

Q1) Find the max set of numbers between 100-200 (inclusive of both) which are relatively prime ?

Q2) Consider a chess board with two of the diagonally opposite corners removed. Is it possible to cover the board with pieces of domino whose size is exactly two board squares?

Q3) Prove that however one selects 55 integers  $1 \leq x_1 < x_2 < x_3 < \dots < x_{55} \leq 100$ , there will be some two that differ by 9, some two that differ by 10, a pair that differ by 12, and a pair that differ by 13. Surprisingly, there need not be a pair of numbers that differ by 11.

Q4) There are several people in the room. Some are acquaintances, others are not. Show that some two people have the same number of acquaintances.

Q5) A chess master who has 11 weeks to prepare for a tournament decides to play at least one game every day but, in order not to tire himself, he decides not to play more than 12 games during any calendar week. Show that there exists a succession of consecutive days during which the chess master will have played exactly 21 games.

Q6) There are eight guests at a Secret Santa party. Each guest brings a gift and each receives another gift in return. No one is allowed to receive the gift they brought. How many ways are there to distribute the gifts?