

International Mathematics
TOURNAMENT OF THE TOWNS

Junior P-Level Paper

Fall 2007

- 1 [1]** (from The Good Soldier Švejk) Senior military doctor Bautze exposed $abccc$ malingerers among $aabbb$ draftees who claimed not to be fit for the military service. He managed to expose all but one draftees. (He would for sure expose this one too if the lucky guy was not taken by a stroke at the very moment when the doctor yelled at him “Turn around !..”) Now many malingerers were exposed by the vigilant doctor?
- Each digit substitutes a letter. The same digits substitute the same letters, while distinct digits substitute distinct letters.
- 2 [2]** Let us call a triangle “almost right angle triangle” if one of its angles differs from 90° by no more than 15° . Let us call a triangle “almost isosceles triangle” if two of its angles differs from each other by no more than 15° . Is it true that that any acute triangle is either “almost right angle triangle” or “almost isosceles triangle”?
- 3 [2]** A triangle with sides a, b, c is folded along a line ℓ so that a vertex C is on side c . Find the segments on which point C divides c , given that the angles adjacent to ℓ are equal.
- 4 [3]** From the first 64 positive integers are chosen two subsets with 16 numbers in each. The first subset contains only odd numbers while the second one contains only even numbers. Total sums of both subsets are the same. Prove that among all the chosen numbers there are two whose sum equals 65.
- 5 [4]** Two players in turns color the squares of a 4×4 grid, one square at the time. Player loses if after his move a square of 2×2 is colored completely. Which of the players has the winning strategy, First or Second?