

PARITY

MATH CIRCLE (BEGINNERS) 10/30/2011

1) The numbers 1 through 10 are written in a row. Can the signs “+” or “-” be placed between them, so that the value of the resulting expression is 0?

2) Can a knight start at square $a1$ of a chessboard, and go to square $h8$, visiting each of the squares exactly once on the way?

3) A grasshopper jumps along a line. His first jump takes him 1 cm, his second 2 cm, and so on. Each jump can take him to the right or to the left. Show that after 2010 jumps the grasshopper cannot return to the point at which he started.

4) The product of 22 integers (i.e. whole numbers) is equal to 1. Show that their sum cannot be 0.

5) Can an ordinary 8×8 chessboard be covered with 1×2 dominoes so that only square $a1$ and $h8$ remain uncovered?

6) Three hockey pucks, A , B , and C , lie on a playing field. A hockey player hits one of them in such a way that it passes between the other two. He does this 25 times. Can he return the three pucks to their starting points?

Problems are taken from:

- D. Fomin, S. Genkin, I. Itenberg “Mathematical Circles (Russian Experience)”
- Previous UCLA Math Circle notes