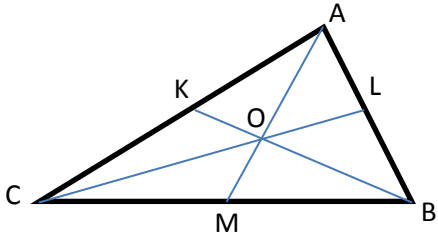


Form 12

1. Prove the inequality $\tan \alpha + \cot \alpha \leq \tan^2 \alpha + \cot^2 \alpha$.
2. Consider a triangle ABC that has medians with such length, that line segments with the same length could be sides of a right angled triangle. Prove that it is possible if and only if two of the medians of the triangle ABC are perpendicular.



3. Let $x^3 - 3bx^2 + 4b^3 = 0$ be a cubic equation, with solutions x_1, x_2 and x_3 . Given that $b > 0$. Prove that if $x_1 < 0$, then $x_2 = x_3$.
4. Prove that if $a^4 + b^4 + c^4 + d^4 + e^4$ is divisible with 5, then $a^4 - b^4$ also is divisible with 5.
5. Andris imagined 8 random numbers. With each question Valdis could find out the sum of any two of those numbers. After 12 questions he had asked about each of the numbers 3 times (in a combination with different numbers of course), but still insisted that he couldn't find out all the numbers that Andris had imagined. Is that possible?