

## Online Competition 2008. Juniors (7 grade)

1. Several 8 and 7 graders stand in pairs in line. In each pair 8 grader is taller than 7 grader. Is it true that if we rearrange 8 graders and 7 graders according to the height (from the tallest to the smallest) then again in each pair 8 grader is taller than 7 grader?
2. Does there exist a closed broken line consisting of 8 segments so that each segment is intersected by another one and only once.
3. There are 4 apples weighting 600g, 400g, 300g, 250 g. Alice and Ben are going to eat them. Each child wants to eat more. Alice picks up an apple first and begins to eat it. Immediately after Ben picks up an apple (from what is left) and also eats it. Both children eat with the same speed. A child who eats up the apple picks up another apple, etc. Find a strategy for Alice and a strategy for Ben that guarantees that a child ate as much as possible (no matter of the opponent's choice).
4. Determine the smallest number a multiple of 225 that can be written by using 1's and 0's only.
5. A company of 19 aboriginals were sitting at a round table (each aboriginal was either a TruthTeller (always tells the truth) or a Liar (always lies)). Each person declared that both his neighbors were Liars. After a quarrel, some people left the room. Each person who stayed declared that both his neighbors were TruthTellers. "Really, there are no Lairs among you now", said the last person who was leaving the room. All who left organized another party at another round table in new place. Each declared that among his neighbors there was exactly one TruthTeller. How many people were remaining in the first room?