The Possibility to Build a Triangle, Given Its Three Medians,Three Bisectors or Three Heights

Janelidze, Sandro (School: Georgian-American School)

Trapaidze, Nodar (School: Georgian-American School)

Introduction: Geometric problems, which can be solved by using compass and straightedge,were always one of the most unique and beautiful parts of math. Even in ancient Greece active discussions about three classic problems occurred. These problems include: Circle squaring Angle trisection Cube duplication 2. The main subject: Our work will partly focus on these issues, specifically whether or not it ispossible to build a triangle if there are given these elements Only 3 medians (Medians case) Only 3 heights (Heights case) Only 3 bisector (Bisectors case) The main value of our work is our discussion andjustification of the mentioned problems with non-traditional geometric (as well as algebraic) methods, which leads to equations, such asx^n+a_1 x^(n-1)+a_2 x^(n-2)+⋯+a_n=0in which the roots and the possibility of the figure structure are based on these equations and to the possibility. At last we justify whether or not it is possible - usinga triangle’s index values can be substituted with known values and the substitution with only using elementary operations (addition, subtraction, multiplication, division, multiplication by rational number and extracting square root) – to build this kind of a triangle, where in other remaining cases it is impossible. 3.Conclusion: First of all, we can prove algebraically that, if there are given triangles three medians and three heights it is possible to build this triangle. We have also presented contraction’s practical methods, but if we are given triangle three bisectors it is impossible to build an Isosceles triangle.