1. Pairwise sums

$$\frac{(\sum_{i=1}^{n} a_i)^2 - (\sum_{i=1}^{n} a_i^2)}{2}$$

2. Number of steps from (i,j) to (m,n)

$${}^{m-i+n-j}C_{n-j} = {}^{m-i+n-j}C_{m-i}$$