

ACMS Problem Solving Seminar - Fall 2005

Presentation Material 3 - Pigeonhole Principle

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Note: The following problems are taken from various sources, which are listed in pdf form on the ACMS problem solving seminar webpage.

1. Show that in a group of 5 people, two of them have the same number of friends.
2. Show that an equilateral triangle cannot be covered up completely by two equilateral triangles of smaller size.
3. Given any five points on a sphere, show that some four of them must lie on a closed hemisphere.
4. If α is any real number, and q is any positive integer, show there exists an integer p such that

$$\left| \alpha - \frac{p}{q} \right| \leq \frac{1}{2q}$$