

1995 Paper 1 Question 1

Discrete Mathematics

Take the identity $(1 + \alpha)^r(1 + \alpha)^s = (1 + \alpha)^{r+s}$ and use generating functions to derive Vandermande's convolution:

$$\sum_{k \geq 0} \binom{r}{k} \binom{s}{r-k} = \binom{r+s}{r}$$

Reach the same result by considering how many ways there are to choose r people from r men and s women. [10 marks]