

Yugoslav IMO Team Selection Test 1970

Belgrade, 1970

1. Positive integers a and b have n digits each in their decimal representation. Assume that m is a positive integer such that $n/2 < m < n$ and assume that each of the leftmost m digits of a is equal to the corresponding digit of b . Prove that

$$a^{\frac{1}{n}} - b^{\frac{1}{n}} < \frac{1}{n}.$$

2. Describe how to place the vertices of a triangle to the faces of a cube in such a way that the shortest side of the triangle is the biggest possible.
3. If all edges of a non-planar quadrilateral tangent the faces of a sphere, prove that all of the points of tangency belong to a plane.