Yugoslav IMO Team Selection Test 1979

Novi Sad, 1979

1. If $a_1, a_2, \dots, a_n$ are different positive integers, prove the inequality

$$(a_1 + a_2 + \cdots + a_n)^2 \leq a_1^3 + a_2^3 + \cdots + a_n^3.$$

2. Find all integers n with $1 < n < 1979$ having the following property: If m is an integer coprime with n and $1 < m < n$, then m is a prime number.

3. There are two circles of perimeter 1979. Let 1979 points be marked on the first circle, and several arcs with the total length 1 on the second. Show that it is possible to place the second circle onto the first in such a way that none of the marked points is covered by a marked arc.

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