Determinants

Determinants of order 2

Let $a_{11}, a_{12}, a_{21}, a_{22}$ be any four numbers (real or complex). The symbol

$$\Delta = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix}$$

represents the number $a_{11}a_{22} - a_{21}a_{12}$ and is called the a determinant of order 2 with.
The number $a_{11}, a_{12}, a_{21}, a_{22}$ are called elements of the determinant and the number $a_{11}a_{22} - a_{21}a_{12}$ is called the value of determinant

Determinants of order 3

The symbol

$$\Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$$

is called a determinants of order 3 and its value is the number

$$a_{11}\begin{vmatrix} a_{22} & a_{23} \\ a_{32} & a_{33} \end{vmatrix} - a_{12}\begin{vmatrix} a_{21} & a_{23} \\ a_{31} & a_{33} \end{vmatrix} + a_{13}\begin{vmatrix} a_{21} & a_{22} \\ a_{31} & a_{32} \end{vmatrix}$$

This is called the expansion of the determinant along its first row

a_{ij} — i^{th} row & j^{th} column element

$(-1)^{i+j}$