**Math Club October 26 2002**
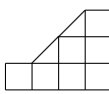
" Math Dep of Moscow University for schoolchildren
of the age 14 - 16 "

**1.** Cut the figure into two equal parts: 

**2.** Twenty points are marked on a circle. Two clever boys are playing the following game: They join in turns some pair of marked points by a chord. The chords should not intersect inside the circle. The one who can't draw a new chord loses the game. Who will win (the first or the second)?

**3.** Two clever girls are playing another game. Starting from the left bottom corner of the chess board they move in turns a single rook. They must shift it either to the right or upward. The one who fails to move further loses the game. Same question: who will win ?

**4.** Is it possible to distribute 209 identical coins between 21 persons so that any two get different amount of money ?
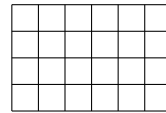
**5.** A boy spends a second to write down a digit. He wrote down all digits of number $2^{2002}$ and then of number $5^{2002}$. How many days did he spend?

**6.** A naturalist was captured by cannibals. Their chief said: We always follow an ancient custom: You should say a statement. If it happens to be true we will eat you, if it happens to be false our pet lion will eat you. What should the naturalist do ?

**7.**   Seven magicians are sitting at the round table. (You should know that a magician can be either good or evil. Besides other strange features, evils always lie, and good ones always say truth.) It happened that each of these seven said – "One of my neighbours is evil, the other is good." Decide whether there are more good or evil magicians at the table?

**8.** How can you join all pairs of 5 points given by red and blue segments so that any triangle gets edges of two different colors?

**9.** Each night a swordfish cuts an edge of a fisherman's net (originally of size 4×6). How long can the net remain in one piece ?

**10.** Is it possible to cut a square into three parts to make up a non-equilateral triangle without right angles ?

**11.**   Is it possible to launch four satellites into the Space so that any place on the Earth should be observable from some of them ?