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# Analysis of Algebraic Operational Problem-Solving Ability in Terms of Adversity Quotient

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***ABSTRACT***

*The adversity quotient (AQ) is used in this study to describe a person's ability to solve algebraic operations problems. Grade VIII students of Intelligent Pure MTs are the focus of this research. Data collection techniques included tests of problem-solving abilities, adversity quotient (AQ) questionnaires, and interviews as part of a descriptive qualitative research method. Miles and Huberman's model and data reduction were used to analyze the data. The results showed that students who had high remaining bad luck (AQ) (Climber) were able to dominate markers of critical thinking skills, and their experimental results reached a score of 90; students who had moderate remaining difficulties (AQ) (Camper ) did not entirely dominate the problem capacity indicators and experimental results. They achieve a score of 70, students with low residual Luck (AQ) (Quitter) cannot master the problem ability indicators, and the test results reach a score of 50. And the conclusion from the results of the problem-solving test on algebraic operations is that the higher the students' Adversity quotient (AQ), The higher (Climber), the better the results obtained in completing solving problems in algebraic operations.*
***Keywords***: *problem-solving, algebraic operations, adversity quotient.*

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## INTRODUCTION

Mathematics is a field of science that studies logic and covers many topics such as numbers, formulas, geometric shapes, and their magnitudes and changes. From this understanding, it is not surprising that mathematics is widely used in various fields of science, because mathematics is the basis for many fields. For example, mathematics is in the field of health, statistics, economics, and so on. Mathematics is also very often used in everyday life which we always use in our daily lives, such as in the case of buying and selling transactions, there are rules for eating that must be 5 healthy 4 perfect, rules for drinking 8 glasses a day, rules for caring for motorbikes must do oil changes every 2000 km or about once every 2 months, and so on.

According to (Sawyer, 2007) Classification of all possible patterns is a subject of mathematics. In this context, the term "pattern" refers to the various kinds of regularities that our minds can perceive. The power of mathematics, its applicability to other major subject areas, and its beauty must be reckoned with in any theory of mathematics. From the opinion (Sawyer, 2007) we know that mathematics is for oneself and other sciences, this opinion strongly emphasizes that mathematics is in other fields of knowledge. For this reason, we must learn mathematics from early school education.

In mathematics several abilities must be possessed by students by the objectives of learning about mathematics, in particular: the ability to solve problems, understand concepts, and reasons, among others. The ability to solve problems is one of the skills that students must have.

The ability to solve problems is a student's skill in solving problems and finding problems in mathematics that require more complicated ways of thinking (Supiyati et al., 2019), (Septiani & Nurhayati, 2019), (Samandy et al., 2021). According to Minarni quoted by (Samandy et al., 2021), the benefits that students have in problem-solving are that students can develop motivation, a sense of curiosity, student creativity, skill in reading and making good sentences, numeracy skills, being able to do problem-solving abilities to select and implement strategies that can be developed, and develop analytical and evaluative skills.

Based on research conducted by (Wardhani et al., 2022), his research revealed that junior high school students in Sungai Kakap had low problem-solving abilities, which had an impact on learning outcomes. This research shows that students place a high value on their ability to solve problems to facilitate their learning success. As shown by Aliah & Bernard's research (Aliah & Bernard, 2020), State MTs students in urban areas face significant challenges in solving math problems. In addition, students find it difficult to determine problem-solving strategies, make mistakes when determining problem-solving plans, and some students are even unable to determine problem-solving strategies. This research emphasizes how important it is for students to be able to solve problems to help them achieve their learning goals.

There is intelligence to measure intelligence that affects students' problem-solving abilities. One of a person's intelligence when facing challenges is called adversity quotient (AQ), or one's fighting spirit and endurance. Leman defines the ability to face challenges as an adversity quotient. In his book Effective Personal

Communication Skills for Public Relations, Andy Green says that a person's "Adversity Quotient" is the "will to succeed," "resilience," and "the ability to bounce back unhindered in pursuit." The results and solutions to this problem have been discussed by everyone. People struggling to solve difficult problems need communicators. Based on this point of view, we can conclude that AQ is a person who can turn challenges into opportunities and survive challenges to find solutions.

To find answers to these difficulties four basic dimensions produce AQ abilities, namely: control, endurance, reach, and ownership. These four dimensions are indispensable for achieving AQ success. AQ ability must be possessed by someone especially students to achieve learning success. If a student has a good AQ then he will succeed in understanding mathematics, but if a student has a low AQ when he encounters simple difficulties the student immediately gives up.

There are three levels of AQ: Climber, Camper, and Quitter. People with the AQ Climber are usually able to solve problems, even under pressure, and they need to persevere to find solutions. People with AQ Camper will quickly feel satisfied with the results they get, even though they are not optimal because they do not want to take high risks in their decisions. In addition, people with AQ Quitter quickly give up because they believe mathematics is complicated. (Samandy et al., 2021), (Septiani & Nurhayati, 2019), (Hidayat & Sari, 2019), (Laili, 2021), (Wahyuni et al., 2022)

Mathematics is also a lot of essential material that is studied and is divided into three fields analysis, geometry, and algebra. In addition, algebraic material is one of the basics that students must understand. However, although this material is basic and necessary, some students have difficulty understanding the concept of algebraic operations.

According to By's research (Sugiarti, 2017), "Student Difficulties in Solving Operational Questions of Algebraic Forms", students experience difficulties in solving various algebraic problems. Some people struggle with algebraic concepts as well as those who struggle with algebraic principles. Another exploration research by (Dwi Kusumawati & Sutriyono, 2018), in his exam entitled "Investigating Student Learning Challenges in Mathematics Assignment Material for Class VII Students of SMP Negeri 3 Salatiga" found students having problems dealing with logarithmic problems related to ideas. and standard in the mathematical illustration of polynomials. Students usually struggle to understand the difficulties associated with dividing equal and different terms when trying to grasp the concept. Students still have difficulty simplifying the results of adding and subtracting algebraic forms in the understanding of principles. According to research (Dwi Kusumawati & Sutriyono, 2018), students have difficulty understanding algebraic operations according to the results of problem-solving, when given questions students have difficulty solving these problems, in the principles and concepts part of algebra.

Based on the description above I want to analyze "***Problem-Solving Ability of MTs Students in Algebraic Operations Viewed from Adversity Quotient***". This is intended as a reference for future researchers and references for teachers in teaching. That the success of students in understanding and solving math problems is successful if there is an Adversity Quotient ability, in addition to the students' mathematical

abilities.

## METHOD

Descriptive qualitative research is the type of research in question, and the students of MTs Intelligent Pure in Kab. Deli Serdang, North Sumatra, was used as a research subject while the sample was students of class VIII MTs. For grouping the levels of Climber, Camper, and Quitter, based on the results of the questionnaire distributed using the Adversity Quotient questionnaire, then an analysis of the answers from solving problems in algebraic operations was carried out, and then interviews.

Based on the indicators of problem-solving abilities, students' problem-solving abilities are evaluated. The Polya indicators used as a reference for problem-solving ability indicators include: 1) understanding the problem, 2) formulating a solution strategy, 3) implementing a settlement strategy, and 4) re-evaluating the results of problem-solving. (Stoltz, 2000) The Adversity Quotient instrument uses the Adversity Quotient dimension element, namely (CO2RE) to measure the magnitude of the Adversity Quotient. Many questions make up the Adversity Quotient questionnaire, which is then broken down into the four dimensions of Control (C), Origin (OR), Ownership (OW), Reach (R), and Endurance (E), or CO2RE for short. Students were divided into three Adversity Quotient (AQ) categories using this questionnaire: climbers with high AQs, campers with moderate AQs, and quitters with low AQs. (Wahyuni et al., 2022)

**Table 1.** Adversity Quotient Categories

| Intervals | Kriteria |
|---|---|
| **166 – 200** | Climber |
| **95 – 134** | Camper |
| **40 – 59** | Quitter |

Source: (Stoltz, 2000)

Adversity Quotient and tests of algebraic problem-solving skills were used to develop the data collection strategy of this research. 1) The Adversity Quotient Questionnaire and problem-solving ability questions on algebraic operations are used to reduce data; (2) The data of algebraic operations problem-solving skills are presented according to the Adversity Quotient level 3) Findings and research sequence.

## RESULTS AND DISCUSSION

The following questions were presented in this study before the abilities of each research subject were discussed. SPLDV material story questions were used. The following is a list of tests used in this study to measure problem-solving abilities.

| No | Question |
|---|---|
| 1. | Angga bought 2 T-shirts and a pair of pants at the market for Rp. 300,000.00. When he got home, it turned out that one of the shirts was torn, so he decided to exchange one shirt for a pair of pants. Because the pants are more expensive, he has to pay another 60,000.00. Determine the price of each T-shirt and pants respectively? |

2. The price for 8 mangoes and 6 snake fruit is Rp. 34,000.00. The price of a salak is 1 ½ times the price of a mango. If Sahriani only has Rp. 25,000.00, but she wants to buy 10 salak fruit. Is the money enough? If not enough, how much money did Sahriani lack?
3. Now the age of a younger brother is 5 years less than his older brother. Five years later, the sum of the ages of a brother and sister will be 35 years. Determine the age of each?
4. The price for 3 drawing books and 5 pencils is Rp. 42,000.00. If the price of a picture book is 3 times the price of a pencil if Farel has Rp. 20,000.00 and Farel want to buy 1 drawing book and 1 pencil each, how much is Farel's change?
5. The price of a pair of shoes is twice the price of sandals. Ardi bought 2 pairs of shoes and 3 pairs of sandals for Rp. 420,000.00, If Arya buys a pair of shoes and a pair of sandals, how much will Arya have to pay?

Based on the results of the Adversity Quotient questionnaire among 31 Class VIII MTs that meet the criteria in Table 1.

**Table 1.** Adversity Quotient Categories

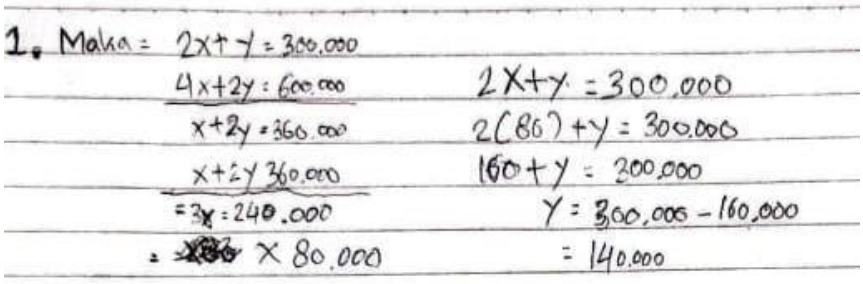
| Intervals | Kriteria | The number of students |
|---|---|---|
| **166 – 200** | Climber | 11 |
| **95 – 134** | Camper | 12 |
| **40 – 59** | Quitter | 8 |
| | | 31 |

Source: (Stoltz, 2000)

Based on the results of the questionnaire, students with a high Adversity Quotient (Climber) had an Adversity Quotient of 35.48%, a moderate Adversity Quotient (Camper) of 38.71%, and a low Adversity Quotient (Quitter) of 25.81%. For those selected, three students will be selected from each answer to analyze the responses to the problem-solving ability test. An Adversity Quotient-based analysis of responses to a problem-solving ability test yielded the following results:

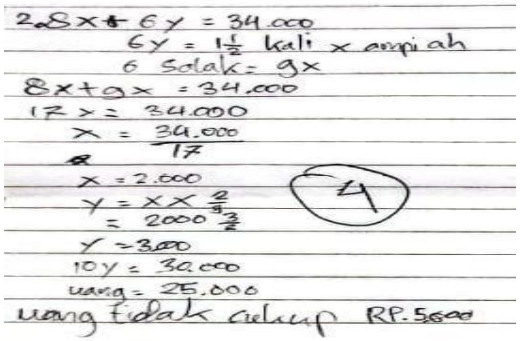
1. Problem-Solving Ability of Climber Students

Subject A at the Climber level has a score of 171. With the following problem-solving skills test results:

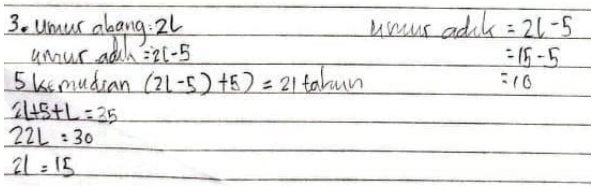



Subject A was able to answer question correctly, knows the price of each shirt and pants, and understand the problem and the methods for solving it, enabling

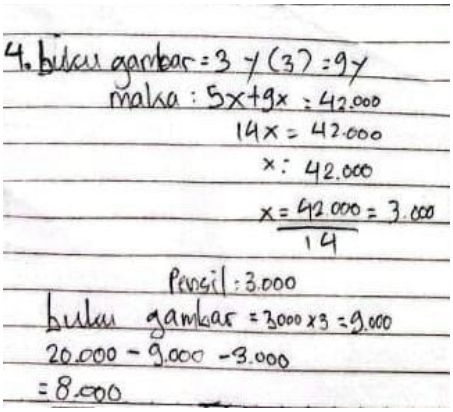
Subject A was able to answer question correctly, knows the price of each shirt and pants, and understand the problem and the methods for solving it, enabling him to estimate the price of pants and t-shirts. Based on the results of the interviews, subject A understands the problems raised by the questions and can determine strategies for solving these problems.



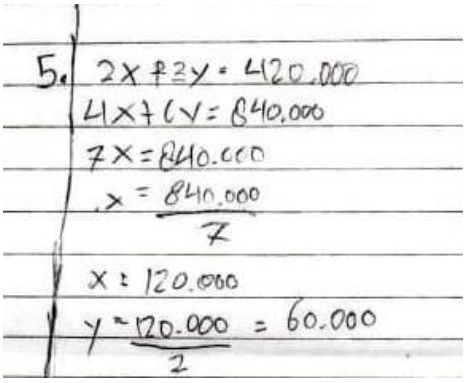

Subject A was able to answer question number 2 well and was able to carry out problem-solving strategies well so that he could determine how much the Shahriani money was short of Rp. 5,000. Based on the interviews that have been conducted, subject A understands the problem in question number 2 and can determine a strategy for solving the problem.




Subject A was able to answer question number 3 well and was able to understand the problem and effectively apply a strategy to solve it, so that he could determine the age of his 15 year old brother and 10 year old younger brother. In accordance with the results of the interviews conducted, subject A carried out the problem-solving strategy well.

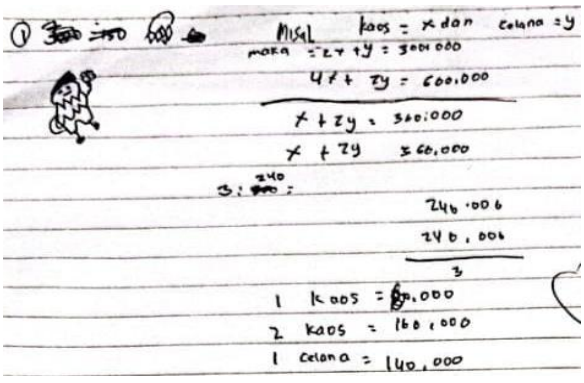



Subject A was able to answer question number 5 well and was able to carry out problem-solving strategies well, so he could determine what price Arya had to pay. In accordance with the results of the interviews conducted, subject A understands the problem in question number 5 and can determine a strategy for solving the problem.

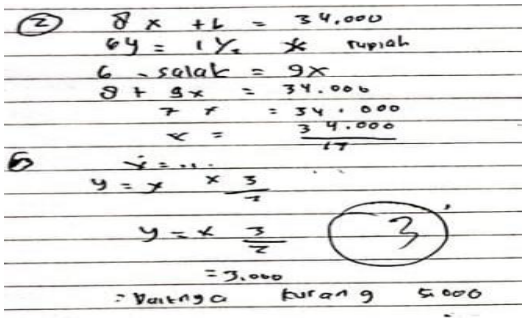



## 2. Problem-Solving Ability of Camper Students

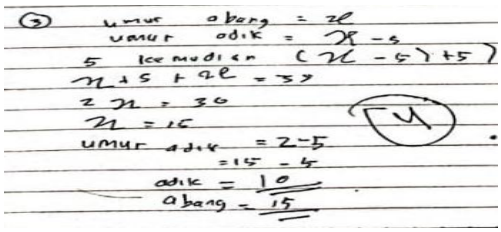
Subject B at the Camper level has a score of 97. With the following problem-solving ability test results:



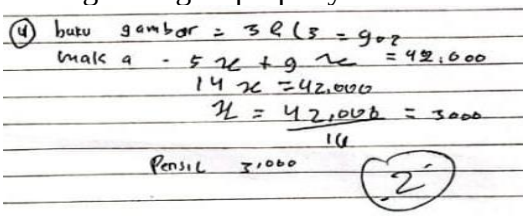
Subject B was able to answer questions but the answers were not correct in carrying out problem-solving strategies on algebraic operations not well. In accordance with the results of the interviews conducted, subject B has not understood the entire problem in question number 1 and has not been able to determine a problem-solving strategy properly.



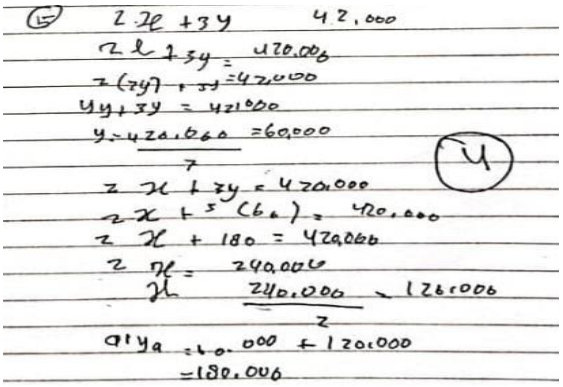
Subject B has answered the questions correctly, but the method of doing it is not quite right, so it is not appropriate to do the problem-solving strategy properly. In accordance with the results of the interviews conducted, subject B already understands the problem in question number 2 but has not been able to complete the problem-solving strategy properly.



Subject B was able to answer questions well, and they were able to identify indicators of problem-solving so that he could determine the age of his brother 15 years and the age of his younger brother 10 years. In accordance with the results of the interviews conducted, subject B already understood the entire problem contained in question number 3 and was able to determine and complete problem-solving strategies properly.



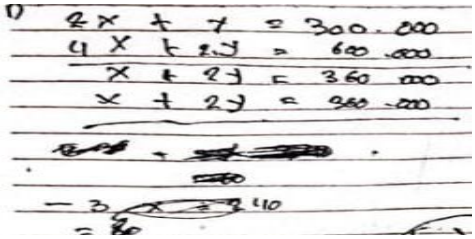
Subject B was unable to answer question number 4 correcly and was unable to determine the problem-solving indicators propely. In accordance with the results of the interviews conducted, subject B did not understand the entire problem contained in question number 4 and had not been able to determine the problem-solving strategy properly, so there was a mistake in her answer.



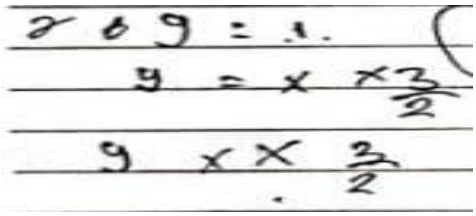
Subject B can answer questions well and can determine indicators of problem-solving well, so he can determine what price Arya must pay. Following the results of the interviews conducted, subject B already understood the entire problem contained in question number 5 and was able to determine a good problem-solving strategy.

### 3. Problem-Solving Ability of Quitter Students

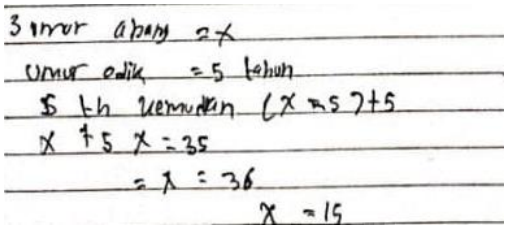
Subject C at the Quitter level has a score of 50. With the following problem-solving ability test results:



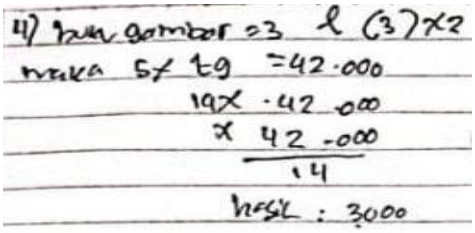
Subject C could not answer question number 1 well, and could not find a problem-solving strategy using algebraic formulas. In accordance with the results of the interviews conducted, subject C did not understand problem-solving and was unable to answer questions properly because of difficulties in finding problem-solving strategies and questions.



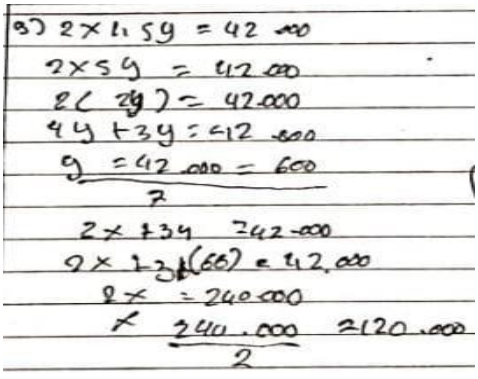
Subject C could not provide a satisfactory answer to question number 2, and he could not find an effective method of solving the problem using algebraic formulas. Based on the results of the interviews conducted, subject C was unable to answer problem-solving questions properly because he did not understand problem-solving questions and had difficulty implementing problem-solving strategies.



Subject C was unable to answer question number 3 but the answer was not correct in determining indicators of poor operation problem-solving. In accordance with the results of the interviews conducted, subject C was unable to solve problem-solving questions but was good enough to carry out problem-solving strategies, so subject C could not answer the questions properly.



Subject C was able to answer question number 4 but the answer was not correct in determining indicators of poor operational problem-solving. In accordance with the results of the interviews conducted, subject C did not understand problem-solving questions and had difficulties in implementing problem-solving strategies, so subject C was less precise in answering the questions properly.



Subject C was unable to answer Subject C was unable to provide a satisfactory answer to question number 2, nor could he find an efficient method based on algebraic formulas to solve the problem. Based on the results of the

interviews conducted, subject C was unable to answer the problem-solving questions correctly because he did not understand the problem-solving questions and had difficulty implementing problem-solving strategies.

The level of intelligence that every individual has varies according to life. And what affects students' intelligence is the Adversity Quotient. This is also supported by (Niky Amanah, 2017) that intelligence or critical thinking has a major effect on a person's AQ and jointly has a good correlation with student learning outcomes. The role of AQ is very important for someone to have, for that, there are three types of AQ, namely AQ Climber, AQ Camper, and AQ Quitter. AQ Climber is someone who can solve problems independently well, according to the opinion (Maryanti & Qadriah, 2021) which states AQ Climber is someone who tends someone with AQ Climber is that he never complains about the problems given, which makes the subject become a Climber. AQ Climber carries out an assimilation process in understanding the problems it faces with strong determination. In addition, the opinion about Camper's AQ was also raised by (Di Perri et al., 1996), a subject who has Camper's AQ is someone who can write back from what is known and what is asked to understand the problem and can provide additional explanations in his sentence besides it simplifies the problem. And (Hidayat & Sari, 2019) also argues that AQ Quitter is someone who struggles to find solutions to the problems they face, so from this opinion, we can know that someone is better off having an AQ Climber because it can support that person's learning success. Following the opinion (Oliveros, 2014) that AQ Climber can solve the problems being faced by him and can be an example.

## CONCLUSION

Climber students can fulfill the indicators of solving algebraic operations problems independently and very well, as can be concluded from the research findings and discussion above regarding the problem-solving skills of MTs Intelligent Murni class VIII algebraic operations. Students at Climber can meet the criteria for solving problems well. However, some questions still need to be adequately fulfilled, such as a lack of mastery of strategies for understanding problem-solving questions. Still, Camper students dare to ask questions they need help understand. Quitter students are not eligible to fulfill the investigation markers of algebraic operations and the difficulty in understanding the questions given, and Quitter students tend not to want to try because of their ignorance of problem-solving problems. Thus, the higher the students have the AQ Climber, the better the results obtained in completing solving problems in algebraic operations, and students have better AQ Climber compared to other AQs.

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## REFERENCE

Di Perri, G., Cazzadori, A., Vento, S., Bonora, S., Malena, M., Bontempini, L., Lanzafame, M., Allegranzi, B., & Concia, E. (1996). Comparative histopathological study of pulmonary tuberculosis in human immunodeficiency virus-infected and non-infected patients. *Tubercle*

*and Lung Disease*, *77*(3), 244–249. https://doi.org/10.1016/S0962-8479(96)90008-8

Dwi Kusumawati, A., & Sutriyono, S. (2018). Analisis Kesulitan Belajar Siswa Pada Materi Operasi Aljabar Bagi Siswa Kelas Vii Smp Negeri 3 Salatiga. *Paedagoria | FKIP UMMat*, *9*(1), 30. https://doi.org/10.31764/paedagoria.v9i1.265

Hidayat, W., & Sari, V. T. A. (2019). Kemampuan Berpikir Kritis Matematis dan Adversity Quotient Siswa SMP. *Jurnal Elemen*, *5*(2), 242. https://doi.org/10.29408/jel.v5i2.1454

Laili, N. (2021). Hubungan Adversity Quotient dan Hasil Belajar Matematika Peserta Didik dalam Pembelajaran Jarak Jauh di SMP. *Journal of Humanities and Social Sciences*, *3*(1), 33–39. https://doi.org/10.36079/lamintang.jhass-0301.210

Maryanti, M., & Qadriah, L. (2021). Proses Berpikir Siswa Sekolah Menengah Atas Dalam Memecahkan Masalah Matematika Berdasarkan Langkah-Langkah Polya Ditinjau Dari Adversity Quotien. *Jurnal Sosial Humaniora Sigli*, *4*(1), 16–27. https://doi.org/10.47647/jsh.v4i1.441

Niky Amanah, L. (2017). Pengaruh Adversity Quotient (Aq) Dan Kemampuan Berpikir Kritis Terhadap Prestasi Belajar Matematika. *Perspektif Ilmu Pendidikan*, *28*(1), 55. https://doi.org/10.21009/pip.281.7

Oliveros, J. (2014). Adversity Quotient and Problem-solving Skills in Advanced Algebra. *JPAIR Multidisciplinary Research*, *17*(1), 65–75. https://doi.org/10.7719/jpair.v17i1.282

Samandy, V., Anas, M., & Zamrun, M. (2021). Analisis Kemampuan Pemecahan Masalah Di Tinjau Dari Adversity Quotient (Aq) Melalui Model Pembelajaran Berbasis Masalah. *Jurnal Biofiskim: Pendidikan Dan Pembelajaran IPA*, *3*(2), 174. https://doi.org/10.33772/biofiskim.v3i2.21789

Sawyer, W. w. (2007). *mathematicians-delight.pdf*. Penguin Books.

Septiani, E. S., & Nurhayati, E. (2019). Analisis Kemampuan Pemecahan Masalah Matematis Ditinjau Dari Adversity Quotient (Aq) Peserta Didik Melalui Model Problem Based Learning (Pbl). *ProsidingSeminarNasional& Call For Papers*, 168–175.

Stoltz, P. G. (2000). *Adversity Quotient: Mengubah Hambatan Menjadi Peluang. [T. Hermaya Trans]*. Jakarta, Indonesia: Grasindo.

Sugiarti, L. (2017). *Prosiding Seminar Nasional Etnomatnesia KESULITAN SISWA DALAM MENYELESAIKAN SOAL OPERASI BENTUK ALJABAR*. 323–330. https://jurnal.ustjogja.ac.id/index.php/etnomatnesia/article/view/2332

Supiyati, H., Hidayati, Y., Rosidi, I., & Wulandari, A. Y. R. (2019). Analisis Kemampuan Pemecahan Masalah Siswa Menggunakan Model Guided Inquiry Dengan Pendekatan Keterampilan Proses Sains Pada Materi Pencemaran Lingkungan. *Natural Science Education Research*, *2*(1), 59–67. https://doi.org/10.21107/nser.v2i1.5566

Wahyuni, G., Mujib, A., & Zahari, C. L. (2022). Analisis Kemampuan Berpikir Visual Siswa Ditinjau

Dari Adversity Quotient. *JUPE : Jurnal Pendidikan Mandala*, *7*(2), 289–295. https://doi.org/10.58258/jupe.v7i2.3335

Wardhani, A. K., Haerudin, & Ramlah. (2022). Analisis Kemampuan Pemecahan Masalah Matematis Siswa dalam Menyelesaikan Soal TIMSS Materi Geometri. *Didactical Mathematics*, *4*(1), 94–103. https://doi.org/10.31949/dm.v4i1.2017