -6 & -8 \\ 7 & 6 \end{pmatrix}$$