

Mathematical Tripos Part IA

1988 Paper 6 Question 9

Discrete Mathematics

State the principle of mathematical induction. Prove your statement, assuming that every non-empty subset of the natural numbers has a least element.

The Master of Regent's College and her husband invite n Fellows and their spouses to a party. After the party the Master asks everyone (including her own husband) how many people they shook hands with, and receives $2n+1$ different answers. Of course, no woman shook hands with her own husband. Show that the person who shook the most hands was **not** the Master's husband. How many hands did the Master shake?