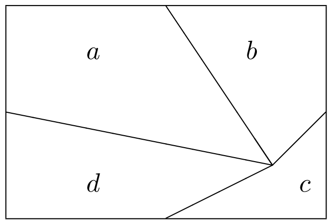
The Georg Mohr Contest in Mathematics 2002

Thursday 10 January 2002 at 9-13 h

Tools for writing and drawing are the only ones allowed.

Problem 1. An interior point in a rectangle is connected by line segments to the midpoints of its four sides. Thus four domains (polygons) with the areas a, b, c and d appear (see the figure).

Prove that $a + c = b + d$.



Problem 2. Prove that for any integer number n greater than 5 a square may be divided into n squares.

Problem 3. Two natural numbers have the sum 2002.

Can the product of the two numbers be divisible by 2002?

Problem 4. In triangle ABC we have $\angle C = 90^\circ$ and $AC = BC$. Furthermore M is an interior pont in the triangle so that $MC = 1$, $MA = 2$ and $MB = \sqrt{2}$.

Determine AB.

Problem 5. Homer Grog has written on 10 slips of paper the numbers 1, 3, 4, 5, 7, 9, 11, 13, 15, 17, one number on each slip. He arranges the slips in a ring and attempts to make the largest sum S of the numbers on 3 consecutive slips as small as possible.

What is the smallest value S can get?

Sponsors: Georg Mohr Fonden, Dansk Matematisk Forening, Matematiklærerforeningen, UNI-C og Gyldendal.