

Chapter 3

Matrices

Lesson 1

Introduction to Matrices

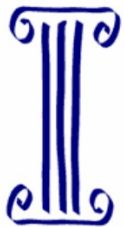
A **matrix** (plural matrices) is a rectangular array of numbers, symbols, or expressions, arranged in rows and columns.



A matrix is usually shown by a capital letter
(such as A or B)

Each entry (or "element") is shown by a lower case letter
with a "subscript" of row,column

$$A = \begin{bmatrix} a_{1,1} & a_{1,2} & a_{1,3} \\ a_{2,1} & a_{2,2} & a_{2,3} \end{bmatrix} \Rightarrow 2 \times 3$$



Columns go
up and down

Rows go left-right
Columns go up-down

To remember that rows come before columns use the word
"arc": $a_{r,c}$

Example 1

$$A = \begin{pmatrix} 1 & 0 & 4 \\ -5 & 1 & 2 \\ 7 & 11 & -1 \end{pmatrix}$$

3x3

$$a_{3,2} = 11$$

$$a_{2,2} = 1$$

$$a_{1,1} = 1$$

Example 2

$$B = \begin{pmatrix} 7 & 19 \\ 84 & 3 \\ 19 & 98 \\ 5 & 23 \end{pmatrix} \Rightarrow 4 \times 2$$

$b_{2,3}$ = Does not exist

$$b_{3,1} = 19$$

$$b_{2,2} = 3$$

$$b_{1,2} = 19$$

Example 3

$$A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \Rightarrow 3 \times 3$$

$$0 \Rightarrow \begin{matrix} a_{1,2} & a_{3,2} \\ a_{1,3} \\ a_{2,1} \\ a_{2,3} \\ a_{3,1} \end{matrix}$$

$$1 \Rightarrow \begin{matrix} a_{1,1} \\ a_{2,2} \\ a_{3,3} \end{matrix}$$

