

National Mathematical Olympiad 1996

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– 2nd Round

1 Three numbers are selected at random from the interval $[0, 1]$. What is the probability that they form the lengths of the sides of a triangle?

2 In the following figure, $ABCD$ is a square of unit length and P, Q are points on AD and AB respectively. Find $\angle PCQ$ if $|AP| + |AQ| + |PQ| = 2$.

<https://cdn.artofproblemsolving.com/attachments/2/c/2f40db978c1d3fcbc0161f874b5cbec926058.png>

3 Let n be a positive integer. Prove that there is no positive integer solution to the equation $(x + 2)^n - x^n = 1 + 7^n$.

4 Determine all the solutions of the equation $x^3 + y^3 + z^3 = wx^2y^2z^2$ in natural numbers x, y, z, w . Justify your answer.
