The 1st INTERNATIONAL MATHEMATICAL CONTEST
NAMED AFTER PROF. JAN MARSZAŁ
time: 180 min.

Problem 1.

Solve the equation $\sqrt[2009]{2\left(1+\sqrt{x-2}\right)-x}+\sqrt[2009]{4\left(\sqrt{x+1}-1\right)-x}=\frac{2}{\left|\cos\frac{\pi x}{3}\right|}$ in the set of real number.

Problem 2.

Prove that if a natural number n is not divided by 5, then n^8+3n^4-4 is divided by 100.

Problem 3.

2009 different points have been chosen at random on a plane: $A_1, A_2, ..., A_{2009}$. Prove that there exists a circle containing exactly 2000 points.

Is there a circle containing exactly k points, if $1 \le k \le n$ and n is the number of points.

Good luck☺

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