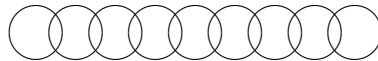**Math Club November 24 2001**

" Math Dep of Moscow University for schoolchildren of the age 14 - 16 "

1. Draw this figure tracing any arc only once not taking the pen away from the paper

2. Two boys are runing down an escalator. Bill is faster than Victor. Who will count more steps ?

3. The height of any tree in a garden is greater than 30 but less than 150 feet. The distance between any two trees does not exceed the difference of their heights. Decide if it is possible to walk at most 240 feet having touched each tree and returning to the starting point.

4. A spot on a table has the form of a quadrilateral. A hostess wants to cover the spot with four round napkins whose diameters are equal to the lengths of the sides of the quadrilateral. Will there remain any uncovered part of the spot if she put the centers of the napkins at the middlepoints of the corresponding sides?

5. Lady Elfly said when boarding a bus : -" The product of ages of my three sons is 36 while the sum of their ages is the number of this bus service."

Her friend miss Marple replied : –" This information is not sufficient to find the ages. "

Then Lady Elfly added: –" Recently my oldest boy caught a cold."

–"Now I know how old they are –" exclaimed Miss Marple. And what about you, can you determine the bus service number ?

6. Eltsin and Putin divided the Kremlin star made of chocolate. It had the regular pentagon shape. Putin took the part dashed. Who took more?
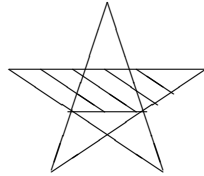
7. The product of successive numbers $1 \times 2 \times 3 \times \ldots \times (n-1) \times n$ is denoted by $n!$ (this is read " n–factorial"). It is known that

$$35! = 10333147966386144929 * 66651337523200000000$$

Here $*$ stands for some digit. Find this digit.

8. Two clever pirates John Silver and Billy Bones are playing the following game: There is a strip of leather divided into twenty squares. There is a golden coin at the leftmost square. They move the coin in turns to any other square (to the right or to the left). They agree that each time the length of the shift must be different from all the previous shifts. The person who has no further possibility to move the coin fails. Who will win if Silver is to start?

9. Coins of 1, 15 and 50 Manats circulate in a certain country. Visiting this country Mike bought a book for several coins. The change contained one coin more. Decide what could be the least possible price of this book.