RAM Maths Circle

In this session, the mentors discussed the following questions with the students.

1. On a straight road, distances in kilometres are marked from a tree. The distance between two consecutive signposts is equal. Two of the signboards show $\frac{1}{18}$ km, and $\frac{1}{5}$ km. Which position of the signs shows $\frac{1}{6}$ km from the tree?

2. At each of the vertices of a cube sits a person. Two person are said to be adjacent if and only if they sit at either end of one of the cube's edges. Each person is either a 'truther', who always tells the truth, or a 'liar', who always lies. All eight person say "I am adjacent to exactly two liars". What is the maximum number of person who are telling the truth?
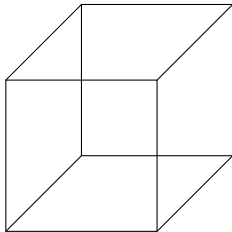
3. What is the largest integer with distinct digits such that the sum of any two of its digits is never a perfect square?