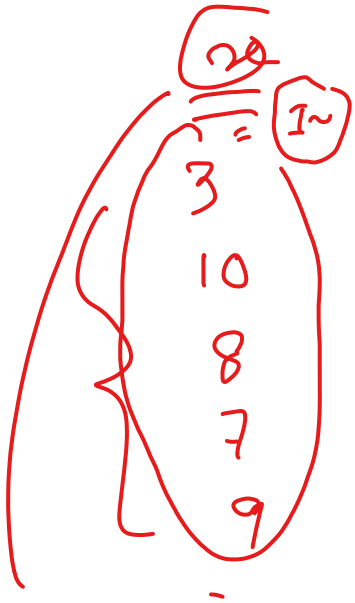
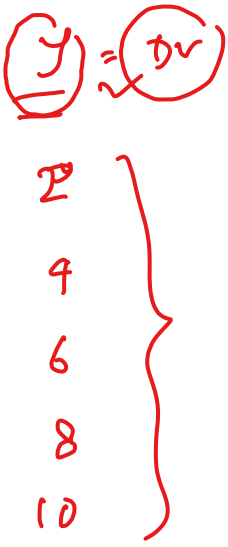




x = 5.

Q1 x + y.

Q2 y - y.

Q3 x * y.

Q3 x / y.

1 Dimensional. 1. Dim.

How to create 1D vectors

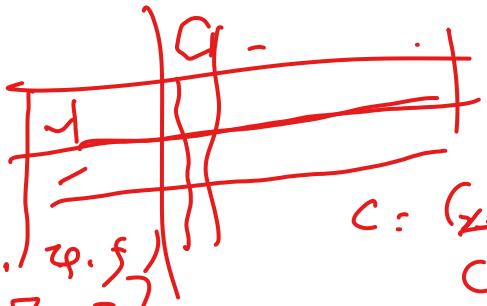
1Dimensional arrays

Vector. → 1 Dimensional.

matrix → 2 "

Excel. | Spss | Eviews | > matrix

Row & Col.



x ← c(5, 10, 8, 7, 9)

c: Create

Create (or Concatenate)

x

y ← c(2, 3, 5, 9, 10).

y

z ← (x + y)

z

(5, 14, 14, 16, 19)

Nature of matrix

1. Addition of two matrices.
2. Subtraction " "
3. multiplication " "
4. Division " "

II. How to Calculate rank of a matrix.

III. How to create a symmetric matrix.

$$A = \begin{pmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \end{pmatrix}_{2\times 3}$$

$$B = \begin{pmatrix} 3 & 4 & 5 \\ 6 & 7 & 8 \end{pmatrix}_{2\times 3}$$

We can add & subtract two matrices if the order of matrices are same.

We can multiply two matrices if the column of 1st matrix equal to row of 2nd matrix.

A 3×2 B 2×3

A . B

C R

Col of 1st matrix = row of the 2nd matrix

Order of the resultant matrix = Row of the 1st matrix × Col. of the 2nd matrix

A . 1000 × 1 only 1 variable

B 1 × 1000

AB 1000 × 1000

BA 1×1

A = 39 × 10

A^T = Transpose of the matrix.

A^T . 10 × 39.

A . A^T . 39 × 39.

$A^T A$ = ( ) 10×10

Case | variable

Case Analysis

variable

$$C = \begin{pmatrix} 1 & r_{12} & r_{13} \\ r_{21} & 1 & r_{23} \\ r_{31} & r_{32} & 1 \end{pmatrix}$$

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 5 & 6 \\ 3 & 6 & 7 \end{pmatrix}_{3 \times 3}$$

$a_{ij} = a_{ji}$

$$B = \begin{pmatrix} 2 & 3 & 4 \\ -3 & 5 & 6 \\ 4 & 6 & 9 \end{pmatrix}_{3 \times 3}$$

$C = A \cdot B$

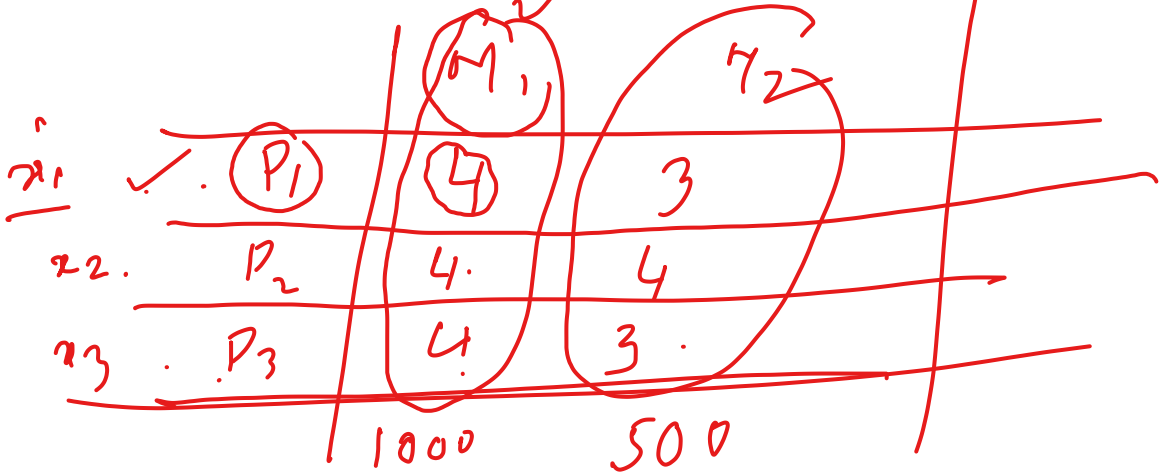
$$\begin{pmatrix} \quad \end{pmatrix}_{3 \times 3}$$

$C =$

Rank.

Three Products

2 m/c



$$\begin{cases} 4x_1 + 4x_2 + 4x_3 = 1000 \\ 3x_1 + 4x_2 + 3x_3 = 500 \end{cases}$$

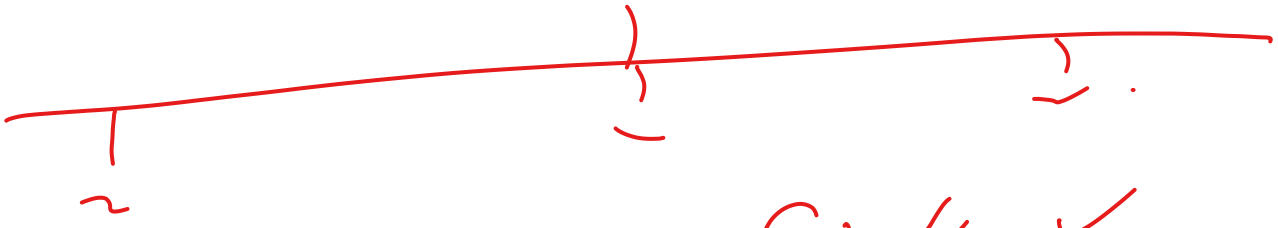
2×3 ✓

$AX = B$.

For solving we need to create a square matrix (row = col)

3×3

2×3



2×2

With the help of Two machines we can produce maximum two products

When Rank = 2

⇒ 2 Product can be Produced.

A: $\begin{vmatrix} 1 & 1 \\ 1 & 1 \end{vmatrix} = 0$

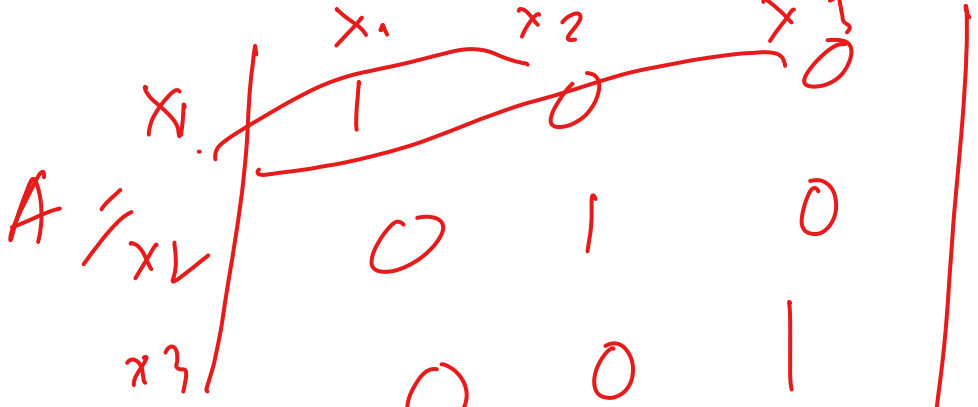
Rank (A) = 1.

If det ≠ 0 ⟹ Rank = order of square / minimum matrix

$$A = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$$

	x	y	z
1	2	2	~~8~~
2	4	4	6
3	6	6	~~7~~

Two rows & Two cols be same value of det, then becomes zero



$|A| = 1 \neq 0$ $R(A) = 3$

independently

$\Rightarrow$

If the value of $|A| \neq 0$ then the variables used in data analysis are independent.

$\Rightarrow$ The variables are highly associated with each other.

$\det \rightarrow 0$

Huge NC occurs among the ind. variables.