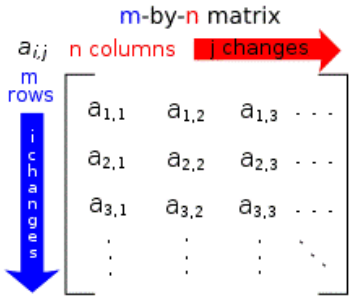
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INTRODUCTION TO MATRICES

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Matrix



A matrix isn't just a Hollywood movie. It is an ordered rectangular array of numbers or functions into rows and columns. The numbers or functions are called the elements or entries of the matrix.

We denote matrices by capital letters.

The following are some examples for matrices.

Klan has 20 shirts and 14 pants

Alan has 12 shirts and 7 pants

Chris has 8 shirts and 8 pants

Now we can arrange this in a tabular form as follows

	Shirts	Pants
Klan	20	14
Alan	12	7
Chris	8	8

1. $\begin{bmatrix} 20 & 14 \\ 12 & 7 \\ 8 & 8 \end{bmatrix}$ — First row, Second row, Third row; First column, Second Column

The horizontal lines of elements are said to constitute, rows of the matrix and the vertical lines of elements are said to constitute, columns of the matrix.

Given below some matrices, write the number of rows and columns for each matrix.

$$A=\begin{bmatrix} -1 & 3 \\ 5 & 0 \\ 4 & -9 \end{bmatrix} \quad B=\begin{bmatrix} \sin x \\ \sec x \\ \tan x \end{bmatrix} \quad C=\begin{bmatrix} 1+x & \sin x & 3x \\ x^5+2 & -4 & 0 \end{bmatrix}$$

Number of rows of A = 3 No. of rows of B = 3 No. of rows of C = 2

No. of columns of A = 2 No. of columns of B = 1 No. of columns of C = 3

Order of a Matrix

If a matrix has ‘m’ rows and ‘n’ columns then its order is m x n (read it as m by n)
Generally we denote A = $[a_{ij}]_{m \times n}$ to indicate that A is a matrix of order m x n
From the above examples we can say,
Order of A = 3 x 2
Order of B = 3 x 1
Order of C = 2 x 3
In general a_{ij} means the element which belongs to i^{th} row and j^{th} column
For example,

In the matrix $A = \begin{pmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & 5/2 & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{pmatrix}$, write

i) The order of the matrix,
ii) The number of elements
iii) Write the elements a_{13}, a_{21}, a_{33}, a_{24}, a_{23}
Solution: i) Order of the matrix A is 3 x 4
ii) Number of elements =12
iii) $a_{13} = 19$, $a_{21} = 35$, $a_{33} = -5$, $a_{24} = 12$ and $a_{23} = 5/2$
Example: If a matrix has 18 elements, what are the possible orders it can have?
Solution: The possible orders are 1 x 18, 2 x 9, 3 x 6, 6 x 3, 9 x 2, 18 x 1

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

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Reference Links:

- http://en.wikipedia.org/wiki/Matrix_(mathematics)
- http://en.wikipedia.org/wiki/Row_and_column_spaces
- http://www.mathreference.com/la-mpoly,order.html

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