

Kettering University Mathematics Olympiad For High School Students

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by parmenides51

- **p1.** Solve the equation $3^x + 9^x = 27^x$.
- p2.** An equilateral triangle is inscribed in a circle of area 1 m^2 . Then the second circle is inscribed in the triangle. Find the radius of the second circle.
- p3.** Solve the inequality: $2\sqrt{x^2 - 5x + 4} + 3\sqrt{x^2 + 2x - 3} \leq 5\sqrt{6 - x - x^2}$
- p4.** Peter and John played a game. Peter wrote on a blackboard all integers from 1 to 18 and offered John to choose 8 different integers from this list. To win the game John had to choose 8 integers such that among them the difference between any two is either less than 7 or greater than 11. Can John win the game? Justify your answer.
- p5.** Prove that given 100 different positive integers such that none of them is a multiple of 100, it is always possible to choose several of them such that the last two digits of their sum are zeros.
- p6.** Given 100 different squares such that the sum of their areas equals $1/2 \text{ m}^2$, is it possible to place them on a square board with area 1 m^2 without overlays? Justify your answer.

PS. You should use hide for answers.
