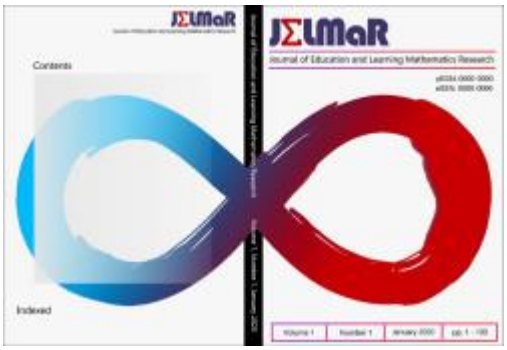

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Analysis of Student's Mathematical Reasoning in terms of Learning Independence During Distance Learning

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***Abstract**: Mathematical reasoning is the student's ability to think logically regarding mathematics problems. The indicators of mathematical reasoning used in this study are presenting statements mathematically, performing mathematical manipulations, compiling the proofs for the truth of solutions, and drawing conclusions from statements presented. This study used qualitative research methods and aims to describe the students' mathematical reasoning abilities for the subject of Three Dimensions, reviewed by their learning independence during Distance Learning. This research was conducted at SMAN 1 Pasuruan class XII MIPA 1 for the 2021/2022 academic year. The instruments used in this study are learning independence questionnaires, mathematical reasoning ability tests, and guides for the interview. The results showed that 21 students can be categorized into Medium Level in terms of their learning independence, and 14 students can be categorized into High Level in terms of their learning independence. Students who have medium learning independence showed medium and low mathematical reasoning abilities. Students are able to solve problems by fulfilling two indicators of mathematical reasoning ability. On the other hand, students with high learning independence showed high mathematical reasoning abilities. Students are able to solve problems by fulfilling all indicators of mathematical reasoning abilities.*

Keyword: mathematical reasoning, three dimension, learning independence, distance learning

INTRODUCTION

Distance Learning (PJJ) in Indonesia has existed since the beginning of independence. In ancient times distance learning was implemented because of the vacancy in the defense of independence. Along with the times, distance learning continues to develop from basic education to higher education. Distance learning in the 2021/2022 academic year is an option that can be applied to educational units during the Covid-19 pandemic. Distance learning can be applied especially to educational units with a high risk of the Covid-19 pandemic.

Since the Covid-19 pandemic has spread in Indonesia, more schools have implemented distance learning compared to limited face-to-face learning. According to data from the Minister of Education and Culture, schools implementing limited face-to-face learning continued to increase until November 2021. This situation did not last long, in early 2022 a new variant of the Covid-19 pandemic emerged, namely Omicron which caused schools to return to implementing distance learning. The impact of the pandemic cannot be controlled and there is even uncertainty about its impact. This uncertainty in the education sector is very important for teachers to be responsive and flexible in choosing learning strategies and technologies.

Dilmaç (Makur et al., 2021) states that distance learning is carried out separately between teachers and students in terms of time and place. Learning is carried out to provide opportunities for individuals to gain experiences that are missed in regular education. Distance learning aims to combine education and technology to help the teaching and learning process run. The Covid-19 pandemic has a great opportunity to threaten the quality of education in the long term and can affect the future of education in Indonesia. This again requires teachers to be at the forefront to change the pattern of the world of education both in choosing learning strategies and providing innovation in learning so that the learning process can go according to plan. The solution in dealing with the challenges of the pandemic is to apply a limited face-to-face learning strategy by combining face-to-face learning (PTM) and distance learning in an integrated manner to create independent students to learn (Kementrian Pendidikan, Kebudayaan, Riset, dan Teknologi, 2021).

Independent learning is important in carrying out learning, especially during online learning (Syelitiar & Putra, 2021). Independent learning is a learning activity that takes place prioritizing the abilities, choices, and responsibilities of each individual (Syamsu Hadi, 2013). Students must be able to carry out independent learning without depending on others so that in practice students are able to increase their learning initiative and self-confidence. Research conducted by Hidayat et al., shows that students' learning independence during the implementation of distance learning tends to be low (Hidayat et al., 2020). The lowest indicator shown is the attitude of responsibility and learning initiative. Research conducted by Rachmawati shows that the distance learning model can increase learning independence. This is evidenced by the initiative of students in completing tasks independently without relying on the help of others. The indicator of learning independence raised in this study refers to the MOOC online self-regulated learning questionnaire (MOSLQ) including learning objectives, environment, learning strategies, time management, seeking help, and self-evaluation (Makur et al., 2021). So that in this study, it is expected to describe the behavior of students in realizing their desires in a real and independent manner through the level of learning independence.

Independent learning is needed to master teaching materials in all subjects including mathematics. Mathematics is a science that consists of concepts that are logical and systematic. According to Kusumawardani in mathematics students are not only limited to numeracy skills, but logical and critical reasoning skills in problem solving must also be achieved [8]. Distance learning requires teachers to continue to innovate so that mathematics learning remains interesting so that students can achieve learning goals. The objectives of learning mathematics according to the Regulation of the Minister of National Education of the Republic of Indonesia Number 22 of 2006 concerning Content Standards are the ability to understand concepts, reasoning abilities, problem solving skills, communication skills, and representation skills. One of the mathematical goals that must be mastered by students to solve problems is the ability to reason mathematically.

Mathematical reasoning ability is the ability to associate problems into a thought with the aim of being able to solve mathematical problems (Salmina & Nisa, 2018). One study shows that good mathematics learning outcomes are necessary for the reasoning ability of each individual (Sumartini, 2015). Improving students' reasoning skills during the distance learning process is also an indicator for achieving learning success. The indicators of mathematical reasoning ability that will be used in this study are as follows.

Table 1. Indicators of Mathematical Reasoning

Numb.	Indicator	Learning Achievement
1.	Presenting mathematical statements in solving three dimensional problems	Students are able to present mathematical statements in writing and pictures
2.	Perform mathematical manipulation in solving three-dimensional problems	Students can carry out mathematical engineering processes using symbols, formal language, and technical language to achieve the desired goals
3.	Compiling evidence against the correctness of the solution	Students are able to compose the calculation of the solution to get the answer
4.	Draw a conclusion	Students are able to draw conclusions from solutions that have been proven previously

Source (Modified from the Ministry of National Education, 2004)

Mathematics learning materials, including geometry materials, can be used as a means of measuring the level of students' reasoning abilities using the distance learning model. Geometry is a part of mathematics that is given with the aim of helping students understand the properties and relationships between geometric components and be able to solve problems well (Muslimin & Sunardi, 2019). Students in learning geometry often experience problems. This is in accordance with the results of Sari & Roesdiana (2019) research which states that the selection of learning strategies used by teachers in learning affects students' mastery of geometry material which is still relatively low. The application of Distance Learning requires strategies and learning media that are in accordance with the students' thinking level in geometry (Safrina, 2014). The results of the Program For International Students Assessment survey show that students have difficulty in geometry, especially in understanding space and shape. This is confirmed by research by Muslimin & Sunardi (2019) regarding the analysis of reasoning abilities in spatial geometry material, which shows that the average value of students' mathematical reasoning abilities in solving spatial geometry problems is low with a score of 66.11. Therefore, this study will describe students' mathematical reasoning abilities in solving three-dimensional problems, namely the distance between points, points to lines, and points to planes.

Based on the results of observations made in August 2021 on one of the mathematics teachers of SMAN 1 Pasuruan, it showed that in the 2021/2022 academic year during the Covid-19 pandemic the school had implemented Limited Face-to-face Learning (PTMT) by combining Face-to-face Learning (PTM)) and distance learning. Circumstances that continue to change due to the new variant of the corona virus have caused schools in the middle of the even semester of the 2021/2022 academic year to return to full distance learning. Learning activities have been carried out optimally but the implementation of distance learning shows that students' learning independence is varied. Based on the observations that have been made, it can be seen that some students are still not focused on the learning objectives to be achieved. Students only depend on teacher instructions, while one of the mathematical goals that must be achieved by students is reasoning ability.

Based on this description, research will be carried out on the subject of three-dimensional material with class XII students of SMAN 1 Pasuruan as research objects. In this study, the title "Analysis of Students' Mathematical Reasoning Ability in Solving Three Dimensional Problems in terms of Learning Independence during Distance Learning (PJJ)" will be chosen.

METHOD

The type of research used in this research is descriptive research with a qualitative approach. The purpose of this study is to describe the students' mathematical reasoning abilities for the subject of Three Dimensions, reviewed by their learning independence during Distance Learning. The research subjects were selected based on the scores obtained in the learning independence questionnaire which was tested on 35 students of class XII MIPA 1 SMA Negeri 1 Pasuruan for the academic year 2021/2022. In this study, there were no students with low learning independence. So the research was conducted only on the mathematical reasoning ability of students with moderate and high learning independence. The selected subjects were 4 students with the highest score on high learning independence and 3 students with the highest questionnaire score on moderate learning independence. The instrument used has been validated and has been declared valid.

The research procedure is carried out through 7 stages of research, namely (1) preliminary activities include determining the title of the research and licensing the research site; (2) Making instruments, including learning independence questionnaires, three-dimensional problem tests, and interview guidelines; (3) Test the validity of the instrument conducted by two lecturers of Mathematics Education at the University of Jember. The validation of the learning independence questionnaire obtained a final score of 3.75 (scale 4), the validation of the students' mathematical reasoning ability test obtained a score of 3.937 (scale 4), and the validation of interview guidelines obtained a score of 3.928 (scale 4). The three scores indicate that the instrument used has been declared valid; (4) Determination of research subjects based on students' learning independence scores, then coding for each subject, namely SS1, SS2, SS3 are subjects with moderate learning independence, and subjects ST1, ST2, ST3, ST4 are subjects with high learning independence; (5) The data collection consists of three stages, namely filling out a learning independence questionnaire to determine the level of learning independence, a mathematical reasoning ability test to describe the mathematical reasoning indicators achieved, and interviews as supporting data to analyze students' mathematical reasoning abilities. Interviews were conducted individually on subjects SS1 to ST4; (6) Data analysis was carried out to answer the problem formulation and achieve the research objectives, namely to describe students' mathematical reasoning abilities in three-dimensional subjects in terms of learning independence during distance learning; (7) Draw conclusions or answer questions in the formulation of research problems.

RESULT AND DISCUSSION

The research subjects were selected based on the level of learning independence obtained from the results of the learning independence questionnaire. This questionnaire was given to 35 students of class XII MIPA 1 SMA Negeri 1 Pasuruan on February 7, 2022. Following are the results of categorizing the level of learning independence of XII MIPA 1.

Table 2. Student Learning Independence Category Results

Numb.	Independence Learning Category	Total Students
1.	Low	0
2.	Medium	21
3.	High	14
Total		35

The results of the learning independence questionnaire showed that there were no students who had low learning independence. Class XII MIPA 1 students tend to have a moderate level of learning independence. This is different from the results of research conducted by Hidayat et al. (2020), namely the learning independence of high school, vocational, and college students is still relatively low. While research by Harli et al. (2021) shows that learning independence is divided into three groups with qualifications of 1 student who has high learning independence, 23 students classified as moderate independence, and 2 students with low category. So the results of this study are the same as those of Harli et al. (2021) that the average student has a moderate level of independence.

The mathematical reasoning ability test in the form of 3 three-dimensional problem items presented in the google form was given to students after filling out a learning independence questionnaire. A total of 34 students answered the test questions given and 1 student did not answer the question. The following are 3 three-dimensional problems given to research subjects to analyze students' mathematical reasoning abilities.

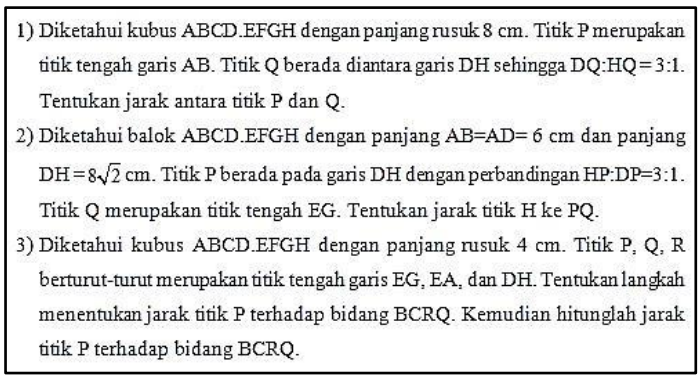
1) Diketahui kubus ABCD.EFGH dengan panjang rusuk 8 cm. Titik P merupakan titik tengah garis AB. Titik Q berada diantara garis DH sehingga DQ:HQ = 3:1. Tentukan jarak antara titik P dan Q.
2) Diketahui balok ABCD.EFGH dengan panjang AB=AD= 6 cm dan panjang $DH = 8\sqrt{2}$ cm. Titik P berada pada garis DH dengan perbandingan HP:DP=3:1. Titik Q merupakan titik tengah EG. Tentukan jarak titik H ke PQ.
3) Diketahui kubus ABCD.EFGH dengan panjang rusuk 4 cm. Titik P, Q, R berturut-turut merupakan titik tengah garis EG, EA, dan DH. Tentukan langkah menentukan jarak titik P terhadap bidang BCRQ. Kemudian hitunglah jarak titik P terhadap bidang BCRQ.

Figure 1. Three-dimensional problems

The results of student work are then given a score according to the scoring rubric and categorized with the provisions that students have a low level of mathematical reasoning ability if $x_i \leq 55\%$, medium mathematical reasoning ability if $55\% < x_i < 70\%$, and high reasoning ability if $x_i \geq 70\%$. The results of the student's mathematical reasoning ability test showed that 17 students had low reasoning abilities, 8 students were classified as medium reasoning abilities, and 9 students had high reasoning abilities.

The research subjects were selected based on the results of the learning independence questionnaire, namely 4 students with the highest score on high learning independence and 3 students with the highest score on moderate learning independence so that they got fixed and saturated results. The following is a list of names that were chosen to be subjects in the research of mathematical reasoning analysis in solving three-dimensional problems when viewed from the independence of student learning.

Table 3. List of Research

Subject	Student Serial Number	Independent Learning Category	Mathematical Reasoning Category
SS1	18	Medium	Medium
SS2	26	Medium	Medium
SS3	9	Medium	Low
ST1	20	High	High
ST2	2	High	High

ST3	27	High	Medium
ST4	28	High	High

The research was conducted with the aim of describing students' mathematical reasoning abilities in solving three-dimensional problems in terms of learning independence during distance learning. In this study, there were no students with low learning independence. So that the description is carried out only on the mathematical reasoning ability of students with moderate and high learning independence.

1. Mathematical Reasoning Ability of Students with Medium Learning Independence

- Analysis of Mathematical Reasoning Ability Problem Number 1

The following is the analysis of solving the three-dimensional problem of SS3 for problem number 1 according to the problem in Figure 2.

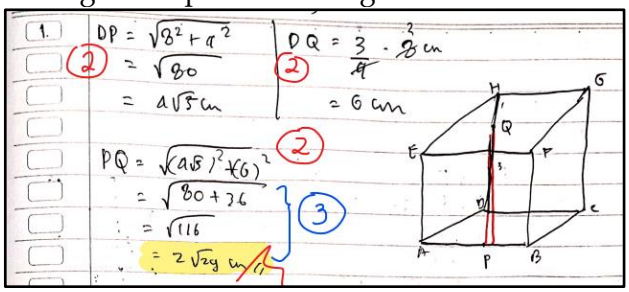

Figure 2. SS3's Answer to Problem Number 1

Based on the description of the answers written on the answer sheet, SS3 has not been able to state information on the questions in written or picture form appropriately. SS3 has been able to manipulate the questions into the desired formula, even though at the initial stage the actual formula was not written down. SS3 can answer correctly partially. However, at the final stage, SS3 has not been able to state the answer in the form of a conclusion. Based on the results of the analysis of written tests and interviews that have been carried out, there is no difference in the reasoning ability indicators achieved by SS3 subjects in the process of working on problem number 1. SS3 gets 3 scores with the correct answer category and only contains two reasoning indicators that the question wants. The indicators achieved are performing mathematical manipulations and compiling proof of the correctness of the solution.

- Analysis of Mathematical Reasoning Ability Problem Number 2

The following is the analysis of solving the three-dimensional problem of SS1 for problem number 2 according to the problem in Figure 3.

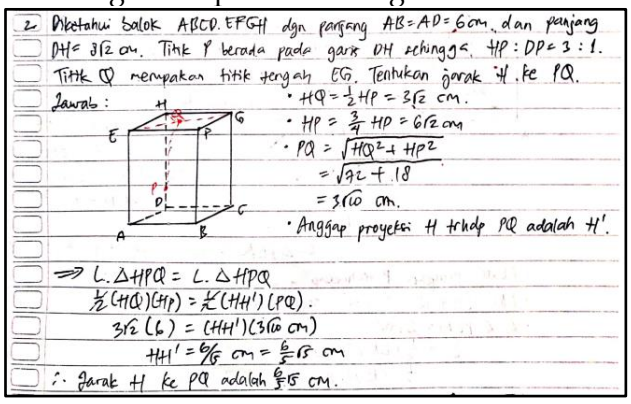

Figure 3. SS1's Answer to Problem Number 2

Based on the description of the answers written on the answer sheet, SS1 solved problem number 2 with a partially correct process, but SS1 made a mistake in compiling evidence against the correctness of the solution. Students are able to

manipulate questions, but they are not right in substituting HP values into the formulas that have been prepared. As a result, SS1 obtained wrong results and conclusions. At the beginning of the answer sheet, SS1 also does not present mathematical statements. SS1 rewrites the same information as the question text given. The illustrated picture also does not cover all the information contained in the problem. Based on the analysis of the written test problem number 2, SS1 is only able to perform mathematical manipulations. Based on the results of the analysis of written tests and interviews that have been carried out, there is no difference in the indicators of reasoning ability achieved by SS1 subjects in the process of working on problem number 2. SS1 gets 1 score in the wrong answer category and contains only one reasoning indicator that the question wants. The indicators achieved are performing mathematical manipulations in solving three-dimensional problems.

- Analysis of Mathematical Reasoning Ability Problem Number 3

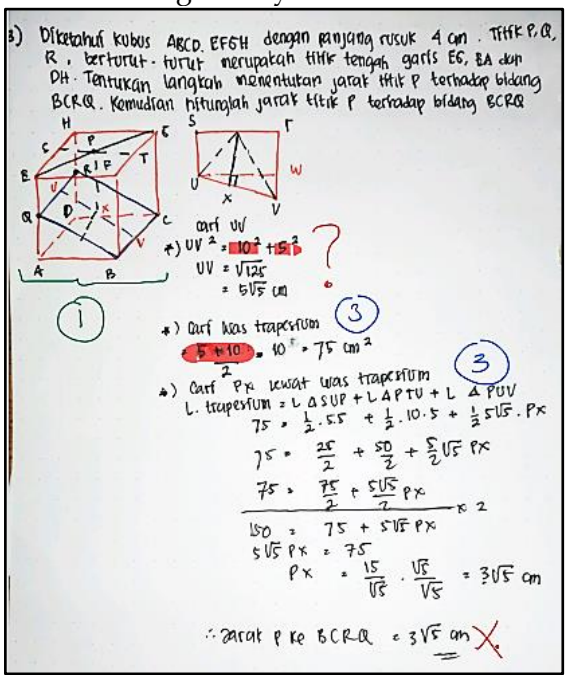

Figure 4. SS2's Answer to Problem Number 3

Based on the description of the answers written on the answer sheet, at the beginning of the answer sheet SS2 is able to present mathematical statements in the form of pictures but still does not cover all the information in the questions. SS2 rewrites the same information as the text of the questions given. If you look at the completion process, SS2 is able to manipulate the problem, but there is an error in compiling evidence for the correctness of the solution, namely in substituting the length of the edge into the formula that has been compiled. As a result, SS2 obtains wrong results and conclusions. Based on the results of the analysis of written tests and interviews that have been carried out, there is no difference in the reasoning ability indicators achieved by SS2 subjects in the process of working on problem number 3. SS2 gets 1 score with the wrong answer category and only contains two reasoning indicators that the question wants. The indicators achieved are presenting mathematical statements and performing mathematical manipulations in solving three-dimensional problems.

The following is a summary of the categories of mathematical reasoning abilities possessed by SS1, SS2, and SS3 subjects with moderate levels of learning independence presented in the table below.

Table 4. Mathematical Reasoning Ability of Students with Medium Learning Independence

Subject	Indicator Problem 1				Indicator Problem 2				Indicator Problem 3				Total Score	Level of Mathematical Reasoning
	1	2	3	4	1	2	3	4	1	2	3	4		
SS1	-	√	√	√	-	√	-	-	√	√	√	√	8	Medium
	Answer : True Score: 3				Answer : False Score: 1				Answer : True Score: 4					
SS2	√	√	√	-	√	√	√	√	-	√	-	-	8	Medium
	Answer : True Score: 3				Answer : True Score: 4				Answer : False Score: 1					
SS3	-	√	√	-	√	√	√	-	√	-	-	-	7	Low
	Answer : True Score: 3				Answer : True Score: 3				Answer : True Score: 1					

Based on table 4, it can be seen that subjects with moderate independence have been able to solve the problems given and are classified as moderate and low level of reasoning abilities. Indicators of reasoning ability that have not been mastered by subjects SS1, SS2, and S3 respectively are drawing conclusions and presenting mathematical statements. While the reasoning indicators that are sufficiently mastered are performing mathematical manipulations and compiling proof of the correctness of the solution.

2. Mathematical Reasoning Ability of Students with High Learning Independence

- Analysis of Mathematical Reasoning Ability Problem Number 1

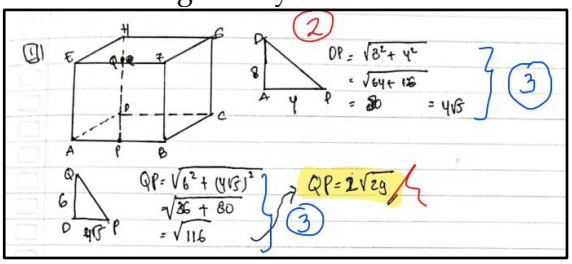

Figure 5. ST2's Answer to Problem Number 3

Based on the description of the answers written on the answer sheet, ST2 was able to answer the problem correctly. In the completion process, there are two indicators of reasoning ability that do not appear, namely presenting mathematical statements and drawing conclusions. ST2 writes a question statement in the form of a makeshift picture and does not contain the right information. ST2 managed to manipulate the problem mathematically by using the side ratio formula and Pythagoras. ST2 as a whole is able to compile evidence to get the solution correctly. However, ST2 has not been able to draw conclusions from the solutions that have been found previously. Based on the results of the analysis of written tests and interviews that have been carried out, there are differences in indicators of mathematical reasoning abilities achieved by ST2 subjects in the process of working on problem number 1. An indicator that only emerged during the interview was the ability to draw conclusions. Thus, ST2 gets 4 scores with the correct answer category and contains all reasoning indicators.

- Analysis of Mathematical Reasoning Ability Problem Number 2

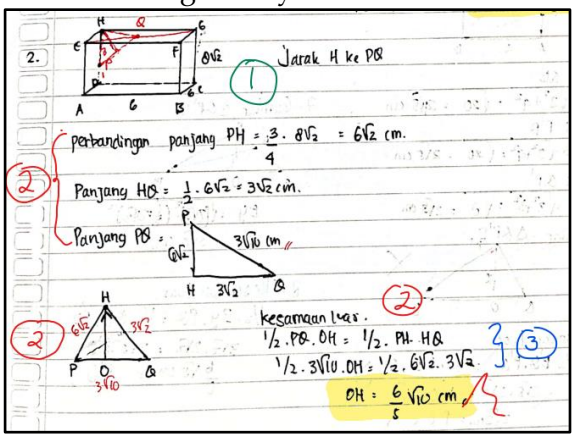

Figure 6. ST1's Answer to Problem Number 3

Based on the description of the answers written on the answer sheet, ST1 is able to answer problem number 2 correctly. ST1 is able to present statements in the form of pictures and write down the questions asked. ST1 is also able to do mathematical manipulation, it can be seen when ST1 can determine the right formula to solve the problem. Overall ST1 has been able to compile proof of the correctness of the solution precisely by substituting the length of the edge into the predetermined formula. However, there are several proof formulas that are not written in full and only focus on obtaining results. ST1 managed to get the right answer equipped with the right unit of length but there is no conclusion from the acquisition of these results. Based on the results of the analysis of written tests and interviews that have been conducted, there are differences in indicators of mathematical reasoning ability achieved by ST1 subjects in the process of working on problem number 2. A new indicator that appears during the interview is the ability to draw conclusions. ST1 is able to convey conclusions from solutions that have been proven previously. Thus, ST1 gets 4 scores with the correct answer category and contains all reasoning indicators.

- Analysis of Mathematical Reasoning Ability Problem Number 3

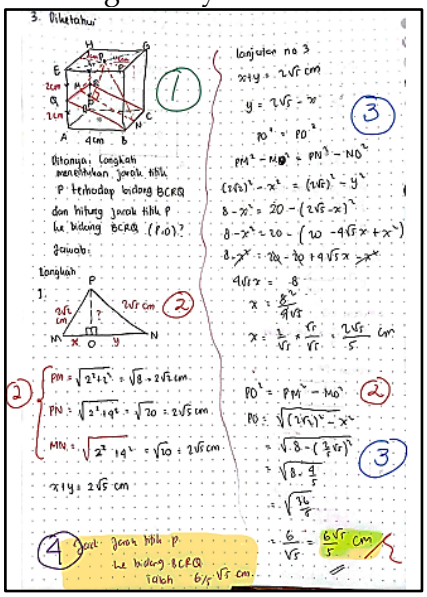

Figure 7. ST4's Answer to Problem Number 3

Based on the description of the answers written on the answer sheet, ST4 was able to solve problem number 3 with a perfect answer and all reasoning indicators

appeared in the process of solving the problem. ST4 is able to present mathematical statements in the form of pictures and writing. The images are clearly illustrated and contain complete descriptions. In addition, ST4 also writes down the questions asked in the question. ST4 is able to manipulate the problem by writing steps to determine the distance from point P to the BCRQ plane. Then ST4 is able to manipulate the problem, namely determining the formula used to get the results. In addition, ST4 has proven the correctness of the results by performing accurate calculations so as to obtain the right results. Then ST4 succeeded in drawing conclusions from the solutions that have been proven previously. Based on the analysis of written tests and interviews regarding problem number 3, ST4 was able to answer correctly and fulfill all reasoning indicators, namely presenting mathematical statements, being able to manipulate mathematics, being able to compile evidence against the correctness of the solution, and being able to draw conclusions.

The following is a summary of the categories of mathematical reasoning abilities possessed by subjects ST1, ST2, ST3, and ST4 with a high level of learning independence presented in the table below.

Table 5. Mathematical Reasoning Ability of Students with High Learning Independence

Subject	Indicator Problem 1				Indicator Problem 2				Indicator Problem 3				Total Score	Level of Mathematical Reasoning
	1	2	3	4	1	2	3	4	1	2	3	4		
ST1	√	√	√	√	√	√	√	√	√	√	√	√	12	High
	Answer: True Score: 4				Answer: True Score: 4				Answer: True Skor: 4					
ST2	√	√	√	√	√	√	√	√	√	√			9	High
	Answer: True Score: 4				Answer: True Score: 4				Answer: False Skor: 1					
ST3	√	√	√		√	√	√	√	√				8	Medium
	Answer: True Score: 3				Answer: True Score: 4				Answer: False Skor: 1					
ST4	√	√	√	√	√	√	√	√	√	√	√	√	12	High
	Answer: True Score: 4				Answer: True Score: 4				Answer: True Skor: 4					

Based on table 5, it can be seen that the first two subjects have a high level of reasoning ability. The third subject has not reached the same level of reasoning ability as the previous subject based on the problem solving process. Then after ST4 was studied, the subject had also achieved all the same indicators as the first two subjects and was at a high level of reasoning ability. Thus it can be concluded that subjects with high learning independence are at a high level of reasoning ability and overall have been able to solve problems in accordance with indicators of mathematical reasoning abilities completely and correctly.

CONCLUSION

The research was conducted in one of the classes, namely XII MIPA 1 SMA Negeri 1 Pasuruan. Class XII MIPA 1 is classified as a superior class with an average report card value higher than the other classes. This affects the results of the research that is not found students with low learning independence. Students tend to have a moderate level of learning independence. Students with moderate learning independence have moderate and low mathematical reasoning abilities. Students are quite capable of solving the problems presented in accordance with the two indicators of students' mathematical

reasoning abilities that are desired. Students are able to perform mathematical manipulation by determining the steps and ways to solve problems, compiling evidence by calculating systematically to get a solution. Students with high learning independence have high mathematical reasoning abilities. Students are able to solve the problems presented correctly. The four indicators of mathematical reasoning ability were also successfully achieved. Students have been able to present the information contained in the questions in writing, pictures, or verbally, able to perform mathematical manipulations appropriately, able to prove all the answers obtained to get the right conclusions.

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REFERENCES

Harli, Syahputri, M., & Febriyanty, L. (2021). Kemampuan Penalaran Matematis dan Kemandirian Belajar Siswa Melalui Pembelajaran Daring. *Jurnal Pendidikan Dan Pembelajaran Terpadu (JPPT)*, *03*(01), 1–14.

Hidayat, D. R., Rohaya, A., Nadine, F., & Ramadhan, H. (2020). Kemandirian Belajar Peserta Didik dalam Pembelajaran Daring pada Masa Pandemi Covid -19. *Perspektif Ilmu Pendidikan*, *34*(2), 147–154.

Kementrian Pendidikan, Kebudayaan, Riset, dan T. (2021). *Panduan Penyelenggaraan Pembelajaran PAUDDIKDASMEN di Masa Pandemi Covid-19* (p. 3).

Makur, A. P., Jehadus, E., Fedi, S., Jelatu, S., Murni, V., & Raga, P. (2021). Kemandirian Belajar Mahasiswa dalam Pembelajaran Jarak Jauh Selama Masa Pandemi. *Mosharafa: Jurnal Pendidikan Matematika*, *10*(1), 1.

Muslimin, M., & Sunardi, S. (2019). Analisis Kemampuan Penalaran Matematika Siswa SMA Pada Materi Geometri Ruang. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *10*(2), 171–178.

Rohmah, W. N., Septian, A., & Inayah, S. (2020). Analisis Kemampuan Penalaran Matematis Materi Bangun Ruang Ditinjau Gaya Kognitif Siswa Menengah Pertama. *Prisma*, *9*(2), 179.

Safrina, K. (2014). Peningkatan Kemampuan Pemecahan Masalah Geometri melalui Pembelajaran Kooperatif Berbasis Teori Van Hiele. *Jurnal Didaktik Matematika*, *1*(1), 9–20.

Salmina, M., & Nisa, S. K. (2018). Kemampuan Penalaran Matematis Siswa Berdasarkan Gender pada Materi Geometri. *Numeracy : Jurnal Pendidikan*, *5*(1), 41–48.

Sumartini, T. S. (2015). Peningkatan Kemampuan Penalaran Matematis Siswa Melalui Pembelajaran Berbasis Masalah. *Jurnal Pendidikan Mosharafa*, *5*(June), 1–10.

Syamsu Hadi, F. S. F. (2013). Pengaruh Minat, Kemandirian, dan Sumber Belajar Terhadap Prestasi Belajar pada Mata Pelajaran IPS Kelas VII SMP Negeri 5 Ungaran. *Jurnal Pendidikan Ekonomi Dinamika Pendidikan*, *VIII*(2), 133–145.

Syelitiar, F., & Putra, A. (2021). Systematic Literatur Review: Kemandirian Belajar Siswa pada Pembelajaran Daring. *Sepren*, *2*(2), 23–31.