298. $$\begin{vmatrix} 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 & 1 & 1 & 1 & 1 \\ 1 & 1 & 0 & 0 & 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 0 & 0 & 0 & 1 \end{vmatrix} = 5.$$

Show that the value of a determinant formed like the above, but with m units and n zeros in each line, is m if m be prime to n, but is zero if m be not prime to n.

299. If $(a, b, c, f, g, h)(\theta\phi, \theta+\phi, 1)^2 = 0,$

and $(a, b, c, f, g, h)(\phi\chi, \phi+\chi, 1)^2 = 0,$

find $(\alpha, \beta, \gamma, \kappa, \lambda, \mu)(\theta\chi, \theta+\chi, 1)^2 = 0,$

and show that if

$$\alpha = a,\ \beta = b,\ \gamma = c,\ \kappa = f,\ \lambda = g,\ \mu = h,$$

then will

$$ac + b^2 + 2bg - 4fh = 0.$$

300. The minors of order $2n-1$ of a skew symmetric determinant of order $2n$ are divisible by the square root of the determinant.