

The Analysis of the Misconceptions of Class VII Junior High School Students in the Topic of Counting Operations

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ABSTRACT

This research is a case study found in Jakarta 48 public junior high school which aims to analyze students' misconceptions of algebraic arithmetic operations in class VII. The method used is descriptive research in the form of 13 question test items given to 106 VII grade students who have previously been given training. The results of student research after analysis turned out that many experienced misconceptions in algebraic material both in understanding notation / letters and error rules when answering questions given. Overall misconceptions from students due to students' low memory abilities, lack of student interest in learning, and students' cognitive development that is not in accordance with the instructional materials that are of interest, so that the inculcation of algebraic learning concepts is still a complicated and difficult thing.

Keywords: Misconceptions, algebraic arithmetic operations.

INTRODUCTION

Mathematics is a science that has an important role in human life that functions to develop the ability to calculate, measure, lower and use mathematical formulas needed in everyday life through algebraic material, geometry, mathematical logic, opportunities and statistics Mathematics is often interpreted by most students as a science that contains the calculation of complex numbers and a collection of rules that need to be understood [1]. This view arises from the experience of students while studying mathematics, so there are some students who do not like mathematics. Even though mathematics is a compulsory subject taught in elementary, junior high, senior high school and even in college.

The low mastery of concepts is one of the obstacles in the learning process and can result in low learning outcomes. One of the causes of the low mastery of concepts is the existence of misconceptions and learning conditions that do not pay attention to the initial conceptions (preconceptions) of students [2].

Based on the results of observations of learning that have been done by researchers at the time of learning in class it can be seen that students experience misconceptions in working on arithmetic operations in the form of algebraic forms of addition and subtraction because the initial concepts they have are not yet complete. In this section we will discuss the notions of variables, constants, coefficients and terms that are similar and not the same. Students will also learn about arithmetic operations in algebraic form using the principles of arithmetic operations on integers. This explains that every material in mathematics learning cannot be separated from facts, concepts and principles.

According to [3] [4] quoted from Leading English Education and Resource Network (LEARN) in the Mathematics Program of Study entitled Algebra: Some Common Misconceptions wants to know the extent of misconceptions on students' algebraic thinking abilities, misconceptions that will be categorized into 4 forms of misconceptions, that is; Misconception of letter understanding, Misconception of notation, Misconception of generalization, Misuse of rules.

RESEARCH METHOD

The study was conducted at SMPN 48 South Jakarta School, 2019/2020 school year in odd semester. Participants who were given the test as many as 3 classes totaling 106 students were given a test item description consisting of 13 questions on algebraic subjects adjusted to the syllabus and indicators. The

study was conducted using descriptive qualitative research and obtained through the analysis of data results and in-depth interviews to determine the location of students' misconceptions. In this study, the data credibility test was carried out by triangulation. Data analysis consists of three activities that occur simultaneously, namely data reduction, data presentation, and data verification

RESULTS AND DISCUSSION

The purpose of this study is to describe the forms of misconceptions experienced in the Material Operations for Calculating Forms of Algebra. Based on preliminary studies that have been carried out, data are obtained that in class VII there are students who experience misconceptions on algebraic material. The data was obtained from the results of working on the test questions in the form of algebraic forms given by researchers to students.

Examples of students doing algebraic misconceptions include:

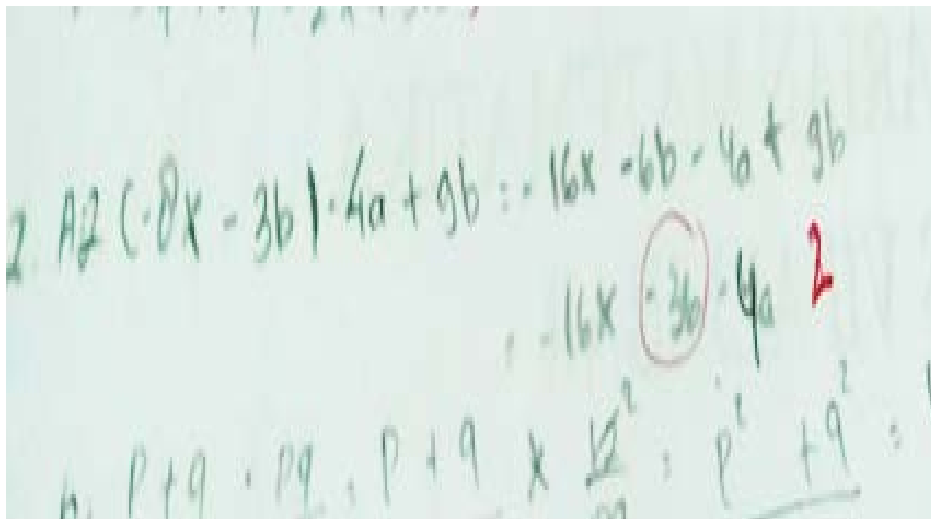


Figure 1. Examples of students doing algebraic misconceptions

In this case it can be seen that students make mistakes in answering that: $-16x - 6b - 4a + 9b = -16x - 3b - 4a$. In this problem students ignore the positive and negative signs. It identifies that students' understanding of algebraic form operations is still low, this will make students experience misconceptions. According [5] students can experience misconceptions.

CONCLUSIONS

Based on the results of the discussion of data analysis in chapter four, it was found that there were still students who were categorized as not experiencing misconceptions and also students who were experiencing misconceptions in solving algebraic concept questions. However, there are also students who are categorized as understanding concepts because of their low memory capacity, lack of student interest in learning, and students' cognitive development that is not in accordance with the instructional materials that are of interest, so that the cultivation of algebraic learning concepts is still a complicated and difficult thing.

There are a number of suggestions that are expected to be used to improve learning based on misconceptions, including: For students, they should study harder and practice more exercises on algebraic forms to better understand the concepts of algebraic forms. Teachers should give more practice questions that include understanding the concept of algebraic form to students so students better understand the concept of algebraic form and must also be able to utilize the time allocation that has been determined so that the learning process runs well and students accept the correct concept of algebraic form. For further researchers, they should use the best time in conducting research so that research results can be maximized.

Proceeding books:

The 2nd International Conference of Education on Science, Technology, Engineering, and Mathematics (ICE-STEM 2020)

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