

Abstract

The aim of this thesis are problems in which pupils demonstrate the ability to switch between geometric and algebraic representation. The task of the thesis is to correctly identify the difficulties and mistakes of pupils in the algebraisation of problems with geometric context before the teaching of algebra and after the teaching of algebra. The thesis consists of theoretical and experimental parts.

The theoretical part defines the necessary concepts, summarizes selected results of research and studies related to the algebraisation of problems with geometric context and contains an analysis of five selected textbooks for the eighth year of elementary school, which are used by pupils participating in the research. The analysis of textbooks is focused on chapters dealing with the topics of *Algebraic expressions with variables* and *Powers*.

The experimental part focuses on research identifying difficulties and mistakes of pupils in solving problems in which pupils try to algebraically model geometric relations. The basis of the research was two sets of test problems followed by an individual conversation with the pupils. The first set of problems was made for sixth-graders, seventh-graders and eighth-graders. The second set of problems was made for ninth-graders. The tests were used in two primary schools and a gymnasium. First, each problem from the set is analyzed in terms of the expected difficulties and mistakes of the pupils. Pupils' solutions are analyzed in the following part of the thesis. The analysis contains a description of the most common difficulties and mistakes of pupils, along with examples of their solutions and interviews with them. The results of the testing are quantitatively evaluated.

The conclusion of the experimental part of the thesis summarizes the most common mistakes and difficulties of pupils in solving problems in the test and in individual conversations. The following are didactic recommendations to decrease or eliminate difficulties and mistakes.

Keywords:

Algebraisation of geometric relations, problems with geometric context, textbook analysis, problem solving, pupils' mistakes

