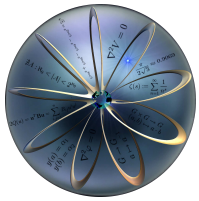

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rule of Sarrus

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Synonym	Sarrus' rule
Related topic	LaplaceExpansion

For calculating the value of a determinant

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

with three rows, it is comfortable to use the *rule of Sarrus* (invented 1833 by the French mathematician P. F. Sarrus).

The rule comprises that first one writes the two first columns of the determinant on the of the determinant (seeing thus a 3×5 matrix!):

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

Here one sums the products on all lines parallel to the main diagonal of D and subtracts the products on the lines parallel to the second diagonal of D. Accordingly, one obtains the expression

$$a_{11}a_{22}a_{33} + a_{12}a_{23}a_{31} + a_{13}a_{21}a_{32} - a_{13}a_{22}a_{31} - a_{11}a_{23}a_{32} - a_{12}a_{21}a_{33},$$

which gives the value of the determinant D.

There is no corresponding rule for determinants with more or less rows.