

Analysis of the ability to understand junior high school mathematics concepts in the material of quadrilaterals

Agus Qowiyuddin¹, Khoirul Huda², Amanda Nur Lailiyatul Faizza^{3, a)}

^{1,2,3} Universitas Nahdlatul Ulama' Pasuruan

Email : ^{a)} amandalailiyatul@gmail.com

Abstract

Build a flat quadrangle It is a certain line segment which is joined by four points where the points are not in a line, which in pairs meet at the ends and each line segment must meet with two corners which are formed called the corners in a quadrilateral with the corner points being the four points the. Quadrilateral shapes include squares, rectangles, parallelograms, rhombuses, kites and trapezoids. (Nadjib, 2014) The aim of this research is to determine and describe the ability to understand mathematical concepts of rectangular flat shapes at Al-Hidayah Sukorejo Middle School Class VII. The research is qualitative research with a descriptive approach. The data collection technique is a sampling technique. From 37 students we take 4 students from the highest score to the lowest score. The results will show their respective understanding abilities towards the mathematical concept of flat shapes.

Keywords: Students' understanding abilities, mathematical concepts, flat shapes, quadrilaterals

Abstrak

Bangun datar segi empat Adalah ruas garis yang tertentu yang digabungkan oleh empat buah titik dimana titik tersebut tidak segaris, yang sepasang-sepasang bertemu pada ujung-ujungnya dan setiap ruas garis pasti bertemu dengan dua sudut-sudut yang terbentuk disebut sudut-sudut dalam segiempat dengan titik-titik sudut adalah keempat titik tersebut. Bangun datar segiempat meliputi persegi, persegi panjang, jajar genjang, belah ketupat, layang-layang dan trapesium. (Nadjib, 2014) tujuan dari penelitian ini untuk mengetahui dan mendeskripsikan kemampuan pemahaman konsep matematika bangun datar segiempat di SMP Al- Hidayah Sukorejo Kelas VII. Penelitian bersifat penelitian kualitatif dengan pendekatan deskriptif. Teknik pengambilan data nya adalah teknik sampling. Dari 37 siswa kita ambil 4 siswa yang dari nilai tertinggi hingga nilai paling rendah. Dengan hasil akan menunjukkan kemampuan pemahaman mereka masing-masing terhadap konsep matematika bangun datar.

Kata kunci: Kemampuan pemahaman siswa, konsep matematika, bangun datar, segiempat

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✉ Corresponding author : Amanda Nur Lailiyatul Faizza

Email Address: amandalailiyatul@gmail.com

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INTRODUCTION

Geometry is one of the main subjects of Mathematics in school, with the basic aim of providing opportunities for students to further analyze the world in which they live, as well as providing basic concepts from an early age as initial capital for further study. In other words, the aim of introducing geometry is to develop students' five basic abilities, namely: visual, verbal, drawing, logic and application. (Mursalin, 2016) By introducing basic concepts, definitions and properties along with types of flat plane geometry, it is hoped that this will become students' initial capital in order to improve students' understanding and abilities of the five basic principles in learning mathematics. Mathematics

is one of the school subjects that must be mastered by students at the elementary to high school education levels.

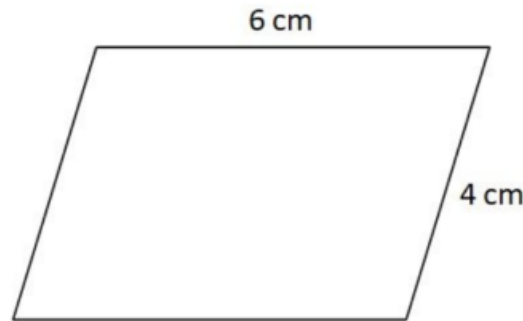
If we look closely, everyone in their life activities will be involved with mathematics. For example, counting and counting, two examples of routine and simple mathematical activities, are done by almost everyone. When viewed from the perspective of classifying fields of science, mathematics is included in the group of exact sciences, which require more understanding than memorization. To be able to understand a subject in mathematics, students must be able to master these concepts to solve the problems they face. According to Uno (in Fitri, 2014: 1) that, "Mathematics is a mental activity to understand the meaning and relationships as well as symbols and then apply them to real situations". According to Wijayanti (in Nuraini, 2015: 21) that, "Mathematics is the science of quantity, shape, arrangement and size as well as the process of finding the correct concept and the relationship between quantity and size".

METHOD

This research is qualitative research and uses descriptive methods. According to Moleong (2017:6) qualitative research is research that intends to understand phenomena about what is experienced by research subjects such as behavior, perceptions, motivation, actions and so on holistically and in a way descriptions in the form of words and language, in a special natural context using various natural methods. Descriptive Research (Arifin & Zainal, 2012) is research conducted to determine the value of independent variables, either one or more variables (independent) without making comparison, or connection with other variables. Descriptive research in this study is intended to obtain an overview and information regarding students' understanding of the mathematical concept of Bangun Datar based on the results of students' answers in the concept understanding test. The sample in this research is class VII students in one schools in Sukorejo for the 2023/2024 academic year. The sample was selected by selecting some of the class VII students, a total of 37, but the researcher chose 4 students. The cognitive ability that will be used as a variable in this research is the ability to understand concepts. Researchers took several indicators contained in the Regulation of the Director General of Basic Education Number 506/C/PP/2004, namely the ability to understand concepts in: classifying objects according to certain properties, presenting concepts in various forms of mathematical representation, using and exploiting and selecting procedures or operations specific concepts, and applying concepts or algorithms in solving problems. The question instrument in this research is the result of adopting an instrument developed by Nurul Fadzillah (2016). This question instrument was chosen because it is appropriate to the problem being studied, namely the ability to understand concepts. Apart from that, this instrument has been tested for validity, reliability and differentiating power so that

it can be used to conduct research. The following are the test questions for the ability to understand the concepts used:

- 1.) It is known that the area of the square is 280 cm^2 The perimeter of the square is.....
- 2.) The length and width of an empty rectangular plot of land in the city of Surabaya is 80 m and 60 m. Find the area of the land?
- 3.) Look at the image below. Area of a parallelogram



Next, the data is processed and analyzed based on the grades obtained by the students which are then categorized based on the average value and standard deviation. According to Arikunto (Effendi, 2017) the average value and standard deviation of research data can determine whether data is in the high, medium category, and low. Students who are in the high category are students who get a score higher than the average score added up by the standard deviation. Students who are in the low category are students who get a score less than the difference between the average score and the standard deviation. Meanwhile, students who are in the medium category are students who get scores between the high and low categories. The student ability categories according to Arikunto (2010) are as follows:

Category	Value Criteria
Tall	$X > (\bar{x}+s)$
Currently	$(\bar{x}-s) \leq X \leq (\bar{x}+s)$
Low	$X < (\bar{x}-s)$

Information :

X = Student Scores

\bar{x} = Average student grades

S = standard deviation of student scores

RESULTS AND DISCUSSION

Based on the results of written tests conducted by researchers from 4 students in After completing 3 questions about rectangular shapes, 2 out of 4 students were still unable to understand the

material about rectangular shapes. The average percentage for each aspect of errors made by students was obtained based on the number of students who made mistakes, including:

1. A Student He was able to answer the questions given, and he was one of the students who was at the top of his class
2. B Student The mistake he made was not being thorough in question number 2. However, he was also able to understand the question given. And also student B is known to be a student who is in the top 10 student category in terms of achievement.
3. C Student The mistake made by student c was still a lack of understanding of the material, but he only understood question number 2.
4. D Student The mistake made by student D was not understanding the material at all, so they got everything wrong when solving the questions

Based on the results of this research, the factors that cause students' misunderstanding of this material are factors within the students themselves. Because it is known from the results of interviews with the 4 students that the mathematics supervisor in delivering the material is easy to understand.

A. Description

1.) Description of students A

Based on this research, the student in the sample with the highest score was one of the students who entered the top 3, namely the first winner in the class, he was known as a student who was thorough in working on questions.

2.) Description of students B

Based on this research, students B are known to still be in the top 10 student category in the sense that these students also have the ability to understand, but their accuracy is still lacking.

3.) Description of Students C

Based on this research, this student is not much different from the student with the first low score, but he still has a positive side, namely paying attention to the teacher when presenting the material, so that from the questions given he still has hope of being able to solve the questions he understands.

4.) Description of the student D

Based on this research, students D do not pay enough attention to educators when teaching, which makes them difficult to understand, and these students are known to often have problems in all subject grades.

B. Interview

Question

- 1.) Of the 3 questions given, is there anything difficult to do?
- 2.) Where is the difficulty in this problem?
- 3.) What do you think about the concept of this rectangular flat shape?
- 4.) Is the concept of learning flat rectangular shapes boring? explain why?

I. Students A

- 1) There was nothing difficult about the 3 questions I did because the chapter had already been explained.
- 2) there is no difficulty at all
- 3) In my opinion, the concept of flat shapes is one of the materials that is easy to understand among other materials.
- 4) It's not boring at all, because the teacher's explanations are easy to understand and the material is very easy.

II. Students B

- 1) Actually, these 3 questions are easy, but there are some who are still confused about solving them.
- 2) Yes, there are still difficulties, but they are small
- 3) I think it's easy, actually it depends on each person understanding it.
- 4) Actually it's not boring, because this material has already been explained.

III. Students C

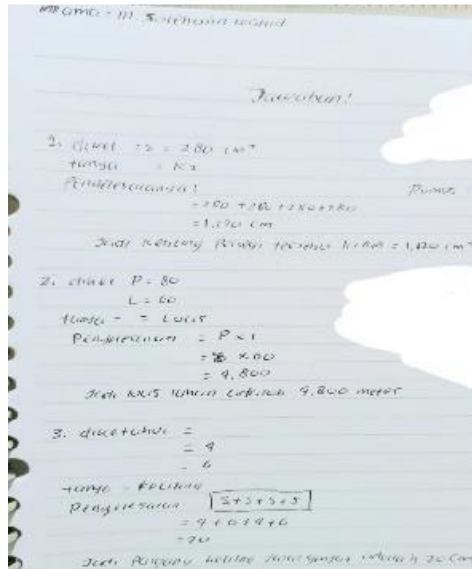
- 1) There are some parts that I understand the solution for, others I still don't understand.
- 2) If there are still difficulties, many people still don't understand.
- 3) In my opinion, easy is difficult, because many of me forget how to solve each flat shape.
- 4) It's not boring, it's just that I forget easily, because in general the presentation of this material is very clear.

IV. Students D

- 1) don't understand at all
- 2) still having trouble
- 3) I think it's difficult and I still don't understand the solution.
- 4) boring, because mathematics is a subject that I don't like.

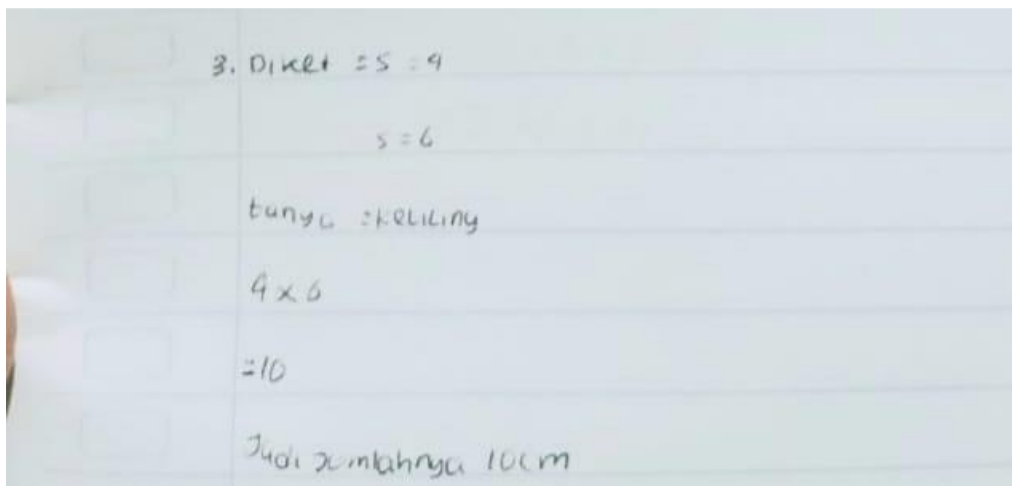
C. Error Description

- 1) Student A



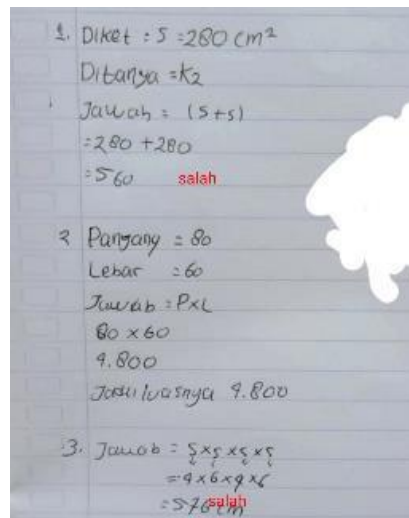
Student A made no mistakes in solving the questions given.

2) Student B



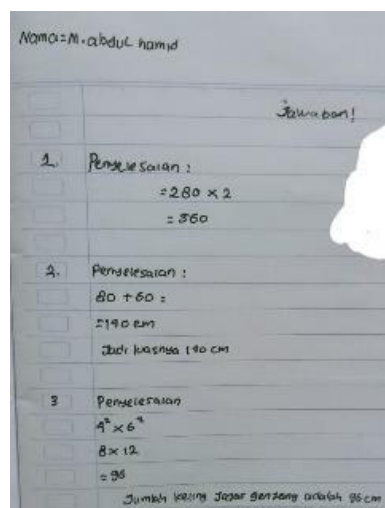
Student B made a mistake in number 3. The actual formula should be $s+s+s+s = 4+6+4+6$ which results in 20. Meanwhile, here student B wrote the formula as $s+s = 4+6$ which is the result is 10.

3) Student C



Student C had difficulty working on questions number 2 and 3 where the way to solve number 1 was $s+s+s+s = 280+280+280+280$ the result was 1,120 cm, while what was written was $s+s=280+280$ which the result is 560. Then the second error is in method number 3 the actual solution is $s+s+s+s = 4+6+4+6 = 20$, while what is written is $S \times S \times S \times S = 4 \times 6 \times 4 \times 6$ is 576 cm.

4) Siswa D



It is known that student D had problems solving the 3 questions given, in fact none of the 3 questions were correct in solving them. The solution carried out by student D is as follows:

- 1) $280 \times 2 = 560$
- 2) $80 + 60 = 140 \text{ m}$
- 3) $4^2 \times 6^2 = 8 \times 12 = 96$

It is known that the solution above is wrong.

CONCLUSIONS

Based on this research, it is known that students' lack of understanding is more or less caused by the students themselves, according to several students in the interview sample who said: Teaching methods are easy to understand, and educators explain clearly This material has already been explained some of the students also said: This material can be said to be easy or difficult according to the way they respond to the material. It is said to be difficult for those who don't like mathematics because they think it is boring.

So, the ability to understand mathematical concepts in rectangular plane material is based on their level of comprehension in understanding the material, and this is caused by each individual, not because of the teacher.'

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