Abstract: The aim is appropriate elaboration of the subject non-Euclidean geometry to high school. The work includes historical introduction that describes the path to the discovery of non-Euclidean geometry. Introduction is focused on failed proof attempts of the fifth Euclidean postulate, as well as errors in them which mathematicians committed. Work continues with list of sentences that are equivalent to the fifth postulate and focuses on different ways of partitioning the geometry in the literature, and clarifying the place of non-Euclidean geometry in these distributions. The work also demonstrates the use of non-Euclidean geometry in everyday life. The important part is the introduction of the primary notion of non-Euclidean geometry using three-dimensional models of this geometry. Aim of thesis is to show the reader which ways we can use to approach geometry, what are the advantages and disadvantages of these methods. The last section is devoted to practical work with non-Euclidean geometry. For this purpose, appropriate mathematical model of this geometry was chosen, easy to operate even with the help of mathematical software often used for teaching in high school.

Keywords: Non-Euclidean geometry, geometry of Lobachevsky, Euclidean geometry, 5. axiom of Euclid, Beltrami–Klein model