

## Numeracy of Eighth Grade Students in Solving AKM-Like Problems Based on Mathematical Ability

Zenithe Wahyudistya<sup>1\*</sup>, Rooselyna Ekawati<sup>2</sup>, Dayat Hidayat<sup>3</sup>

<sup>1,2,3</sup>Mathematics Education, Universitas Negeri Surabaya, Surabaya, Indonesia

DOI: <https://doi.org/10.26740/mathedunesa.v12n2.p522-533>

### Article History:

Received: 14 July 2023  
 Revised: 19 July 2023  
 Accepted: 19 July 2023  
 Published: 20 July 2023

### Keywords:

Numeracy, AKM-like Problems, Equations dan Equalities, Mathematical Ability, Eighth Grade Students

\*Corresponding author:  
 zenithe.19031@mhs.unesa.ac.id

**Abstract:** Numeracy is the ability to locate, use, interpret, evaluate, and communicate mathematical information and ideas in the real context. This research purpose to describe the numeracy of eighth grade students in solving AKM-like problems in equations and inequalities subdomain based on high, moderate, and low mathematical ability. The research subjects were eighth grade students consisting of one student with high mathematical ability, one student with moderate mathematical ability, and one student with low mathematical ability. The research method used in this research is qualitative descriptive research. Data were obtained by numeracy test. Student with high mathematical ability presented the information obtained in the form of equations and inequalities, use mathematical rules and procedures on equations and inequalities, interpret the results in the context of the problem, evaluate the results of problem solving through supposed, and communicate the results of their interpretation to others both orally and writing appropriately. Student with moderate mathematical ability presented the information obtained in the form and use procedures and rules of equations and inequalities in solving problems appropriately. However, student with moderate mathematical ability interpreted the results inaccurately so that in communicating the results of the interpretation were also inaccurate and evaluated the results only by correcting or recalculating. Student with low mathematical ability did not present information in the form of equations and inequalities, nor used procedures and rules of equations and inequalities in solving problems. The interpretation of student with low mathematical ability was also incorrect so that communicating the results of interpretations was not correct. In addition, student with low mathematical ability did not evaluate the results of problem solving, either through supposed or correcting and recalculating. Based on the results, equations and equalities need to be a topic of attention to improve mathematics learning achievement in the school.

### INTRODUCTION

The role of mathematics in real life is very important for every individual. Mathematics is a compulsory subject that must be learned by Indonesian students. In the 21st century, mathematics can be understood through numeration (Goos, 2021). Numeracy in PIAAC is defined as the ability to access, use, interpret and communicate mathematical information and ideas to engage in and manage the mathematical demands of various situations in adult life (OECD, 2012). Goos et al (2012) defines numeracy as the ability to use mathematics to act within inside and in the world in various contexts. Numeracy emphasizes the ability to deal with numbers and data and evaluate statements about problems and situations that incur mental processing and predictions in real contexts (Treffers; De Lange, 2003). Numeracy behavior can be understood through several aspects and supporting factors which include contexts, responses, content/mathematical ideas,

representation of mathematical information, and activation of cognitive and non-cognitive processes. The process of numeracy behavior is divided into three, namely identify, locate, or access; act upon or use; and interpret, evaluate/analyze, communicate (OECD, 2012).

In 2021, Ujian Nasional (UN) was officially changed to become a National Assessment which was attended by students of fifth, eighth, and eleventh grade with the aim of being able to improve learning experiences while still at school (Pusmendik, 2022). The National Assessment includes the Minimum Competency Assessment (AKM), Character Survey, and Learning Environment Survey. Minimum Competency Assessment (AKM) is used to measure students' reading literacy and numeracy. Through the numeration of AKM, it is hoped that the numeracy of students in Indonesia can be increased.

In numeration of AKM, there are several levels according to the class level of the students. The questions developed for AKM are contextual, take various forms of questions, measure problem-solving competence, and stimulate students to think critically (Pusat Asesmen dan Pembelajaran, 2020b). Components in numeration of AKM include content, cognitive level, and context (Pusat Asesmen dan Pembelajaran, 2021). AKM numeracy has four kinds of content, namely numbers, geometry and measurement, data and uncertainty, and algebra. Cognitive levels in numeration AKM include knowing, applying, and reasoning. The context of AKM numeracy raises personal, socio-cultural, and scientific contexts. The forms of questions in the AKM framework include multiple choice, complex multiple choice, matching, filling, and essay or description. Domain content in AKM Numeration is divided into several sub-domains. The algebraic domain consists of the subdomains of equations and inequalities, relations, and functions (including number patterns), and ratios and proportions (Pusat Asesmen dan Pembelajaran, 2020b). In the equations and inequalities subdomain for eighth grade there are two competencies, namely solving linear equations of one variable and two variables in real life problems and solving linear inequalities of one variable (Pusat Asesmen dan Pembelajaran, 2020a).

Equations and inequalities are still one of the difficulties for students. Several previous studies have shown various difficulties and errors faced by junior high school students in solving equations and inequalities. Fitriani (2018) identifies students' difficulties in solving equations and inequalities, these difficulties and errors are in concepts, principles, and skills. The same thing was explained by Jumiaty & Zanthi (2020), students' mistakes in solving equations and inequalities were due to a lack of understanding of concepts, principles and operations as well as weak problem understanding skills. These difficulties are due to students who tend to have low ability in solving problems in real life regarding equations and inequalities.

Regarding numeracy, research by Nurutami, et al. (2018) found that students with high mathematical ability understand the objectives of the questions and formulate the problems contained in the questions as well as solve; interpret problems; and present their answers fairly well. Meanwhile, students with low mathematical ability cannot use formulas; apply procedures; and give proper reasons for the results obtained. In the results

of research by Sari, et al. (2021), students are accustomed to calculating rather than analyzing and drawing conclusions. Some students did not write down the answers completely. Students also find it difficult to understand so they cannot analyze the information that has been given accurately, only calculate.

Research by Baharuddin, et al. (2021) obtained the result that students with low mathematical ability were only able to use various numbers and symbols related to basic mathematics to solve problems in different daily life contexts, but were unable to analyze the information displayed and unable to interpret the results of the analysis to predict and make predictions. In addition, Dewi (2022) conducted similar research with the result that students used various numbers and symbols related to basic mathematics to solve problems in real life. Errors that occur, namely errors in understanding the problem given, errors in analyzing the information presented, errors in calculating, and errors in interpreting the results of the analysis obtained.

Sari, et al. (2021) examined numeracy with the subdomain of ratio and proportion in questions using the PISA framework. Dewi (2022) also examined numeracy with ratio and proportion subdomain using the development of AKM questions, while Baharuddin, et al. (2021) also examined the same topic using questions that were equivalent to AKM problems on fractional operations. However, at present there is no research that discusses student numeracy in solving AKM-like problems in the subdomain of equations and inequalities. The purpose of this research is to describe the numeracy of eighth grade students in solving AKM-like problems in the subdomain of equations and inequalities based on high, moderate, and low mathematical ability. This research is expected to be useful as knowledge and reference for teachers regarding the numeracy of eighth grade students in solving AKM-like problems in the subdomain of equations and inequalities, so it can be used to provide appropriate learning methods for teaching equations and inequalities. In addition, it can also be useful for other researchers to use as reference material to follow up this research with a broader and more complex the scope of research.

## **METHOD**

This research was designed using a qualitative design with a case study model. Data analysis and triangulation are used to test the validity of the data and find the truth real objective. This research was conducted in SMP Al-Azhar Menganti, on eighth grade students. Class that is given mathematical ability tests are heterogeneous class based on recommendations from partner teachers. The results of the mathematical ability test are used to classify students into 3 categories of mathematical ability levels. The subjects chosen were one student with high mathematical ability, one student with moderate mathematical ability, and one student with low mathematical ability by selecting students who were communicative. Categorization is based on the hypothetical mean value and hypothetical standard deviation for each subject (Azwar, 2012). The following is a table of categorization of the level of mathematical ability in this research.

**Table 1.** Categorization of Mathematical ability Level

Interval	Category
$x \geq 72$	High
$36 \leq x < 72$	Moderate
$x < 36$	Low

Data collection techniques used in this research is written tests and interviews. The written tests are mathematical ability tests, numeracy tests, and interview guidelines. Numeracy test results are analyzed based on the indicators in the table as follows.

**Table 2.** Numeracy Indicators

Process of Numeracy (OECD,2012)	Numeracy Indicators	Code
Identify, locate, or access	Present the information obtained in a mathematical form by identifying the problems that presented.	N1
Act upon or use	Use procedures and rules of equations and inequalities in solving problems.	N2
Interpret, evaluate, and communicate	Interpret the results in the context of the problem.	N3.1
	Evaluate the results of problem solving.	N3.2
	Communicate the results of actions or their interpretations to others through oral or written.	N3.3

Interview guidelines used to help gather information about the students' process of numeracy. Data triangulation is done to get evidence by seeing or hearing many examples from several different sources which increases the trustworthiness of the analysis. Interview data will be analyzed using the Miles, et al. (2014) method which includes the process of condensing data, presenting data, and drawing conclusions.

## RESULT AND DISCUSSION

The following are presented the results and analysis of research data on the process of numeracy based on high, moderate, and low mathematical ability.

### High Mathematical Ability

ST presented the information obtained in a mathematical form through the identification of problems appropriately. The following is the answers of ST on the process of identify, locate, or access.

Diket:  $x : p_1 : 3,5 \text{ jam} \rightarrow 50 \text{ kendaraan} : 5.000$   $\rightarrow 2 \text{ jam} \rightarrow 3000$   
 $y : p_2 : 3,5 \text{ jam} \rightarrow 100 \text{ kendaraan} : 3000$   $2 \text{ jam} \rightarrow 2000$   
 Total kendaraan hari ini 370 kendaraan  
 $x + y = 370$   
 total sebenarnya : 1.185.000.  
 $250.000 + 3.000(x - 50) + 800.000 + 2000(y - 100) = 1.185.000$   
 $3.000(x - 50) + 2000(y - 100) : 1.185.000 - 250.000 - 800.000 = 135.000$   
 $3000x - 150.000 + 2000y - 200.000 : 635.000$   
 $3000x + 2000y : 635.000 + 150.000 + 200.000 :$   
 $3000x + 2000y : 985.000$

**Figure 1.** Answer of ST in the Process of Identify, Locate, or Access

The following is excerpts of an interview with ST at the process of identify, locate, or access.

PST-01 : What information do you get from this question?

ST-01 : The information I got was that R2 and R4 totaled 370 for today. So, the 100 R2 parked for 3.5 hours and the 50 R4 also parked for 3.5 hours. The rest is under 2 hours. The actual total income is 1,185,000. (N1)

PST-02 : What does the meaning of  $x - 50$  and  $y - 100$ ?

ST-02 : That's the total of R4 and R2 which are parked in less than 2 hours. (N1)

Based on Figure 1 and the results of the interview, ST determined the form of equations in presenting the information that has been obtained. ST supposed the R4 with the symbol  $x$  and the R2 with the symbol  $y$ . Then ST also supposed R4 and R2 which are parked for less than 2 hours (N1; ST-01).

ST used procedures and rules of equations and inequalities in solving problems correctly. The following is the answers from ST on the process of act upon or use.

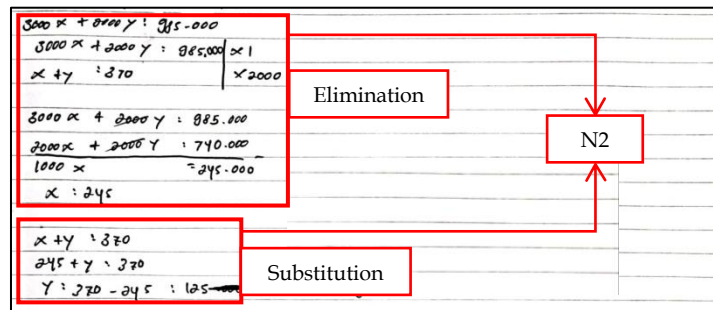


Figure 2. Answer of ST in the Process Act upon or Use

Based on Figure 2, ST solved the problem using the procedures and rules of a two-variable system of linear equations using the elimination and substitution method. ST looked for the value of  $x$  by elimination method (N2). Then, ST found the value of  $y$  by substituting the value of  $x$  into the equalities.

ST interpreted the results into the context of the problem, evaluates the results of problem solving, and communicates the results of the interpretation appropriately. The following are the answers from ST on the process of interpret, evaluate, and communicate.

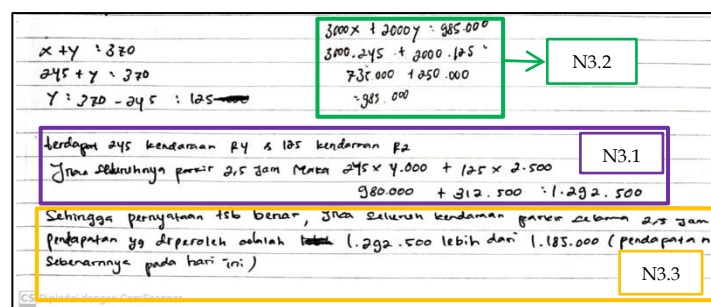


Figure 3. Answer of ST in the Process of Interpret, Evaluate, and Communicate

The following are the excerpts of an interview with ST in the process of interpret, evaluate, and communicate.

PST-03 : Then what conclusion did you come to?

ST-03 : In conclusion, there are 245 R4 vehicles and 125 R2 vehicles. All of that is parking for 2.5 hours, then 245 times 4000 plus 125 times 2500 the result is 1,292,500. So that statement is true. All vehicles parked for 2.5 hours, the income earned is greater than the actual income. (N3.1 and N3.3)

PST-04 : How do you believe that your answer is correct?

ST-04 : Sure, because I put 245 and 125 here ( $3000x + 2000y = 985.000$ ). So, 3,000 times 245 plus 2,000 times 125, the result is 985,000. So I'm sure, because the  $x$  and  $y$  are 245 and 125. (N3.2)

Based on Figure 3 and the results of the interview, ST explained the relationship between the results of the solution and the context of the problem by returning the  $x$  and  $y$  to vehicles R4 and R2. ST also made a decision by writing a conclusion from the results of the settlement by adding up the income earned if all the vehicles are parked for 2.5 hours (N3.1; ST-03). Then, ST. ST checked by substituting the  $x$  and  $y$  values that have been obtained through the mixed method into the previously equation form. ST explained that when the  $x$  and  $y$  values were substituted into the previous equation, the results obtained were the same (N3.2; ST-04) so ST believed that the results obtained were correct. In addition, ST wrote down the results of the settlement and conclusions by returning them to the context of the problem presented by comparing the income results if all vehicles that parked for 2.5 hours with the actual amount of income that is already known in the problem (N3.3; ST 03).

**Moderate Mathematical Ability**

SS presented the information obtained in a mathematical form by identifying the problems presented correctly. The following are the answers from SS on the process of identify, locate, or access.

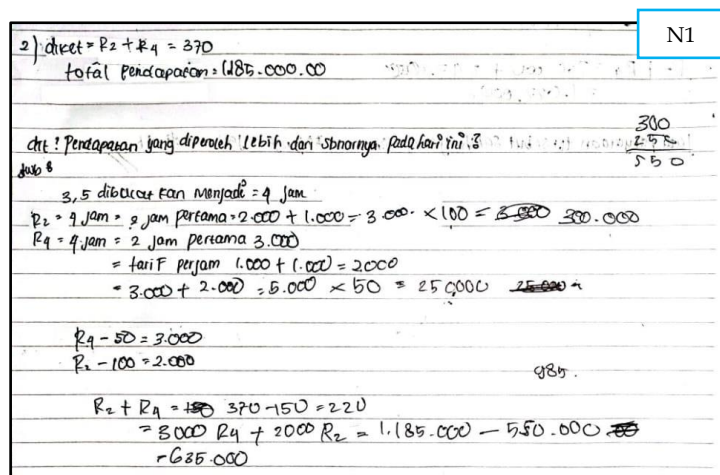


Figure 4. Answer of SS in the Process of Identify, Locate, or Access

The following are excerpts of an interview with SS on the process of identify, locate, or access.

PSS -01 : What information did you get from this question?

SS-01 : It is known that R2 plus R4 equals 370. Total income is 1,185,000. Then, 50 R4 and 100 R2 parked for 3.5 hours and the remaining parked for 2 hours. (N1)

PSS-02 : Here it says  $R_4 - 50 = 4000$  and  $R_2 - 100 = 2000$ , what is this for?

SS-02 : For vehicles that parked for 2 hours. (N1)

Based on Figure 4 and the results of the interview, SS succeeded in identifying the information contained in the questions and presenting them in equations form correctly. During the interview, SS also explained that vehicles parked for 2 hours can be searched for by subtracting vehicles parked for more than 2 hours by presenting them as  $R_4 - 50$  and  $R_2 - 100$  (SS 08).

SS used procedures and rules of equations and inequalities in solving problem exactly. The following are the answers from SS on the process of act upon or use.

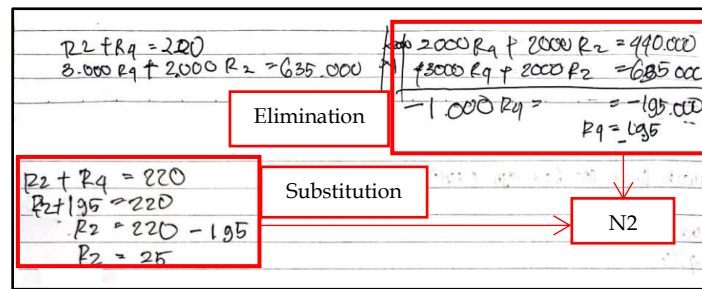


Figure 5. Answer of SS in the Process of Act upon or Use

Based on Figure 5, SS finds the amount of R4 and R2 vehicles parked for no more than 2 hours using the elimination and substitution method (N2). SS used the elimination method to find the amount of R4. Then, SS substituted the amount of R4 into the equation to find the amount of R2. For

SS was not precise in interpreting the results of the action into context, evaluating the results of solving problems by calculating again, and communicating the results of interpretations that are not quite right. The following are the answers from SS on the process of interpret, evaluate, and communicate.

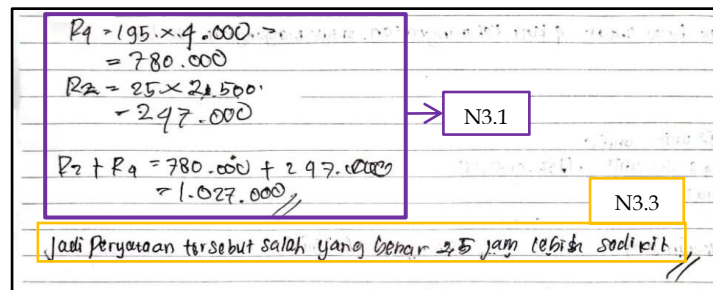


Figure 6. Answer of SS in the Process of Interpret, Evaluate, and Communicate

The following are the excerpts of an interview with SS in the process of interpret, evaluate, and communicate.

PSS-03 : What conclusions can you draw?

SS-03 : So that statement is wrong. The overall revenue on the question is less than the revenue of 2.5 hours of parking. (N3.1 and N3.3)

PSS-04 : Are you sure about your answer? How can you be sure of your answer?

SS-04 : Yes, by correcting and recalculate it again. (N3.2)

Based on Figure 6 and the results of the interview, SS explained the relationship between the results of the solution and the context of the problems in the questions and interpreted the results obtained into the context of the problems presented (N3.1; N3.3; SS-03). SS also explained what is the interpretation and conclusions that can be drawn from the results of the settlement (N3.3; SS-03). However, the interpretation made by SS was not right because of an error in the calculation. SS did not add the number of vehicles parked for 3.5 hours. SS also did not check by substituting the sums of R4 and R2 into the previously formed equation. SS only corrected by recalculating (SS-04).

**Low Mathematical Ability**

SR presented the information obtained through the identification of the problems presented, but the information obtained is only partial and is not presented in equations form. The following are the answers from SR on the process of identify, locate, or access.

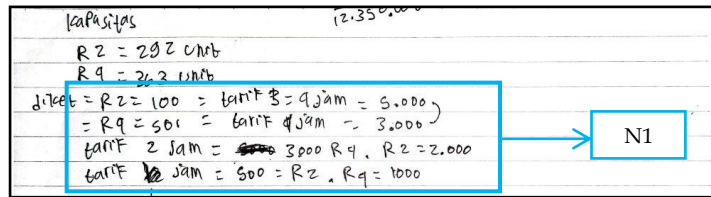


Figure 7. Answer of SR in the Process of Identify, Locate, or Access

The following are excerpts from an interview with SR on the process of identify, locate, or access.

PSR -01 : What information did you get from this problem?

SR-01 : There are 100 R2 and 50 R4 parked. The fare for R2 for 4 hours = 3000 and R4 for 4 hours = 5000. The 2-hour fare for R4 = 3000, R2 = 2000. The 1- hourly tariffed R2 = 500, R4 = 1000. (N1)

Based on Figure 7 and the results of the interview, the information obtained by SR was only partial (SR-11). SR did not mention that there were 370 vehicles with a total revenue of IDR 1.185.000,00. In addition, SR also wrote down the information obtained not in equations form.

SR did not solve the problems by using equality and inequality procedures and rules. The following are the answers from SR on the process of act upon or use.

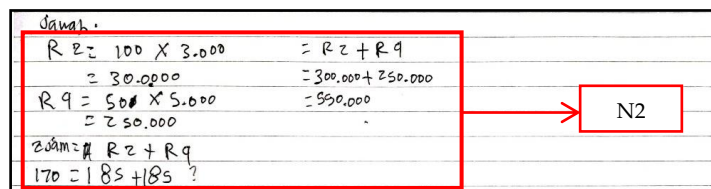


Figure 8. Answer of SR in the Process of Act upon and Use

The following are excerpts of an interview with ST on the process of act upon and use.

PSR -02 : What method did you use for this problem?

SR-02 : R2 plus R4, 170 = 185 + 185. (N2)

PSR -03 : Where did you get 185?

SR-03 : Got from 370 vehicles parked less than 2 hours ago, I subtracted. (N2)

Based on Figure 8 and the results of the interview, SR found the amount of parked R4 and R2 vehicles without solving equations and inequalities. SR only calculated the income earned from R4 and R2 vehicles parked for 3.5 hours, and then summed up. Next, SR immediately determined the total number of parked R4 and R2 vehicles by subtracting so that the number of R4 and R2 vehicles is 185 each (N2; SR-13). SR only calculated without following the procedures and rules of equations and inequalities.

SS was less precise in interpreting the results of actions into context, did not evaluate the results of problem solving, and communicate the results of interpretations that were not correct. The following are the answers from SR on the process of interpret, evaluate, and communicate.



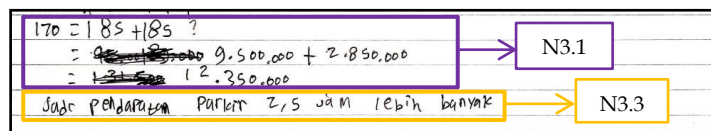


Figure 9. Answer of SR in the Process of Interpret, Evaluate, and Communicate

The following are the excerpts of an interview with ST in the process of interpret, evaluate, and communicate.

- PSR-04 : 9,500,000 plus 2,850,000, where did you get it?
- SR-04 : Get from a parked vehicle for 2 .5 hours. Wheel 2 has 185 units and wheel 4 has 185 units. (N3.1)
- PSR-05 : What's your conclusion?
- SR-05 : So parking revenue for 2 .5 hours more. (N3.3)
- PSR-06 : How can you be sure that your answer is correct?
- SR-06 : I do what I can. (N3.2)

Based on Figure 9 and the results of the interview, SR explained the relationship between the results of the solution and the context of the problems in the questions and interprets the results obtained into the context of the problems presented (N3.1). The existence of errors in solving equations and inequalities made SR interpreted the results of the solutions with inaccurate reasons (N3.3; SR-05). SR also did not show any evaluation of the results either on the answer sheet or during the interview. SR explained that the results obtained from work that was done as best SR could (SS-06).

Based on the previous explanation, the following is a summary of the numeracy of eighth grade students in solving AKM-like problems in the subdomain of equations and inequalities based on high, moderate, and low mathematical ability .

Table 3. Recapitulation of Students' Numeracy Based on High, Medium, and Low Mathematical Ability

Process	Similarity	Difference
Identify, locate, or access	The three students presented information through problem identification.	Students with high or moderate mathematical ability presented the identification results in a mathematical form. Student with low mathematical ability did not present the identification results in a mathematical form.
Act upon or use		Students with high or moderate mathematical ability used procedures and rules of equations and inequalities in solving problems. Whereas student with low mathematical ability did not use proper procedures and rules of equations and inequalities.
Interpret, evaluate, and communicate	The three students interpreted the results into the context of the problem.	Student with high mathematical ability interpreted correctly. Students with moderate or low mathematical ability interpreted less precisely as a result of errors in solving.
		Student with high mathematical ability checked by substituting other values or results obtained into equations and inequalities previously formed. Student with moderate mathematical ability was recalculating his/her work. Student with low mathematical ability did not evaluate the results of the completion at all.
	The three students communicated the results of their actions or interpretations to others in writing and orally.	Student with high mathematical ability communicated interpretation results appropriately. Meanwhile, student with moderate or low mathematical ability communicated the results of inaccurate interpretations.

These results are consistent with previous research that student with high mathematical ability could understand the objectives of the questions and formulate the problems contained in the questions as well as solve problems, interpreted results, and communicated the results of their interpretation well, while student with low mathematical ability couldn't use formulas, apply procedures, and provide proper reasons for the results obtained (Nurutami et al., 2018). In research conducted by Baharuddin et al. (2021) with research results showing that student with high mathematical ability used various kinds of numbers and symbols related to basic mathematics to solve problems in various contexts of everyday life, analyzed the information displayed, and interpreted the results of the analysis to predict and make decisions. Student with moderate mathematical ability used a variety of numbers and symbols related to basic mathematics to solve problems in various contexts of everyday life, analyzed the information that presented, and interpreted the results of the analysis to predict and make decisions (Baharuddin et al., 2021) . In addition, student with moderate mathematical ability also completed the problem according to the procedure for working on the problem and knew the conclusions of the problem, but didn't interpret it exactly. Student with low mathematical ability was only able to use various numbers and symbols related to basic mathematics to solve problems in different daily life contexts, but couldn't analyze the information displayed and interpret the results of the analysis to predict and make decisions.

This study also has results that are in accordance with research conducted by Sari & Aini (2022) which also obtained results that student with high mathematical ability was able to use symbolic/numeric language in solving problems, analyze information to interpret analysis results in predicting, and make decisions on when solving problems. Student with moderate mathematical ability was only able to use symbolic/numeric language in solving problems, analyzing information , but not reaching the stage of making the right decision (Sari & Aini, 2022) . In addition, student with low mathematical ability was only able to use numbers or numerical symbols when solving land problems.

## CONCLUSION AND SUGGESTIONS

Depend on the analysis of the results, students with high mathematical ability did all the process of numeracy that locate, use, interpret, evaluate, and communicate mathematical information and ideas from real context problems in equations and equalities subdomain appropriately. Student with moderate mathematical ability located and used mathematical information and ideas from real context problems in equations and equalities subdomain appropriately. However, student with mathematical ability interpreted inaccurately, evaluated the results by recalculating, and communicated the interpretation results that inaccurate. Student with low mathematical ability did not locate, use, interpret, evaluate, and communicate mathematical information and ideas from real context problems in equations and equalities subdomain appropriately. Students with low mathematical ability did not present information in the form of equations and inequalities, nor did

he/she use procedures and rules of equations and inequalities in solving problems. The interpretation of student with low mathematical ability was also incorrect so that this student communicated the results of interpretations incorrectly. In addition, student with low mathematical ability did not evaluate the results of problem solving, either through examples or correcting and recalculating.

Based on the findings, discussions, and conclusions that have been described previously, numeracy is needed in real life. Therefore, it is advisable for teachers to make students wanted to present information in mathematical form, use mathematical rules and procedures, interpret the results according to the context of the problem, evaluate results, and communicate the interpretation in learning. Thus, students can apply mathematics in real life. The results of this research indicate that students with moderate and low mathematical ability do not achieve all numeracy indicators at the cognitive level of reasoning so that next researchers can carry out further research related to student numeracy in solving AKM-like problems in the subdomain of equations and inequalities at the cognitive level of knowing and applying. In addition, it is also necessary to have an analysis of the items on the instrument which includes terms of validity, reliability, level of difficulty, and distinguishing power.

## REFERENCES

- Azwar, S. (2012). *Metode Penelitian*. Pustaka Belajar.
- Baharuddin, M. R., Sukmawati, & Christy. (2021). Deskripsi Kemampuan Numerasi Siswa dalam Menyelesaikan Operasi Pecahan. *Pedagogy*, 6(2), 90-101.
- Dewi, D. L. (2022). Student's Numeracy Skills In Solving The Fourth Level Of Minimum Competent Assessment on Ratio and Proportion. *Digital Library: Perpustakaan Universitas Negeri Surabaya*.
- Fitriani. (2018). Analisis kesulitan dalam menyelesaikan soal cerita pada materi persamaan dan pertidaksamaan linear satu variabel. *Pedagoogy*, 3(3), 138-147.
- Goos, M. (2021). Numeracy Across The Curriculum As a Stimulus for Interdisciplinary Inquiry in Elementary School Mathematics. *International Symposium Elementary Mathematics Teaching*, 21-32.
- Jumiati, Y., & Zanthi, L. S. (2020). Analisis kesalahan siswa dalam menyelesaikan soal cerita persamaan dan pertidaksamaan linear satu variabel. *Jurnal Pembelajaran Matematika Inovatif*, 3(1), 11-18. <https://doi.org/10.22460/jpmi.v3i1.p11-18>
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative Data Analysis: A Methods Sourcebook* (3rd ed.). SAGE Publications.
- Nurutami, A., Riyadi, & Subanti, S. (2018). The Analysis of Students' Mathematical Literacy Based on Mathematical Ability. *Atlantis Press*, 157(Miseic), 162-166. <https://doi.org/10.2991/miseic-18.2018.40>
- OECD. (2012). *Literacy, Numeracy and Problem Solving in Technology-Rich Environments: Framework for the OECD Survey of Adult Skills*. OECD Publishing. <https://doi.org/http://dx.doi.org/10.1787/9789264128859-en>
- Pusat Asesmen dan Pembelajaran. (2020a). *AKM dan Implikasinya pada Pembelajaran*.
- Pusat Asesmen dan Pembelajaran. (2020b). *Desain Pengembangan Soal Asesmen Kompetensi Minimum*.
- Pusat Asesmen dan Pembelajaran. (2021). *Framework Asesmen Kompetensi Minimum (AKM)*.
- Pusmendik. (2022). *Asesmen Nasional*. <https://pusmendik.kemdikbud.go.id/an/>
- Sari, F. A., & Aini, I. N. (2022). Analisis Literasi Numerasi Siswa SMP dalam Menyelesaikan Soal Pola

Bilangan. *Jurnal Pendidikan Tambusai*, 6(2), 11963-11969.

Sari, S. P., Zulkardi, Z., & Darmawijoyo, D. (2021). Students' Numeracy Skills Relating to Algebra Topic Using COVID-19 Context. *JTAM (Jurnal Teori Dan Aplikasi Matematika)*, 5(1), 182. <https://doi.org/10.31764/jtam.v5i1.3881>