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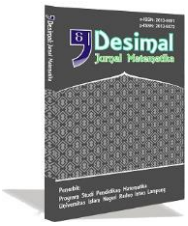

# Mathematical creative thinking ability: The impact of adversity quotient on triangle and quadrilateral shapes material

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## ARTICLE INFO

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## ABSTRACT

*This research has a background, namely the ability to think mathematical creatively. This is because students pay less attention to the mathematics learning process. This will have an impact on the ability to think creatively in mathematics so that it will not develop properly. Adversity Quotient is the creative thinking ability of a student who can solve problems well if supported by good solving skills. The purpose of this research is to see the creative thinking ability of students in terms of the adversity quotient. The method in this research is descriptive qualitative research with an interview process. Data collection in this research is in the form of instrument questions that contain indicators of creative thinking, namely fluency, flexibility, originality, and elaboration. The results of the research were seen from the results of the answers to the questions on the mathematical creative thinking ability instrument and the adversity quotient, which contained that students had three types of adversity quotient, namely Climbers, Campers, and Quitters. Subjects with indicators of fluency, flexibility, originality, and elaboration with the Climbers type were able to solve the questions according to each indicator, the Campers type students were able to solve the questions correctly but were still lacking in preparing answers, and the Quitters type students still did not understand how to solve the questions so that the answer was wrong.*
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## INTRODUCTION

Creative thinking ability is the ability that must be possessed by students to understand and use abstract or concrete concepts in new or different ways. Think creatively to identify and propose solutions to problems, produce something new, and combine something new with the previous one (Faradillah, 2019; Nugroho et al., 2020). So, the habit of thinking that is trained by paying attention to intuition, activates the imagination, discovers new possibilities, opens up amazing perspectives, and finds unexpected ideas (Suripah & Sthephani, 2017).

The problem faced in mathematical creative thinking ability is that students are not paid enough attention during the

mathematics learning process, this will have an impact on mathematical creative thinking abilities so that it will not develop properly (Putra et al., 2018). Mathematics is one of the subjects taught in schools that has a strong and clear structure and linkage that can encourage students to think creatively and logically in solving problems. One of the most important tasks of a mathematics teacher is to analyze and develop creativity in learning mathematics (Nadjafikhah & Yaftian, 2013). Therefore, developing good thinking skills for creative thinking is an important task and must be trained by students from elementary school to the high school level (Abidin et al., 2018).

Developing students' mathematical creative thinking concepts can make students despair and give up, therefore the relationship between the creative thinking ability and the adversity quotient is that a student's creative thinking ability can solve the problem well if it is supported by good solving skills. A person's ability to observe difficulties and use their intelligence to deal with them and make tasks to be solved is known as Adversity Quotient (Purwasih, 2019). This success is the influence of several factors, namely the Adversity Quotient (Komarudin et al., 2021). Adversity Quotient is a theory from Paul G. Stoltz which bridges the gap between intellectual intelligence (IQ) and emotional intelligence (EQ). According to Stoltz (2005), both of them do not have a good IQ and EQ, nor do they have good fighting power and the ability to overcome the difficulties that exist in themselves, then both of these things will be in vain. In addition, Stoltz (2005) explained that there are three fields of science that support the Adversity Quotient, namely cognitive psychology, psychoneuroimmunology, and neurophysiology (Fay, 1967). This Adversity Quotient has three categories including the Quitters type, which is a group that lacks the will to accept challenges, the Campers type is a group that does not want to take risks, and this Climbers type is a group of people who have the courage to face problems and are ready to take risks, so this Adversity Quotient includes providing inspiration that can encourage students to think creatively, but the facts in the classroom show that creative thinking in education has not received much attention and do not realize the importance of practicing creative thinking (Komarudin et al., 2021). Based on this, it is important to do research on creative thinking skills based on this Adversity Quotient.

Several researchers have conducted research on creative thinking skills and Adversity Quotient including the first research by Widiastuti & Putri (2018) entitled "Students' creative thinking ability in learning fraction operations using an open-ended approach". The results of this research are students' thinking ability is quite sufficient because in solving test questions there are some students who are still hesitant in giving explanations. The second researcher from the research of Azhari & Somakim (2014) entitled "Increasing creative thinking skills". The result of the research is that students can develop their knowledge and skills in creative thinking skills. The third researcher from the research of Purwasih (2019) entitled "The mathematical creative thinking ability of junior high school students". The results of the research are in the preparation and the stages are not good. The fourth researcher from the research of Fardah (2012) entitled "Process analysis and students' creative thinking skills". The results of this research are students' creative thinking abilities were low and did not vary. The fifth researcher from the research of Komarudin et al. (2021) on the analysis of mathematical creative thinking skills. The result of this research is the lack of interaction of students' mathematical

creative thinking on the Adversity Quotient.

Based on the description above, the novelty of this research is to relate how students' creative thinking skills are based on the Adversity Quotient. So, the purpose of this research is to describe students' mathematical thinking skills which are reviewed based on the Adversity Quotient of junior high school students.

## METHOD

This research was conducted using qualitative descriptive research with the aim of understanding an object to be studied in depth (Gunawan, 2013). The flow chart of this research can be seen in Figure 1.

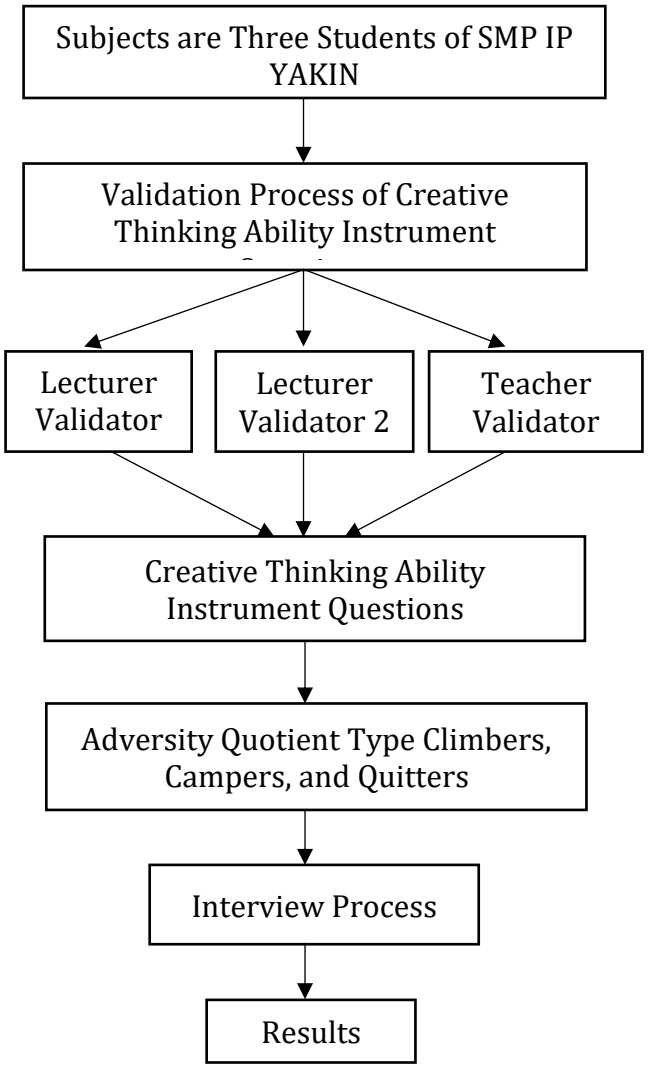


**Figure 1.** Research Method Flowchart

This research was conducted at SMP IP Yakin, the subject of the research was class VIII students. The measuring instrument used in this research is in the form of mathematical essay questions. The validation process of the question was carried out with three validators including two lecturer validators, and one validator from a mathematics teacher at SMP IP Yakin. After these three validators stated that they were suitable for use for instrument questions distributed to students, the researchers will test the mathematical creative thinking ability

instrument questions based on description questions consisting of eight questions regarding creative thinking skills in accordance with four indicators, namely fluency, flexibility, originality, and elaboration (Suripah & Sthephani, 2017). The subjects to be taken are climbers, campers, and quitters and each type is assigned two students and is given the subject code CL, CA, and QU. Table 1 is the selected student subjects.

**Table 1**. Selected Student Subject

| No | Type | Subject Code |
|---|---|---|
| 1. | *Climbers* | CL |
| 2. | *Campers* | CA |
| 3. | *Quitters* | QU |

Based on Table 1, students who were selected for the types of Climbers, Campers, and Quitters were divided into two subjects. These three students will be tested on the question instrument regarding the quadrilateral and triangle lessons. The selected students are three students.

## RESULTS AND DISCUSSION

Based on the results of this mathematical creative thinking ability question instrument which was conducted in Class VIII SMP IP Yakin with three students, where they worked on creative thinking skills questions in quadrilateral and triangle lessons. The following is a description of the results of students' answers to the question of mathematical creative thinking abilities for the subject that is reviewed based on the Adversity Quotient.

### *Fluency*

#### 1. Analysis of Student Responses at Number 2 with AQ Climbers

Figure 2 shows that CL has understood question number 2. When the researcher re-asked the meaning of question number 2, CL was able to explain the meaning of question number 2 and explained that in question number 2 it is known that a square length with a predetermined area has to be found, so it is necessary to look for different lengths and widths but with the same area results. After understanding the problem, the researcher asked what method they used to handle the problem. Then CL answered how to find the area of a rectangle by multiplying the length by the width. When asked if CL is sure of the answer, then CL answered very confidently with their answer result.

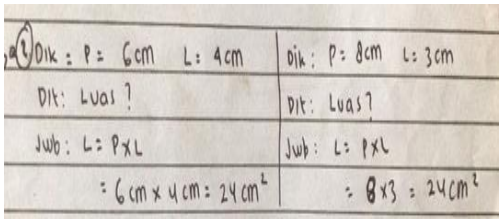


**Figure 2.** The Results of the Subject Answer to the Question with AQ Climbers

Based on the results of the explanation above, it can be seen that the results in Figure 1 show that the first step taken by CL is to determine what is known and what will be asked. After that CL solves it by way of solving with different lengths and widths but has the same area results. So that CL is able to answer with the correct answer. The results obtained did not experience errors in the calculation, and from this explanation it can be concluded that CL meets the Climbers type AQ. In accordance with research that says that the solution is appropriate, does not experience difficulties, and is correct (Purwasih, 2019).

#### 2. Analysis of Student Responses at Number 2 with AQ Campers

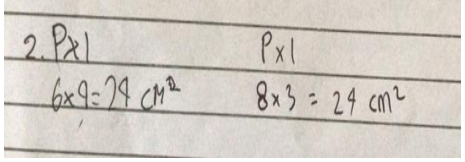


**Figure 3.** The Results of the Subject Answer to the Question with AQ Campers

Figure 3 shows that CA is quite familiar with question number 2 and CA can re-explain question number 2. CA solves the problem in question number 2 by looking for areas with different lengths and widths. The method used by CA to solve the problem is the length multiplied by the width. Then CA is sure of their answer results.

Based on the results of the explanation above, it can be seen that the results in Figure 2 show that CA is only able to solve questions with the correct answer, but does not include how to determine and solve the problem. So, CA is more likely not to take risks and it can be concluded that CA meets the Campers type AQ. This is in line with the research that says students are able to solve problems and students are more likely not to want to take risks so they are categorized as Campers type AQ (Suhandoyo, 2016).

### 3. Analysis of Student Responses at Number 2 with AQ Quitters

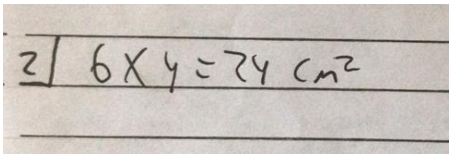


**Figure 4.** The Results of the Subject Answer to the Question with AQ Quitters

Figure 4 shows that QU understands a little about question number 2. When asked to re-explain question number 2 in their own language, QU replied that they just multiplied which will result same as the question. The method that QU uses is multiplication. When asked whether QU believed in the answer result, QU answered that they were still unsure of the results, it was seen that QU was not confident in the answer result because QU was still in doubt.

Based on the results of the explanation above, QU only solves with one answer, even though what is asked by the researcher is more than one answer. So that QU is less able to solve the problem properly and correctly. QU can be categorized as a Quitters type AQ. This is linear with the research that says students are still lacking in solving the problem properly and correctly (Widiastuti & Putri, 2018).

***Flexibility***

### 1. Analysis of Student Responses at Number 3 with AQ Climbers

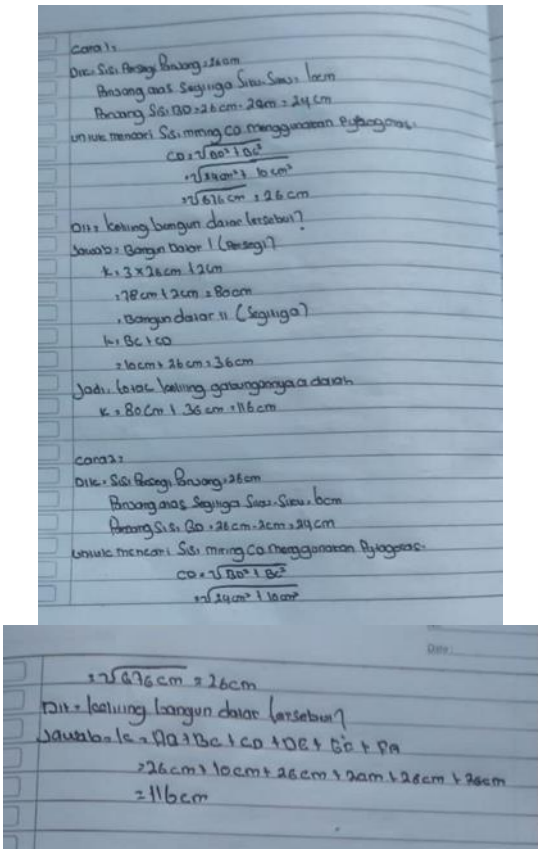


**Figure 5.** The Results of the Subject Answer to the Question with AQ Climbers

Figure 5 shows that CL has understood question number 3 and CL explains that question number 3 is asked to find the circumference of the flat shape and then look for the circumference in a different way. Then the researcher asked what method was used to deal with question number 3, then CL answered the first method, which was to write down what was known and then what was asked after that was answered according to the flat wake formula. Then for the second

method, which is to add the results of all the side lengths of each outer side of the flat shape. When the researcher asked whether CL is sure of the answer, CL is sure because the method used was correct.

Based on the results of the explanation above, CL was able to solve the flexibility indicator questions, so that CL could solve the problem correctly. CL wrote the answer in detail at the stage of problem-solving. So, it can be concluded that CL has a Climbers type AQ. This is similar to research that says students with mathematical abilities are able to describe problems with precise and detailed steps (Suripah & Sthephani, 2017).

### 2. Analysis of Student Responses at Number 3 with AQ Campers

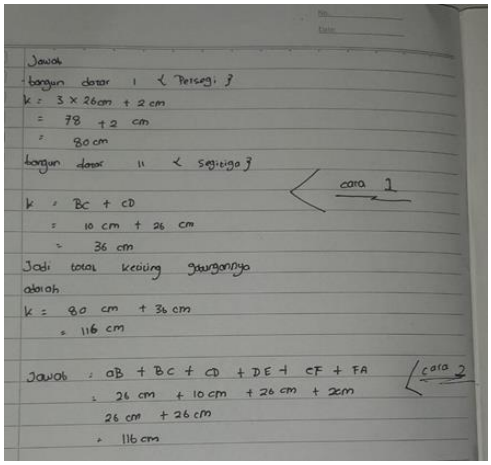


**Figure 6.** The Results of the Subject Answer to the Question with AQ Campers

Figure 6 shows that CA has understood question number 3, and CA is able to explain the meaning of question number 3. CA explains that question number 3 is asked to find the circumference in a different way but with the same result. The method used to handle this problem is the first method using the formula for each flat shape, and the second method using the addition of the known length of each side. CA is sure of their answer because the first method and the second method have the same results, although in different ways.

Based on the results of the explanation above, CA works on the questions with the flexibility indicators with the maximum possible answers. However, CA solved the problem by not mentioning what was known and asked. CA only immediately answered with a formula. However, CA's answer is correct. So that CA has the ability to think with Campers type AQ. Therefore, in line with the research that says students are less focused on solving problems so they don't write down what is known and asked (Fardah, 2012).

### 3. Analysis of Student Responses at Number 3 with AQ Quitters

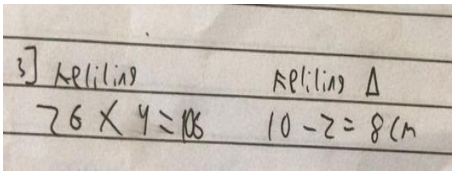


**Figure 7.** The Results of the Subject Answer to the Question with AQ Quitters

Figure 7 shows that QU did not really understand, and when asked to explain question number 3, QU did not seem to understand the meaning of the question. Then the answer is wrong and not appropriate. So, QU is not sure about the answer.

Based on the results of the explanation above, CU works on the questions on the flexibility indicator. However, CU has poor thinking ability, so the answer is not optimal and the answer is wrong. So that CU has low thinking ability with the Quitters type AQ. Therefore, it is in line with research that says students are less optimal and focus on solving problems (Putra et al., 2018).

### *Originality*

### 1. Analysis of Student Responses at Number 5 with AQ Climbers

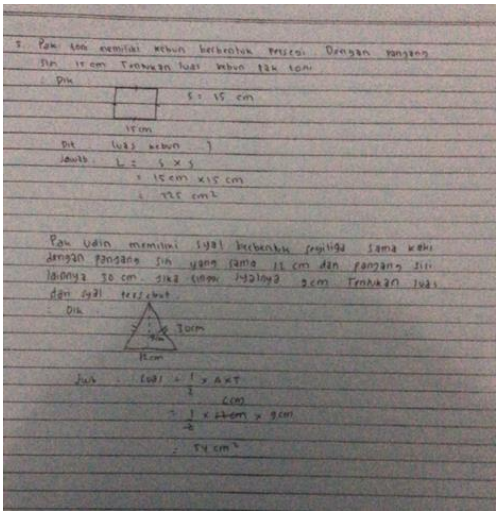

**Figure 8.** The Results of the Subject Answer to the Question with AQ Climbers

Figure 8 shows that CL already understood question number 5, and CL is able to explain the meaning of question number 5. CL explained that question number 5 asked students to make story questions about quadrilaterals and triangles after that students solve the story problems. CL's way of solving the problem is by making a story problem of a square shape to find the area of the garden. For a story problem of an isosceles triangle, that is by finding the area of a scarf in the shape of an isosceles triangle. CL is very confident with the answer.

Based on the results of the explanation above, CL works on questions with the originality indicator. CL is able to make questions according to the instructions from the problem and is able to sketch pictures according to the questions made. The result of the answer is in accordance with what was ordered by the question. Therefore, CL is able to work on questions with indicators of originality and has the ability to think creatively with a Climbers type AQ. It can be seen that CL understands what the questions are told and answers correctly (Dwi Herdani & Ratu, 2018).

## 2. Analysis of Student Responses at Number 5 with AQ Campers

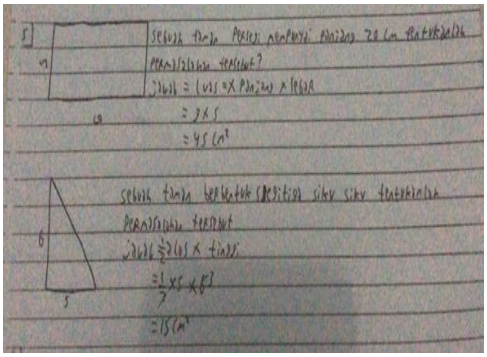

**Figure 9.** The Results of the Subject Answer to the Question with AQ Campers

Figure 9 shows that CA understood question number 5. CA explained that in question number 5, students are asked to make story questions in everyday life about triangles and quadrilaterals and then solve them with answers. The method used by CA is to make story questions and use the formula for the story questions. Then, CA is sure that the story questions that CA made are appropriate and the answers are correct.

Based on the results of the explanation above, CA works on questions with indicators of originality. CA solves the problem according to the orders but there are some things that are lacking in solving the problem. CA did not mention what was known and asked in its answer results. So, CA is able to solve originality-indicated questions but there are still some answers that are not complete but the results and solutions are good and correct. CA has a Campers type AQ in solving these problems. This is in accordance with the fact that students are only lacking in problem-solving (Abidin et al., 2018).

## 3. Analysis of Student Responses at Number 5 with AQ Quitters

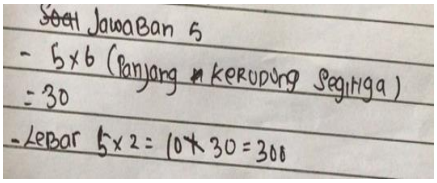

**Figure 10.** The results of the subject answer to the question with AQ Quitters

Figure 10 shows that QU did not understand the meaning of question number 5. So that QU has difficulty in solving the problem. QU feels unsure about the answer results.

Based on the results of the explanation above, QU students worked on questions with indicators of originality with less optimal answers. QU from the beginning of the interview was also not sure about the results of the answer. So, from the results of the answers that are wrong and not detailed, QU has the ability to think creatively with the Quitters type AQ. This is the same in the research that says students are less optimal at solving problems and do not have self-confidence (Nufus et al., 2018).

### *Elaboration*

#### 1. Analysis of Student Responses at Number 8 with AQ Climbers

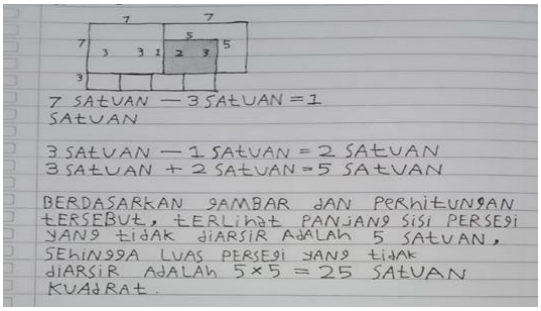


**Figure 11.** The Results of the Subject Answer to the Question with AQ Climbers

Figure 11 shows that CL understands the question in number 8 and is able to explain the meaning of the question, namely in question number 8, students are asked to find how many square units of unshaded squares are. It is known that 2 large rectangles have a side length of 7 units and 4 smaller rectangles have a side length of 3 units. CL's way of solving this problem is by subtraction. After that, when the results have been found, to find the area of the unit square, the sides are multiplied, then 5 * 5 = 25 Units squared. So, CL is sure that the answer is correct.

Based on the results of the explanation above, CL worked on elaboration questions and was able to solve problems with a good working process. CL's creative thinking process in solving problems has the potential so that CL has the ability to think creatively with a Climbers type AQ. Therefore, it is in line with research that says students are able to solve problems correctly and the stages of the process are good (Nugroho et al., 2020).

#### 2. Analysis of Student Responses at Number 8 with AQ Campers

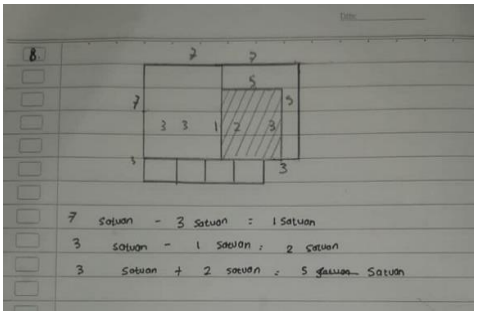


**Figure 12.** The Results of the Subject Answer to the Question with AQ Campers

Figure 12 shows that CA understood question number 8. The method used by CA to solve this problem is subtraction because there is not enough time to solve the problem, and CA did not finish it. So, CA feels unsure of the results of the answer.

Based on the results of the explanation above, CA worked on the elaboration indicator questions and the problem solving done by CA was correct. However, at the time of completion, there were no conclusions so that CA had the ability to think creatively with a Campers type AQ. There are students during the problem-solving process, only lacking in the conclusion process of the answer results (Purwanti et al., 2019).

### 3. Analysis of Student Responses at Number 8 with AQ Quitters

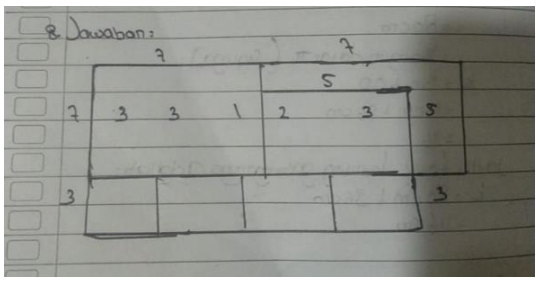


**Figure 13.** The Results of the Subject Answer to the Question with AQ Quitters

Figure 13 shows that QU understood a little about question number 8 so that when solving the problem, QU only draws and did not finish it completely because it is constrained by the time that has run out. So that QU feels unsure of the results of the answer.

Based on the results of the interview above, QU worked on questions with elaboration indicators. However, QU only drew sketches on the answers so QU was not sure of the results of the answers. So that QU has the ability to think creatively with a Quitters type AQ. Therefore, research says that students who have a lack self-confidence make it difficult for students to solve problems (Munahefi et al., 2020).

## CONCLUSIONS AND SUGGESTIONS

According to the results of research on Class VIII SMP IP YAKIN students, the results obtained on an overview of mathematical creative thinking ability with this Adversity Quotient are: (1) on the fluency indicator, the Climbers type students solved problems and the results obtained did not experience errors in the calculation, the Campers type students wrote the correct answers but do not include what is known and asked on the answer sheet, the Quitters type students only finished with the result of one answer that was not the same as the ordered question. (2) On the flexibility indicator, the Climbers type students wrote down the answers in detail, the Campers type students did not write down what is known and asked but the answers are correct, the Quitters type students answered less optimally and the answer was wrong. (3) On the originality indicator, the Climbers type students were able to work on the questions according to what was ordered and the results were correct, the Campers type students have some things that are lacking in dealing with these questions, and the Quitters type students were less optimal in solving problems and doubt that makes the answer wrong. (4) In the elaboration indicator, the Climbers type students were able to complete the process of working on a good question so that the answers were structured and correct, the Campers type students have the correct answer but there was no conclusion at the end of the problem solving, the Quitters type students only describe sketches on solving problems and students have no confidence in the results of their answers.

Suggestions in this research are for future researchers should explore in more detail creative thinking ability and the Adversity Quotient because this research still has shortcomings, namely, it is still limited in the topic of triangles and quadrilaterals. So that further researchers can improve more so that this research can be used as a reference to develop the impact of the adversity quotient on mathematics learning.

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