

## Additional Problems for Further Interest (Homework)

1. Demonstrate that in any group of five people, there are at least two people who have an identical number of friends within the group.
2. Imagine standing at the North Pole. You walk 1 km south, then 1 km east, and finally 1 km north. Where do you end up? Can you find points on Earth where this journey brings you back to your starting location?
3. Prove that the set of prime numbers is infinite.
4. Imagine you are in an aeroplane flying at an altitude  $h$  above the Earth's surface. The sky is completely clear, with no clouds or fog. What is the farthest distance you can see? Write an expression for this distance in terms of the Earth's radius  $R$  and the altitude of the airplane  $h$ .