



AN ANALYSIS OF MATHEMATICAL PROBLEM-SOLVING SKILLS OF JUNIOR HIGH SCHOOL STUDENTS

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ABSTRACT

This study examines the level of mathematical problem-solving abilities among students, specifically focusing on contextual problems related to plane geometry. A qualitative method with a descriptive approach was employed, involving data reduction, data presentation, and conclusion drawing. Problem-solving abilities were measured using a test comprising two questions. The results indicate a low level of proficiency among students of Public Junior High School 10 in Sungai Penuh City, with an average score of 22.28 and a success rate of 15.23%. These findings underscore the need for enhancing students' problem-solving skills. The critical role of teachers in the learning process and the use of effective learning media are anticipated to significantly improve students' abilities. For future research, it is recommended to conduct a deeper analysis of factors influencing these low problem-solving skills, such as curriculum, teaching methods, and the student's learning environment, and to test educational interventions that could enhance problem-solving skills.

ANALISIS KEMAMPUAN PEMECAHAN MASALAH MATEMATIS PADA SISWA SMP

ABSTRAK

Kata Kunci:

Analisis
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Penelitian ini mengkaji tingkat kemampuan pemecahan masalah matematika siswa, dengan fokus khusus pada soal kontekstual terkait geometri datar. Menggunakan metode kualitatif dan pendekatan deskriptif, penelitian ini melibatkan tahapan reduksi data, penyajian data, dan penarikan kesimpulan. Kemampuan pemecahan masalah diukur melalui tes yang terdiri dari dua soal. Hasilnya menunjukkan tingkat kemampuan yang rendah di kalangan siswa SMP Negeri 10 Kota Sungai, dengan skor rata-rata 22,28 dan tingkat keberhasilan 15,23%. Temuan ini menekankan perlunya peningkatan kemampuan pemecahan masalah. Peranan kritikal guru dalam proses pembelajaran, serta pemanfaatan media pembelajaran yang efektif, diharapkan dapat meningkatkan kemampuan pemecahan masalah siswa secara signifikan. Untuk penelitian berikutnya, disarankan melakukan analisis lebih dalam terhadap faktor-faktor yang mempengaruhi rendahnya kemampuan pemecahan masalah ini serta menguji intervensi pendidikan yang dapat meningkatkan keterampilan pemecahan masalah.

1. INTRODUCTION

Mathematics plays a central role in the educational curriculum of Indonesia because it is a discipline that has an importance to be studied [1]. In addition, mathematics is also a compulsory subject for all students because it provides valuable benefits for students' cognitive and social development. Through the intensive study of mathematics from elementary school through college, students can develop analytical, critical, and systematic thinking skills [2], [3].

The role of mathematics in education is enormously important. The NCTM has set five standards for the mathematics learning process that need to be applied, and one of them is problem-solving skills [1], [4]–[8]. According to one of the NCTM mathematics learning process standards, teachers must develop students' problem-solving skills. In this way, students can cope well with mathematical problems and better understand the subject.

We must provide a comprehensive mathematics education that equips students with the essential skills of logical thinking, analytical reasoning, systematic problem-solving, critical evaluation, and creative exploration. In addition, we must emphasize the importance of collaborative learning experiences to foster their growth in these areas. The purpose of mathematics education is to develop the mathematical skills of all students so that they can achieve maximum mathematical learning outcomes. An important aspect of achieving these learning outcomes is maximizing the learning of problem-solving skills. Research has shown that problem-solving skills are critical in math learning for every student, especially in story problems. To solve story problems successfully, students need to have good reading and writing skills beforehand. In addition, students also need to know the right strategy plan or steps in solving story problems. Therefore, as teachers, we need to ensure that our mathematics teaching helps students develop good problem-solving skills, including in the context of story problems [9], [10].

Problem-solving ability is essential in mathematics and everyday life [11]. By having various problem-solving skills, one can easily find solutions to any problem [12]. For example, when students learn to calculate the area of agricultural land, in this case, students are faced with the task of measuring and calculating the area of agricultural land given in the form of complex geometric fields such as trapezoids or other shapes. Students will learn how to use geometric formulas to calculate the area of different types of planes. They are also taught how to make accurate measurements using tools such as rulers and straightenedges. In learning math, students learn abstract concepts and make real-world connections between those concepts and their application in everyday life. Through this learning, students can understand how mathematics can be applied in the context of real life and develop their problem-solving skills. This skill is one of the aspects taught in mathematics.

Mathematics education in schools has a vital role in supporting the achievement of the competencies of primary and secondary school graduates. The learning objectives from the 2013 SMP/MTs Curriculum Syllabus emphasize students' ability to understand and apply mathematical concepts in everyday life, recognize patterns for generalization, use mathematical operations for simplified calculations, perform mathematical reasoning, solve problems while communicating mathematical ideas, and develop a positive attitude and perseverance in tackling problem-solving challenges [13], [14].

The above description states that before solving a problem, it is important to understand and gain a good understanding of the problem. Next, detailed steps must be taken to find a solution or solve the problem. Finally, a strong will to solve the problem is also required.

Polya explained four main stages in problem-solving: understanding the problem, planning the solution, implementing the plan, and checking the results [15]–[18]. Polya's approach is different from the 2013 middle school mathematics curriculum, which focuses more on mathematical problem-solving skills. On the other hand, Polya's approach describes general problem-solving steps and is not limited to mathematical problems. Students' ability to solve mathematical problems includes willingness, creativity, knowledge, skills, and their application in everyday life [19]–[21].

Although various efforts have been made to improve the quality of education in Indonesia, especially in mathematics, the reality is that the quality of education is still low, and Indonesia is lagging compared to other countries. In addition, the Indonesian government has also realized the low quality of mathematics education and tried to improve it [22]. The PISA test is evidence that shows different types of tested mathematical skills, such as mathematical understanding, problem-solving, critical thinking, reasoning, and so on. The ability to solve problems is one factor that influences the results of the PISA test. If someone does not have this ability, they will have difficulty answering the questions in the PISA test. In the 2018 PISA test results, Indonesia ranked last in mathematics. The average score for the math category in the 2018 PISA test was 379, placing Indonesia 73rd out of 79 participating countries. Indonesia is only ahead of Saudi Arabia, which has an average score of 373. Meanwhile, China still ranks with an average score of 591 in the math category [23]. This survey shows that the mathematical skills of Indonesian students are very low. The majority of Indonesian students can only answer questions involving numbers, while they have difficulty answering story problems that require reasoning and logic. As a result, Indonesia lags far behind other countries.

In Sungai Penuh City, the condition of students' problem-solving ability is also similar. Research shows that students still have difficulty solving problems, especially problems in the form of stories [24]. Students tend to be confused in determining the first steps to solve the problem. In addition, the observation results of research stated that students do not fully understand the problem when given a problem different from what they usually learn in class, especially when the problem is contextual [25]. Therefore, students still have difficulty in determining the correct strategy to solve the problem and often make mistakes in solving the problem. Based on this situation, it is essential for mathematics education to pay attention to various aspects that affect students' problem-solving ability.

Based on the explanation above, it can be concluded that the students' mathematical problem-solving skills are poor. This shows that students' mathematical problem-solving skills are still low because they still have difficulty in problem-solving, especially in analyzing story problems and determining the steps to solve them. They also do not fully understand the problem when given problems different from what they usually learn in class, especially contextual problems. This indicates the need to improve students' problem-solving skills through more effective learning approaches and an emphasis on contextual understanding [24], [25].

To support the above argument, the researchers sought supporting data related to students' mathematical problem-solving skills in Sungai Penuh City. Based on the interview results with the school mathematics teacher, it is known that students have difficulty solving story problems. When the given problem is different from the example the teacher gave, the students find it difficult to solve. Only a few students in the class were able to solve such problems.

Referring to the results of interviews with mathematics teachers, it is important to analyze students' mathematical problem-solving skills. Mathematical problem-solving skills play an important role in learning mathematics. Students can improve their higher-order thinking skills by implementing problem-solving-based mathematics learning. Mathematical problem-solving can also improve students' specific skills that help students understand the relationship between concepts, foster perseverance and curiosity, and develop students' confidence in dealing with problems [26]. Through this analysis, it is possible to know the errors that occur when students solve problems with the indicators of mathematical problem-solving skills contained in them [27], [28]. The results of this analysis can also be used to develop strategies following the location of errors made by students.

Numerous studies have been conducted on problem-solving ability analysis, including the analysis of mathematical problem-solving in plane geometry [29], analysis of problem-solving ability based on initial ability [30], analysis of problem-solving ability and self-efficacy [31], and analysis of problem-solving ability in SPLDV topics [32]. However, among these studies, none have been found that analyze problem-solving abilities in contextual problems of plane geometry. This research aims to analyze students' problem-solving abilities in contextual problems of plane geometry. Its novelty lies in analyzing students' problem-solving abilities in contextual questions, which involves knowledge of daily life phenomena. Previous research has been conducted on similar topics but did not focus on contextual problems. This research is expected to provide insights into students' abilities to solve contextual problems in plane geometry.

2. METHOD

The methodology used in this study is a qualitative approach. A qualitative approach is a type of research that aims to describe phenomena and tends to use data analysis [33]. Qualitative methods in research are procedures that produce descriptive data in the form of written or oral accounts of individuals and observable behavior. In other words, this method provides a clear picture of a problem following the facts in the field.

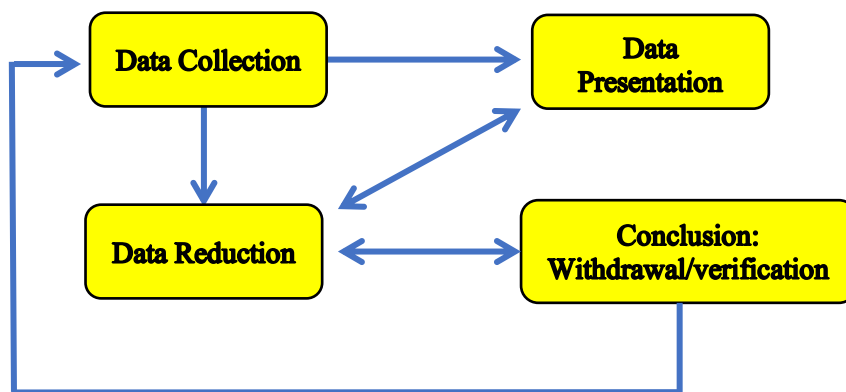


Figure 1. Qualitative Research Flowchart

This research used a case study research design [34] and was conducted in SMP Negeri 10 Kota Sungai Penuh in May 2023. The research subjects were two Grade VIII students who attempted to solve mathematical problems using Polya's steps, although not all steps were implemented. The instruments used include the main instrument (the researcher himself) and supporting instruments such as observation guides, interview guides, and question sheets. Data collection techniques included questionnaires,

observations, interviews, and field notes. At the same time, the data analysis technique refers to the Miles and Huberman model [35], which consists of three stages: data reduction, data presentation, and drawing conclusions. Figure 1 shows the flow of the research procedure.

3. RESULTS AND DISCUSSION

3.1 Analysis Results of Mathematical Problem-solving Skills

The research process and data collection were conducted at SMP Negeri 10 Kota Sungai Penuh. The subjects of this study were students of grade VIII. The data collected in this study included information about students' steps or ways of solving mathematics problems in the task sheet. This information was analyzed using indicators related to the problem-solving process. The research process was carried out by giving the students of class VIII a problem. The researcher then checked the students' answers and evaluated them. In addition, interviews were conducted with two students to get more information about the students' problem-solving abilities. In the interview, the researcher will ask the students about the approaches and strategies they use in solving mathematical problems. The goal is to better understand how students overcome challenges and see potential improvements in their learning.

Table 1. Description of Problem-solving Skills for Each Criterion Indicators of the Solution of the Problem Based on Polya's Steps [36]

Problem-solving Steps by Polya	Problem-solving Indicators	Skill Description
Skill Description	Identify known, requested, and sufficient data to solve the problem.	The students do not write anything down. They do not understand the problem. Students write data concepts that do not match the problem. Students write only what they know or what is required. Students have written data concepts but are still wrong in one of them. Students can write what is known and what is required and illustrate the picture so that students understand the problem.
Solution planning process	Identification of strategies for action	Students do not make a solution plan Students are wrong to make a plan. Students have created a problem-solving plan, but it is incomplete. Students have created a problem-solving plan, but there are still some mistakes. Students are able to use and write down all the information to solve the problem correctly.
Execution of solution/calculation plan	Solve mathematical models with the power of reasoning	Students are unable to carry out the plan they have made. Students make mistakes in implementing the plan they have made. Students have implemented the plan correctly, but students are incorrect in the algorithm/calculation, so the answer is wrong. Students do not carry out the plan according to the plan but get the correct answer. Students carry out the plan with no miscalculations and no procedural errors.
Checking the result		Students do not check their answers

Checking the correctness of the solution obtained	Students check their answers incorrectly.
	Students do not review the answer.
	The student checks the answer, but the answer is not complete.
	Students double-check that the answer is appropriate, complete, and correct.

3.2 Analysis of Test Answers of Students of SMP NEGERI 10 Kota Sungai Penuh

In this study, it is necessary to conduct an in-depth analysis to evaluate the students' problem-solving skills. There are two stages of analysis carried out, namely analyzing the results of written tests and conducting in-depth interviews with subjects selected based on several considerations to represent each criterion of problem-solving ability. The criteria include excellent, good, fair, poor, and very poor. The analysis related to Polya's problem-solving steps. The goal is to better understand students' strategies and approaches to solving mathematical problems. This analysis gives us a comprehensive picture of the student's problem-solving skills.

3.2.1 Analysis of Students' Mathematical Problem-Solving Ability Question Number 1

In Indicator 1, students are expected to be able to identify known data, required data, and sufficient data to solve problems. In general, students could not write what is known and what is asked from the problems in problem 1. The following is an example of a student's response.

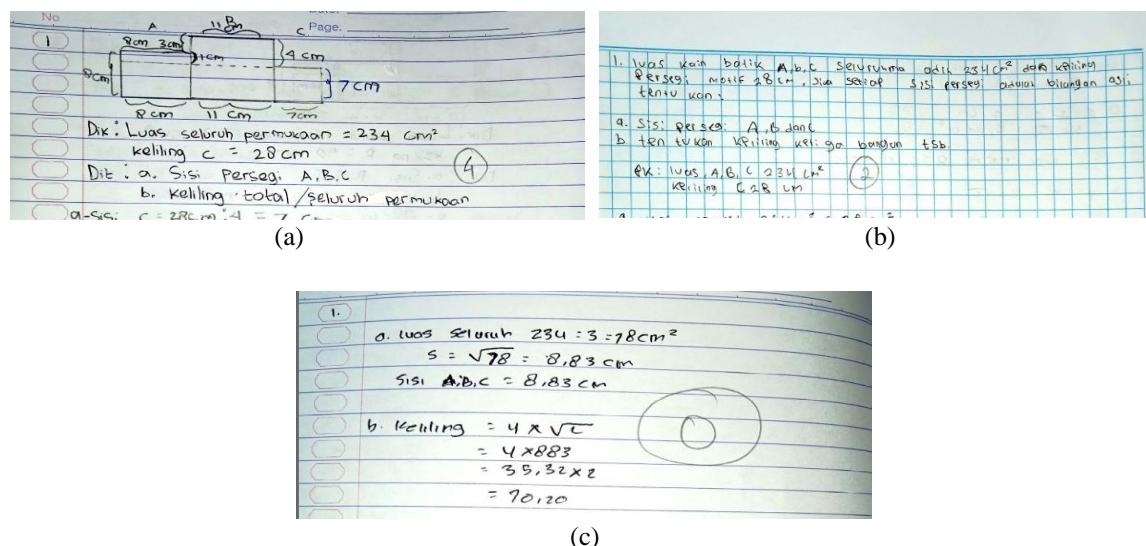


Figure 2. (a) Answer the Question Correctly, (b) Students' Answers are Incomplete, and (c) Answer is Wrong

Based on the analysis of students' responses, it is evident that Indicator 1 reflects varying performance levels. Among the examples provided, Figure 2 (a) illustrates that six students successfully responded by identifying the given information and the required elements of the problem. Conversely, Figure 2 (b) highlights that 13 students failed to provide a complete response, as they omitted crucial details such as the lengths of the two sides. Additionally, Figure 2 (c) demonstrates that some students struggled to articulate the known and required components of the given problem, resulting in 4 students being unable to answer. Regarding question number 1, the distribution of scores among the students is as follows: 5 students scored 4, 5 students scored 2, 8 students scored 1, and 4 students scored 0.

In indicator 2, students are expected to demonstrate their capability to identify applicable problem-solving strategies. However, it is noticeable that students generally face challenges in identifying suitable strategies for the given problems. Here are a few examples of student responses.

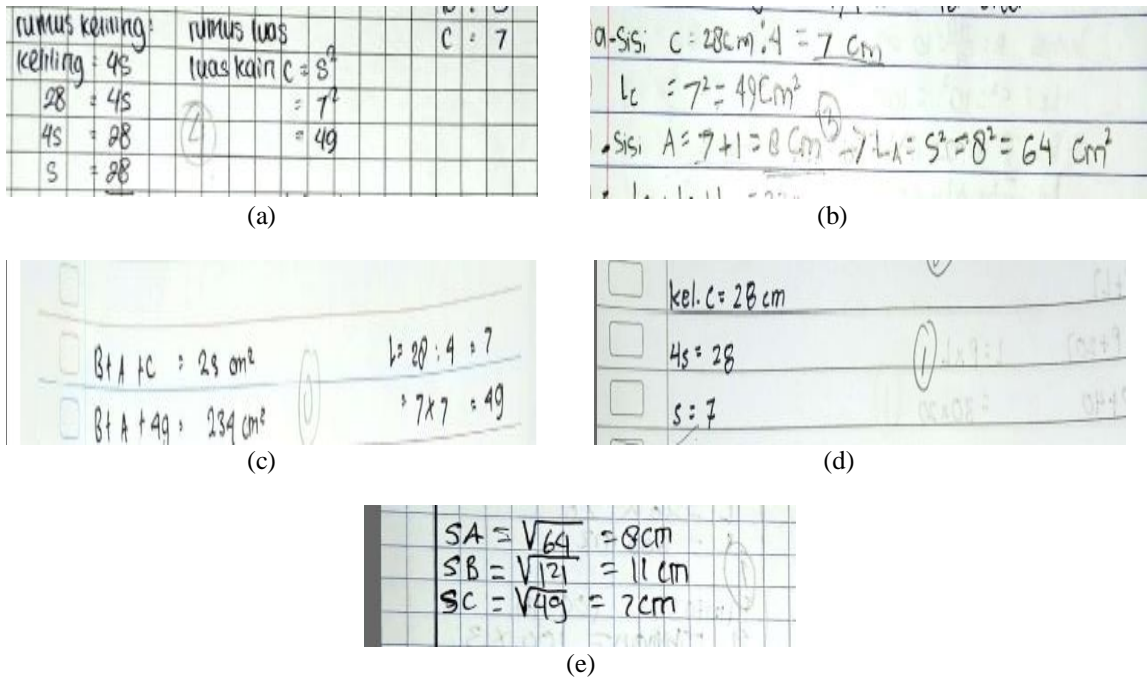
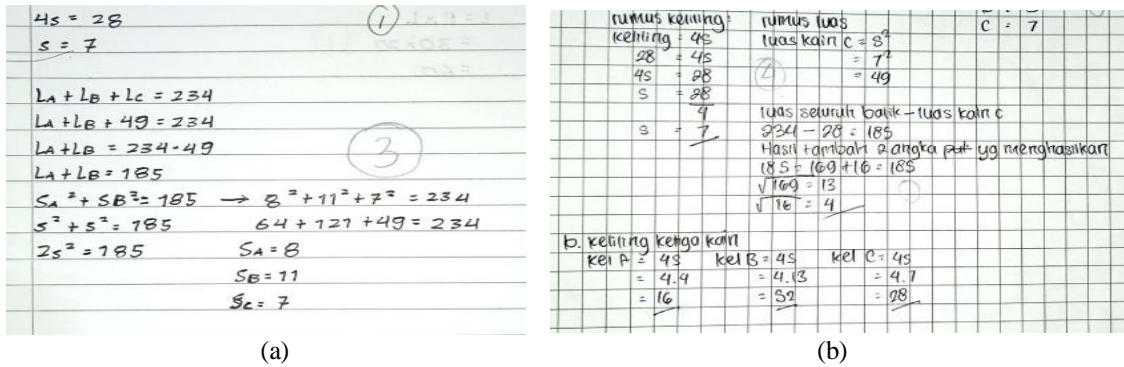


Figure 3. (a) Right Answer (Score 4), (b) Incomplete Answers (Score 3), (c) Answers are Less Accurate than (Score 2), (d) Less than a Precise Answer (Score 1), and (e) Imprecise Answer (Score 0)

Within Indicator 2, an examination of student responses reveals noteworthy observations. Figure 3 (a) demonstrates that two students successfully provided correct answers. However, Figure 3 (b) shows that one student's response lacks completeness despite employing the correct solution strategy. The student hastily proceeded with calculations without fully addressing the problem. Similarly, Figure 3 (c) showcases another incomplete response, where the employed strategy is accurate but leads to an incorrect answer due to unclear information.

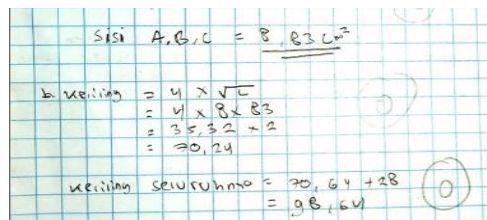
Furthermore, Figure 3 (d) displays instances where students failed to provide comprehensive answers; their strategy was impractical and could not be continued, resulting in 9 students being unable to respond adequately. Lastly, Figure 3 (e) portrays students who were incapable of identifying the appropriate strategy for solving the problem, with nine students failing to answer entirely. To question number 1, the distribution of scores among the students is as follows: 2 students scored 4, 1 student scored 3, 1 student scored 2, 9 students scored 1, and 9 students received a score of 0 for incorrect answers.

In indicator 3, students are expected to demonstrate their proficiency in solving mathematical models accompanied by valid reasoning. Yet, it is observed that students generally encountered difficulties in solving the mathematical model presented in their answers to question number 1.



(a)

(b)

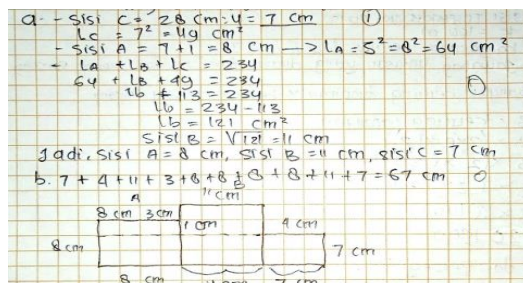


(c)

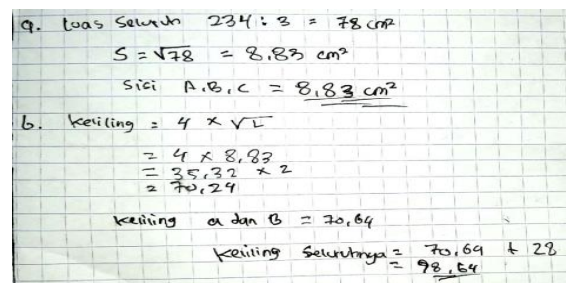
Figure 4. (a) Answer Not Complete (Score 2), (b) Incomplete Answer (Score 1), and (c) Wrong Answers (Score 0)

Several observations can be made regarding Indicator 3 after reviewing the students' responses. In Figure 4 (a), it is evident that three students provided incomplete answers. Although their answers were correct, the strategy employed was not feasible and could not be continued effectively. Similarly, Figure 4 (b) showcases nine students with incomplete answers, where the strategy utilized was also less feasible and could not be sustained. Furthermore, Figure 4 (c) exemplifies how some students' answers lack both the solution steps and an accurate approach to solving the problem, leading to 11 students being unable to respond satisfactorily. Regarding question number 1 (Indicator 3), the distribution of scores among the students is as follows: 3 students scored 2, 9 students scored 1, and 11 students received a 0 for incorrect answers.

Now, let's move on to Indicator 4, which focuses on students' ability to verify the accuracy of the solutions they obtain. It is observed that, in general, students encountered difficulties when attempting to solve problem 1. Here is an example illustrating one student's answer.



(a)



(b)

Figure 5. (a) Less Precise Answer (Score 1) and (b) Wrong Answer (Score 0)

Upon analyzing the students' responses, several observations can be made regarding Indicator 4. In Figure 5 (a), it is evident that three students provided incomplete answers. The strategy they employed was not feasible and could not be continued effectively. Additionally, these students failed to verify their answers by summing the three numbers. Furthermore, Figure 5 (b) illustrates that students' answers did not yield the correct solution

to the problem at hand. As a result, 20 students were unable to provide a satisfactory response. Regarding question number 1 (Indicator 4), the distribution of scores among the students is as follows: 3 students scored 1, and 20 students received a 0 for incorrect answers.

Table 2. Problem-solving Category of the Students in Grade VIII of SMP Negeri 10 Kota Sungai Penuh on Question 1 by Indicators

Indicator	Average Learner Score	Category
Indicator	45,65	Sufficient
Identify known data, requested data, and sufficient data to solve the problem	23,91	Low
Identify strategies to pursue	16,30	Poor
Solve math models with reasoning	3,26	Poor

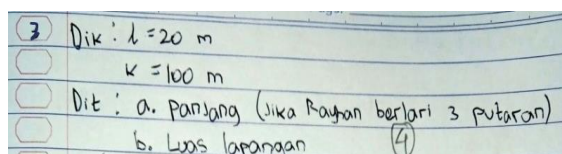
Based on the provided table, it is evident that the mathematics problem-solving skills of students from SMP Negeri 10 Sungai Penuh City are relatively low in Indicator 1. The average score falls within the "sufficient" category, while the other indicators indicate scores in the "low" and "poor" categories.

The researchers also interviewed two students regarding the answer to question number 1. In tests of the mathematical problem-solving ability of 2 students, they could also not fulfill all problem-solving indicators correctly. Their answers were also incorrect. The interview results show that the students could not fully understand the problem, but there are certain parts of the problem where he can mention what he knows. For other indicators, the students could not perform them correctly; they could not find the answers to other questions, and they could not check the answers. Thus, It can be concluded that mathematical problem-solving skills, especially students' mathematical problem-solving skills, are still in short supply.

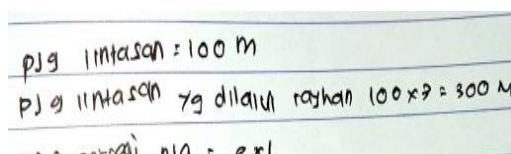
The researcher also interviewed two students about their answers to problem number 1. In the mathematical problem-solving test, the two students could not correctly meet all the problem-solving indicators. Their answers were also incorrect. The interview results show that the students still do not fully understand the given problem, but they can mention some information already known in certain parts of the problem. However, for other indicators, the students were not able to perform them correctly, such as not being able to solve other questions and not being able to check their answers. Thus, it can be concluded that the students' ability to solve mathematical problems, especially mathematical problem-solving, is still lacking. Some aspects need to be considered and improved so that students can develop better mathematical problem-solving skills.

3.2.2 Analyzing Students' Mathematical Problem-Solving Ability Question No. 2

In Indicator 1, students are expected to be able to identify known data, asked data, and sufficient data to solve problems. In general, students could not write what is known and what is asked from the problems in question number 2. The following is an example of a student's response.



(a)



(b)

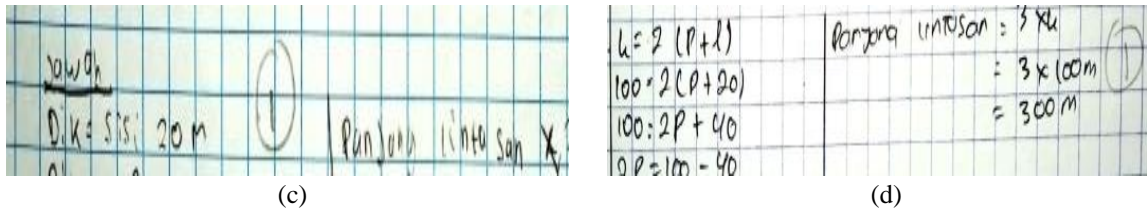
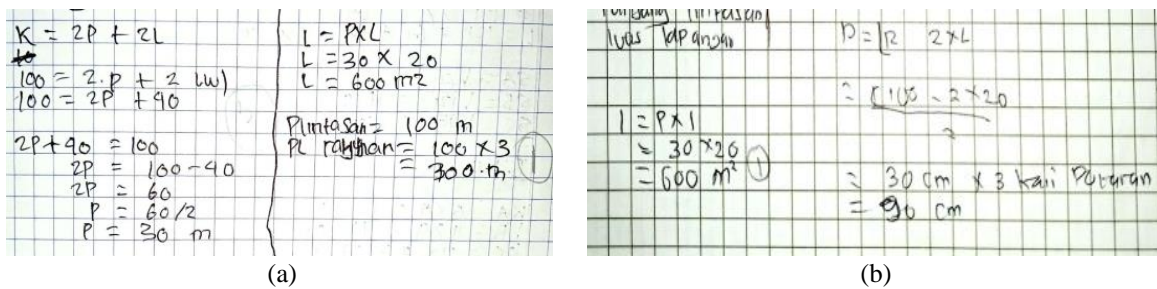


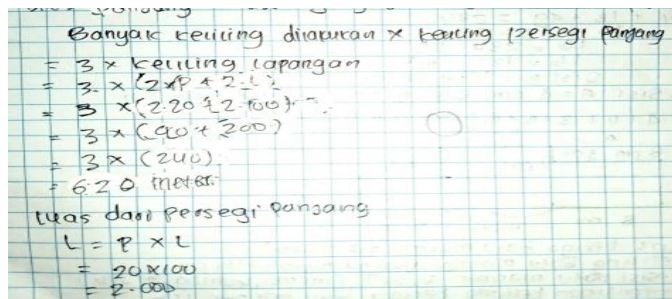
Figure 6. (a) Right Answer (Score 4), (b) Answers that are Incomplete (Score 2), (c) An Incomplete Answer (Score 1), dan (d) Wrong Answer (Score 0)

In Indicator 1, specifically in Figure 6 (a) of question number 2, it is evident that seven students could answer correctly by accurately identifying the given information and the required elements of the problem. However, five students provided incomplete answers in Figure 6 (b). Although their responses were correct, they lacked important details, such as the shortest side. Similarly, in Figure 6 (c), two students failed to provide a complete answer. While their solutions were accurate, vital information such as the shortest side, track length, and field perimeter was missing. Additionally, Figure 5 (d) illustrates how nine students could not adequately identify the known information and the requirements of the problem, resulting in no answer being provided. Regarding question number 2, the distribution of scores among the students is as follows: 7 students scored 4, 5 students scored 2, 2 students scored 1, and 9 students received a score of 0.

In indicator 2, students must demonstrate their ability to identify applicable problem-solving strategies. However, it is observed that, in general, students encountered challenges in identifying suitable strategies for the given problems in question number 2. Here are a few examples of student responses.



(a) (b)



(c)

Figure 7. (a) correct answer (score 4), (b) Incomplete answer (score 1), and (c) Answer is not correct (score 0)

Upon analyzing the students' responses, several observations can be made regarding Indicator 2. In Figure 7 (a), it is evident that two students could provide correct answers. However, in Figure 7 (b), 11 students did not complete their answers. The strategy they employed was not feasible and could not be continued effectively. Furthermore, these students struggled with writing the circumscribed formula accurately.

Additionally, Figure 7 (c) exemplifies how students' answers were incorrect in solving the problem, leading to 8 students being unable to provide a satisfactory response. Regarding question number 2 (Indicator 2), the distribution of scores among the students is as follows: 2 students scored 4, 1 student scored 2, 11 students scored 1, and 9 students received a score of 0 for incorrect answers. Moving on to Indicator 3, which focuses on students' ability to solve mathematical models accompanied by reasoning. It is observed that, in general, students encountered difficulties when attempting to solve the mathematical model presented in their answers to question number 2. Here is an example illustrating one student's answer.

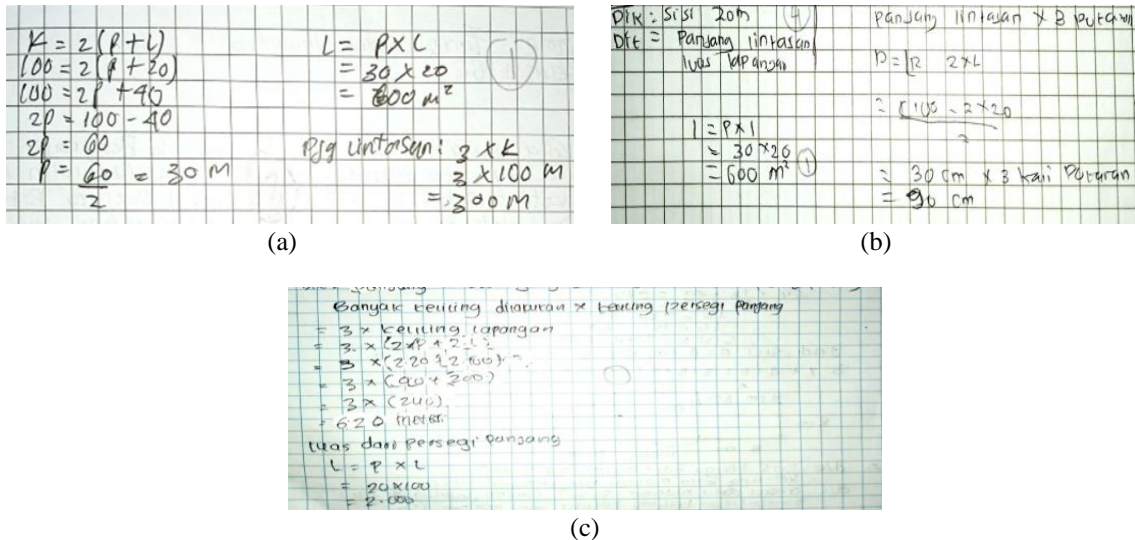


Figure 8. (a) Right Answer (Score 3), (b) Answers are less precise (score 1), and (c) Answer is not correct (score 0)

In Figure 8 (a), question number 2, indicator 3, one student can answer correctly. In Figure 8 (b), 14 students did not complete the answer. The strategy used is not feasible and cannot be continued. The students are not able to write the formula of the circumference correctly. In Figure 8 (c), the student's answers are incorrect in solving the problem. There were seven students who could not do the solution. Based on students' answers to question number 2 indicator 3, there was one person who scored 3, 14 people with a score of 1, and 7 people who answered incorrectly with a score of 0.

In Indicator 4, students are expected to be able to check the correctness of the solution they have obtained. In general, students were not able to solve problem number 2. The results show that the student's answers do not correspond to what was asked, so the final answer is still wrong. Twenty-three students still answered incorrectly.

Table 3. Category of Problem-solving Ability of Students in Grade VIII SMP Negeri 10 Sungai Penuh on Question 2 by Indicator

Indicator	Average Learner Score	Category
Identify known data, requested data, and sufficient data to solve the problem	43,47	Simply
Identify strategies to pursue	22,82	Less
Solve math models with reasoning	18,47	Less
Checking the correctness of the obtained solution	0	very less

Based on the provided data, it is evident that the mathematical problem-solving ability of students at SMP Negeri 10 Sungai Penuh, as indicated by the table, is significantly low in Indicator 1. The average score falls within the "sufficient" category,

while the scores for other indicators are categorized as "low" and "poor." Consequently, the overall problem-solving ability of the students can be deemed insufficient, indicating a need for further intervention and support.

The researcher interviewed students regarding their responses to problem number 2 to gain a deeper understanding. The results of the interviews showed that the students struggled to accurately fulfill the required problem-solving indicators. Their answers were also imprecise. In particular, the students faced challenges in correctly identifying the known elements and accurately representing the required elements of the problem. This difficulty was evident from their answers, which only partially addressed the problem. In addition, the students demonstrated inadequate planning skills, as shown by their answer sheets, which simply listed the known information without any clear planning or attempt to check their answers [37]. It can be concluded that students still have difficulties in implementing effective problem-solving plans and checking their answers. To overcome this problem, efforts should be made to help students develop their planning skills, improve accuracy in identifying the known items, and represent the elements asked appropriately. In addition, teaching students the importance of checking their answers before solving the whole problem is also very important [38]. Based on the comprehensive data analysis, the average level of mathematical problem-solving ability among students at SMP Negeri 10 Sungai Penuh is determined. The following represents the average mathematical problem-solving ability of the students.

Table 4. The Average Mathematical Problem-Solving Ability of the Students

Item Number	Average Skill Level Mathematical Problem-solving
Question 1	22,28 (Low)
Question 1	15,23 (Low)

Based on the table above, we can see that problem-solving skills are still in the low category. The low scores indicate that many students struggle with understanding and applying mathematical concepts to solve the given problems. This suggests a need for more focused educational interventions to enhance mathematical problem-solving skills among students.

4. CONCLUSION

Based on the findings of this study, it is evident that students at SMP Negeri 10 Kota Sungai have a low level of mathematical problem-solving ability. The average score obtained is 22.28 out of 100, which accounts for approximately 15.23% of the total possible score. This indicates a clear need to enhance the student's problem-solving skills. To improve the students' problem-solving abilities, the role of teachers in the learning process is crucial. Teachers are vital in guiding and supporting students as they develop their problem-solving skills.

Appropriate instructional media and learning tools can greatly enhance students' abilities. By providing students with effective learning resources and the guidance of dedicated teachers, significant improvements in their problem-solving skills are expected. In conclusion, it is essential to address the low level of mathematical problem-solving ability among students at SMP Negeri 10 Kota Sungai Penuh. Through the collaborative efforts of teachers and the utilization of suitable teaching resources, students are expected to experience notable advancements in their problem-solving skills.

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