Tips and Tricks:

Tip-1

As much as possible, avoid direct calculation of determinats using lengthy expansions. Be calm and try to use determinats properties to first simplify and then expand. Some

Tip-2

Minors and cofactors are important concept to understand inverse of a matrix in further lectures.

Note: (a) A determinant of order 3 will have 9 minors and each minor will be a determinant of order 2 and a determinant of order 4 will have 16 minors and each minor will be determinant of order 3.

(b) $\underline{a_{11}C_{21} + a_{12}C_{22} + a_{13}C_{23} = 0,}$ i.e. cofactor multiplied to different row/column elements results in zero value.

Tip-3

Row and Column Operations of Determinants

(a) $R_i \leftrightarrow R_j \quad or \quad C_i \leftrightarrow C_j, \quad when \quad i \neq j$; This notation is used when we interchange ith row (or column) and jth row (or column).

(b) $R_i \leftrightarrow C_i$; This converts the row into the corresponding column.

(c) $R_i \to Rk_i \quad or \quad C_i \to kC_i; \ k \in R$; This represents multiplication of ith row (or column) by k.

(d) $R_i \to R_ik + R_j \quad or \quad Ci \to C_ik + C_j; (i \neq j)$; This symbol is used to multiply ith row (or column) by k and adding the jth row (or column) to it.

These operations are VERY USEFUL in simplifying complex determinants.