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The Assessment Innovation: AKM Questions With A Bengkulu Cultural Context For Students' Mathematical Reasoning

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Abstract

The Minimum Competency Assessment or Asesmen Kompetensi Minimum (AKM) is an improvement in education quality and learning outcome evaluation applied to the independent curriculum. This study focuses on developing a context-based numeracy assessment instrument for Bengkulu using the AKM model approach to measure students' mathematical reasoning abilities. The type of research is research and development (R&D) using the 4D method, namely define (definition), design (design), develop (development), and disseminate (dissemination). Data was collected using questionnaires and tests. During the development stage, expert/logical validity testing and development testing were conducted, while during the dissemination stage, field testing was conducted to measure students' reasoning abilities, and the final draft of the developed questions was distributed on a limited basis. Expert/logical validity was measured using Aiken’s V index, and reliability was assessed using Cronbach’s Alpha. The analysis of the questions showed that they are suitable for use and have good item quality, as they meet the criteria for validity, reliability, and have appropriate levels of difficulty and discriminative power. Additionally, based on the field test results, the questions are capable of developing and improving students' mathematical reasoning abilities, with the analysis showing that students' mathematical reasoning ability in solving the questions reached 32.3%.

Keywords: *AKM; Assessment; Bengkulu; Cultural Context; Mathematical Reasoning*

Introduction

Mathematical reasoning reflects the ability to think logically, connecting available information to form valid conclusions in the context of a problem. Mathematical reasoning ability refers to the thinking skills needed to generate statements and draw conclusions based on core competencies and basic mathematical competencies appropriate to a particular grade level. The importance of this ability for students is not only to memorize facts, rules, or problem-solving steps, but also to train reasoning skills. With this ability, students can make estimates based on their experiences, so they can understand interrelated mathematical concepts and learn deeply or meaningfully (Hendriana et al., 2017). A good understanding of mathematical concepts in students can be achieved by having and improving mathematical reasoning skills. However, in reality, not everyone is able to easily train and improve their mathematical reasoning skills, which results in low mathematical ability in Indonesia (Yeni, 2015).

Students' lack of mathematical reasoning skills can lead to a decline in the overall quality of education, ultimately leading to lower academic achievement. This challenge is also evident in Indonesian students' performance in international assessments such as PISA and TIMSS.

According to the 2018 Programme for International Student Assessment (PISA) conducted by the OECD, Indonesia ranked near the bottom in numeracy performance, placing 70th out of 78 participating nations. Indonesian students obtained an average mathematics score of 379, which is far below the international average score of 489. This wide gap highlights the pressing need for educational reforms and focused interventions to strengthen students' mathematical competence in the country (OECD, 2019). Alongside the OECD's PISA study, the Trends in International Mathematics and Science Study (TIMSS) has also examined the mathematical performance of Indonesian students. The findings indicate that their average achievement remains below that of neighboring countries, including Malaysia, Thailand, and Singapore. In the cognitive domain, Indonesian students recorded the lowest score at the reasoning level, with only 17% (Rosnawati, 2013).

A TIMSS-based study conducted by Susanta, Susanto, and Maizora in 2020 examined the mastery of mathematics problems among junior high school students in Bengkulu City. The results showed that student mastery in the Bengkulu context, based on the cognitive domain, was as follows: for the knowledge domain, 28 students (29.17%) were at the low criteria, 47 students (48.96%) were at the medium criteria, and 21 students (21.88%) were at the high criteria. In the application domain, 37 students (38.54%) were at the low criteria, 40 students (41.67%) were at the medium criteria, and 19 students (19.79%) were at the high criteria. Meanwhile, in the reasoning domain, 56 students (58.33%) were at the low criteria, 32 students (33.33%) were at the medium criteria, and only 8 students (8.33%) were at the high criteria. These data indicate that students' mathematical abilities in Bengkulu are relatively low, particularly in the cognitive reasoning domain, which is the lowest. These findings highlight the need for focused educational strategies to improve students' reasoning abilities in mathematics, which are crucial for their academic success and future learning (Susanta et al., 2021). Based on this reality, there is a need to improve the evaluation system to enhance students' abilities.

For many years, Indonesia evaluated student learning outcomes primarily through the National Examination (UN), which was applied at the elementary, junior high, and senior high school levels. This exam traditionally acted as the decisive measure of a student's academic success. In 2021, however, the Ministry of Education, Culture, Research, and Technology introduced a major policy change by eliminating both the UN and equivalency tests. These were replaced with the National Assessment (AN), a new system designed to provide a broader and more comprehensive picture of educational quality (Rahayu & Ulya, 2022). The National Assessment (AN) aims to measure the overall quality of learning within schools by using three key components: the Minimum Competency Assessment (AKM), a character survey, and a learning environment survey. These components are developed in accordance with the educational policy framework set by the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) (Kemendikbud, 2021).

The Minimum Competency Assessment (AKM) evaluates the essential skills that every student should possess to foster personal development and contribute positively to society. It is intended to provide information that can drive improvements in the quality of teaching and learning, ultimately enhancing student learning outcomes. When learning is planned with consideration of students' achievement levels, it becomes easier for them to master the expected content or competencies in a subject. In AKM, two core competencies are assessed: reading literacy and mathematical literacy (numeracy), both of which are aligned with the frameworks used in PISA and TIMSS (Asrijanty, 2020). The numeracy component of the AKM assesses students' ability to apply mathematical concepts, procedures, facts, and tools in problem-solving contexts. Despite its introduction in 2021, the performance of Indonesian junior high school students in numeracy remains low. Data from the Ministry of Education and Culture indicate that fewer than half of these students have reached the minimum competency benchmark. A similar situation is observed in Bengkulu Province, where the proportion of junior high school students attaining the minimum competency standard in numeracy is also below 50% (Kemendikbudristek, 2022).

The low achievement of junior high school students in numeracy skills in Bengkulu Province prompted researchers to observe the best junior high schools in Bengkulu City. “Based on the average UN scores in 2019, one of the best junior high schools in Bengkulu City is SMPN 1 Kota Bengkulu” (Oklis, 2022). From the results of observations and interviews, it was identified that the implementation of AKM activities at the school still faced several limitations. A number of students expressed that they found the AKM items challenging, particularly those presented in lengthy, narrative forms. According to the informant, such questions generally require cognitive reasoning and are considered non-routine, making them unfamiliar to students. This difficulty arises because the learning materials typically used in class rarely incorporate AKM-type problems, especially those demanding higher-order reasoning skills, and the availability of relevant examples is also minimal. Furthermore, students have not yet been provided with comprehensive guidance regarding the nature and purpose of the Minimum Competency Assessment (AKM), adding to the challenges in answering these questions.

The development of questions using a contextual approach based on local culture has a significant influence on students' mathematical problem-solving abilities (Saparudin & Pabolo, 2017). The use of context in mathematical questions can present real situations that students have experienced. In addition, Susanta, Sumardi & Zulkardi (2022) mention that learning with an emphasis on contextual problems can support students in improving their abilities. Relevant study concerning the development of mathematical reasoning items within contextual settings is titled *“Development of TIMSS-Type Reasoning Questions Using the Cultural Context of Lampung.”* The study resulted in 14 questions that met the criteria of validity, practicality, and demonstrated potential effects. These items effectively stimulated students’ mathematical reasoning skills and were well comprehended by the learners. The incorporation of Lampung’s cultural context in the questions was found to enhance students’ motivation in tackling the problems presented. (Wahyudi et al., 2016). The research on "Mathematical Reasoning Ability Questions on Three-Dimensional Plane Figures with the Bengkulu Context" has produced 10 questions that demonstrate good validity, reliability, discriminatory power, and appropriate difficulty levels. These questions are designed to improve students' mathematical reasoning abilities, especially in the context of three-dimensional plane figures. Furthermore, these questions can be a valuable reference for developing mathematical reasoning tests that require specific difficulty levels and discrimination indices. By utilizing these well-constructed questions, educators can effectively assess and improve students' reasoning abilities in mathematics, ensuring that the assessment is both challenging and able to differentiate between different levels of student performance (Budiarti et al., 2022).

Methods

The type of research conducted is research and development (R&D), which is generally defined as a systematic activity aimed at increasing knowledge to produce specific products. This particular study was carried out at a public junior high school located in the city center of Bengkulu, which has implemented the Merdeka Curriculum. The school was selected based on the consideration that its students are familiar with the local culture of Bengkulu. The participants in the study included 35 students from class VIII.2, who served as the test subjects, and 31 students from class VIII.3, all in the second semester of the 2022/2023 academic year. This research aims to leverage the local cultural context to enhance educational outcomes within the framework of the Merdeka Curriculum. This research adapts the 4D development model (Thiagarajan et al., 1976), which consists of four main phases: defining needs, designing instruments, the development process, and dissemination and testing.

Define: the purpose of the definition stage is to establish and define the requirements in the question development process. This stage involves three types of analysis, namely initial analysis, analysis of learners, and concept analysis. Design: the design stage aims to prepare and compile the initial draft of the questions (draft I) to be developed, which includes the construction of reference criteria, format selection, and initial design. Development: the development stage includes expert assessment and development testing. The expert assessment stage is a proof of logical validity. Meanwhile, the development testing stage includes reliability testing, difficulty level testing, and discrimination power testing. Expert validity is proven using the Aiken validity index (Aiken V) calculation, which is the agreement of experts or validators (raters) on the suitability of items with the indicators measured using those items (Retnawati, 2016) with the following Aiken's V formula. With the following validity criteria as shown in Table 1.

Table. 1 Validity Criteria

$\overline{V}$	**Category**	**Criteria**
$0{,}0 \leq V \leq 0{,}4$	Low	Invalid
$0{,}4 < V \leq 0{,}8$	Medium	Valid
$0{,}8 < V \leq 1{,}0$	High	Highly valid

Adapted from (Retnawati, 2016)

The reliability criteria for questions were obtained from analysis using Cronbach's Alpha test. Questions developed were considered reliable if the estimated reliability value obtained was $r_{11} \geq 0.60$ (Nitko & Brookhart, 2011). The reliability level of the questions tested was based on Guildford's classification (1956), as shown in Table 2.

Table. 2 Reliability Criteria

Reliability Index	**Category**
$0{,}00 < r_{11} \leq 0{,}20$	Unacceptable
$0{,}20 < r_{11} \leq 0{,}40$	Undesirable
$0{,}40 < r_{11} \leq 0{,}70$	Minimum acceptable threshold
$0{,}70 < r_{11} \leq 0{,}90$	Fairly good
$0{,}90 < r_{11} \leq 1{,}00$	Excellent

Adapted from (Guildford, 1967)

The reliability of the questions developed, namely the Bengkulu-contextualized AKM model questions, is closely related to the consistency of the questions in measuring mathematical reasoning abilities.

In addition, identifying the difficulty level of test items is important for evaluating how challenging the questions attempted by students are. Likewise, the discriminatory power of each item is applied to assess its effectiveness in differentiating students with high, medium, and low levels of ability. For essay-type questions, the difficulty level can be determined by calculating the mean score. The criteria for classifying the level of difficulty of questions can be seen in Table 3.

Table. 3 Classification of Difficulty Level

Value (x)	**Category**
1	Very easy
$0{,}70 < x < 1$	Easy
$0{,}30 < x \leq 0{,}70$	Medium
$0{,}00 < x \leq 0{,}30$	Hard
0	Very Hard

Adapted from (Bagiyono, 2017)

To calculate the discriminating power of the questions, test participants were divided into two groups: the upper group and the lower group. Discriminating power was determined by looking at the discrimination index (DP) of each question item. The criteria for discriminating power (DP) used in the developed questions were shown as table 4.

Table. 4 Discriminating Power (DP) Criteria

DP	**Category**
$DP < 0,20$	Low
$0,20 \leq DP < 0,30$	Medium
$0,30 \leq DP < 0,40$	High
$DP \geq 0,40$	Excellent

Adapted from (Arifin, 2017)

Disseminate: the dissemination stage is a stage that aims to disseminate the developed product to a wide target audience as the target users of the product. The implementation of this dissemination stage begins with the packaging of the developed product (final draft). The final draft as a product of question development in this study will later be tested in the field test stage. The aim is to understand students' mathematical reasoning abilities when working on the developed questions, in order to assess their level of mathematical reasoning ability. Analysis of students' reasoning abilities will be evaluated based on the categorization shown in Table 5 below.

Table. 5 Mathematical Reasoning Ability Category

Score Range (x)	**Category**
$x \leq 20$	Very Low
$20 < x \leq 40$	Low
$40 < x \leq 60$	Medium
$60 < x \leq 80$	High
$80 < x \leq 100$	Very High

Adapted from (Jailani & Wulandari, 2017)

Findings and Discussion

Findings

The result of this study is the development of three AKM-model reasoning questions in the context of Bengkulu. The results of each step or stage carried out are as follows below:

Define: the definition stage aims to establish and define the provisions in developing questions so that a preliminary draft of the development questions, referred to as draft I, can be formed. This stage is carried out in three analytical steps, namely front-end analysis, student analysis, and concept analysis. They are: (a) Front-end analysis is the analysis in this stage is conducted through interviews on question reviews in schools and reviews of mathematics textbooks used in schools. Based on the interview results, it is known that the mathematics questions used in the schools in this study are routine mathematics questions or commonly encountered questions. Additionally, it is known that schools rarely apply or implement Bengkulu-context mathematics questions and very rarely apply mathematical reasoning questions, especially AKM model questions. The results of the question review showed that the questions frequently given as exercises to students were taken from textbooks. The researcher found that most of these questions were at a low cognitive level (C1, C2, C3) and did not incorporate real-world applications, especially the Bengkulu regional context (the students' surrounding environment); (b) Student Analysis is the analysis of students aims to review the age, academic ability, and character of students, particularly in this study in classes VIII.2 and VIII.3, as these are the grade levels that are the subject of the study. Based on the analysis results, it was found that the age of students in classes VIII.2 and VIII.3 was between 13 and 14 years old, which, according to Piaget, is the peak of formal operational stage cognitive development. At the formal operational stage, individuals begin to have the ability to consider experiences that go beyond concrete experiences and can think about them in a more abstract, idealistic, and logical way (Noor & Hidayati, 2017). Therefore, students at this age should be able to solve AKM model mathematical reasoning problems with their abilities; (c) Concept Analysis is used as an analysis that identifies, details, and systematically organizes concepts for the creation of reasoning questions in draft I. This is done by searching for and examining AKM numeracy questions as a reference for the questions that will be used in question development. After that, the questions to be developed are reviewed based on the Bengkulu context to find contexts that are relevant to the questions and AKM content.

Design: the design stage serves to prepare and create a preliminary draft (draft I) based on the results of the analysis conducted in the previous definition stage. One of the stages of designing Draft I is constructing criterion-referenced tests (CRTs). Constructing criterion-referenced tests involves creating a question matrix for Draft I. This begins with developing criteria for each question in accordance with the characteristics of AKM, which include content and cognitive reasoning related to AKM. Then, in this stage, the researcher created a question grid for mathematics developed in Draft I. The grid contains explanations or descriptions of the Bengkulu context, time allocation, domains and subdomains, as well as competencies (indicators).

Develop: at this stage, development results are carried out in two steps: first, evaluation by experts followed by revision, and second, through development testing. (1) Expert Assessment, based on the logical validation of content, construct, and language aspects, it is known that all questions in draft I are highly valid with Aiken's V index values for each question in terms of content, construct, and language exceeding 0.8 (> 0.8). So, based on the criteria used, all questions are declared valid. Therefore, Draft I, which will be revised according to the experts' notes, does not need to undergo further analysis because the expert assessment already meets the validity criteria and is even highly valid. After being revised according to the experts' comments and suggestions, the questions in Draft I become the questions in Draft II. The experts comments and suggestions can be seen in Table 6; (2) Development Testing, at this stage, an analysis is conducted on the reliability, difficulty level, and discriminating power of a question. The results of this analysis will be used to revise the product if it does not meet the established criteria. These criteria are used to determine whether the quality of a question is high or low. The data obtained from the results of this development test is analyzed using JASP 18.3 software. The results obtained from the reliability test of the (Draft II) development questions are shown in Table 7.

Table. 6 Summary of Experts Comments and Suggestions

Expert	Comments and Suggestions
1	Pay attention to and replace non-standard words.
	Adjust the alphabetical order.
	Double-check the information provided in the questions.
2	The instructions for answering the questions are too long and ineffective.
	The questions must be written in accordance with PUEBI
3	Reduce typos in the questions.

Table. 7 Reliability Test Result

	Cronbach's Alpha	Criteria	Category
Reliability Statistics	0,65	Reliabel	Medium

The reliability test of the questions (draft II) developed was in the medium category with a Cronbach's alpha value of 0.65. From this value, we can conclude that each question created will produce similar results if retested on students (reliable). After analyzing reliability, the next step is to evaluate the level of difficulty and discriminating power of the questions. Questions that most students answered correctly are classified as easy questions. Conversely, questions that only a few students answered correctly are considered difficult. If questions are too difficult, they cannot accurately assess students' abilities. Therefore, ideal questions are those that are not too easy but also not too difficult. The results of the analysis of the difficulty level of the questions can be seen in Table 8.

Table. 8 Difficulty Level Test Result

Question Item	Difficulty Index	Category
1	0,267	Hard
2	0,414	Medium
3	0,56	Medium

Based on the calculations and criteria used, question no. 1 was classified as hard, while questions no. 2 and 3 were classified as medium. Of the three questions, none were classified as very easy or very hard, so the questions were used without modification. The results of the analysis of the discriminating power of the questions (draft II) developed are shown in Table 9.

Table. 9 Discriminating Power (DP) Test Result

Question Item	DP Index	Category
1	0,33	High
2	0,55	Excellent
3	0,5	Excellent

The analysis reveals that the discriminating power of item no. 1 falls into the *good* category, whereas items no. 2 and no. 3 are classified as *very good*. Therefore, it can be inferred that all three developed items are effective in differentiating the abilities of students in the upper and lower groups

The expert validity testing and development testing that has been conducted, it can be concluded that all questions in draft II are deemed acceptable because they meet all validity and reliability criteria and have an appropriate level of difficulty and discriminating power. Therefore, the questions in draft II can be declared as draft III (final draft) without revision for field testing in the next stage. However, from the results of the implementation and completion of the questions by the students in the development test, an alternative solution (alternative answer) was found for question number 3. This answer was ultimately added as the correct answer in the scoring rubric, as shown and explained in Figure 1 and Figure 2.

Given:
- Pattern of diameters: 1, 4, 9
- Pattern of spots: 24, 46, 68

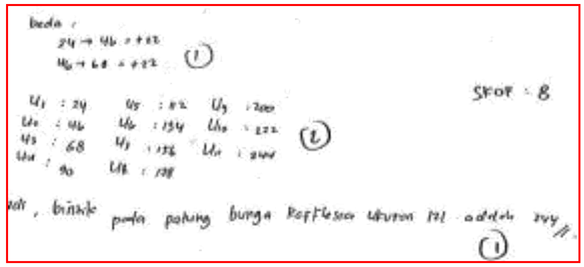
Question:
How many spots will there be if the diameter is 121 cm?

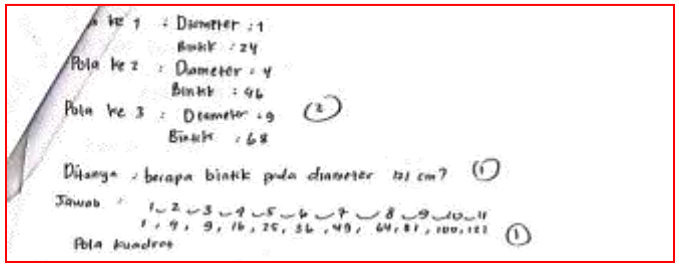
Solution:
- Diameter pattern: 1, 4, 9, ... → corresponds to the sequence of perfect squares ($1^2, 2^2, 3^2, \dots$)
- Since $n^2 = 121$, it follows that $n = 11$. Therefore, the problem asks for the number of spots in the 11th term of the sequence.
- Number of spots pattern: 24, 46, 68, ...
- First term (a) = 24
- Common difference (b) = 22

General formula for the n-th term of an arithmetic sequence:
$u_n = a + (n - 1)b$
Substituting n = 11:
$u_{11} = 24 + (11 - 1) \times 22$
$u_{11} = 24 + 220$
$u_{11} = 244$

Conclusion:
Based on the calculation, when the diameter of a Rafflesia flower is 121 cm, the number of spots on the flower is 244 spots.

Figure 1. Answer Key in the Assessment Section

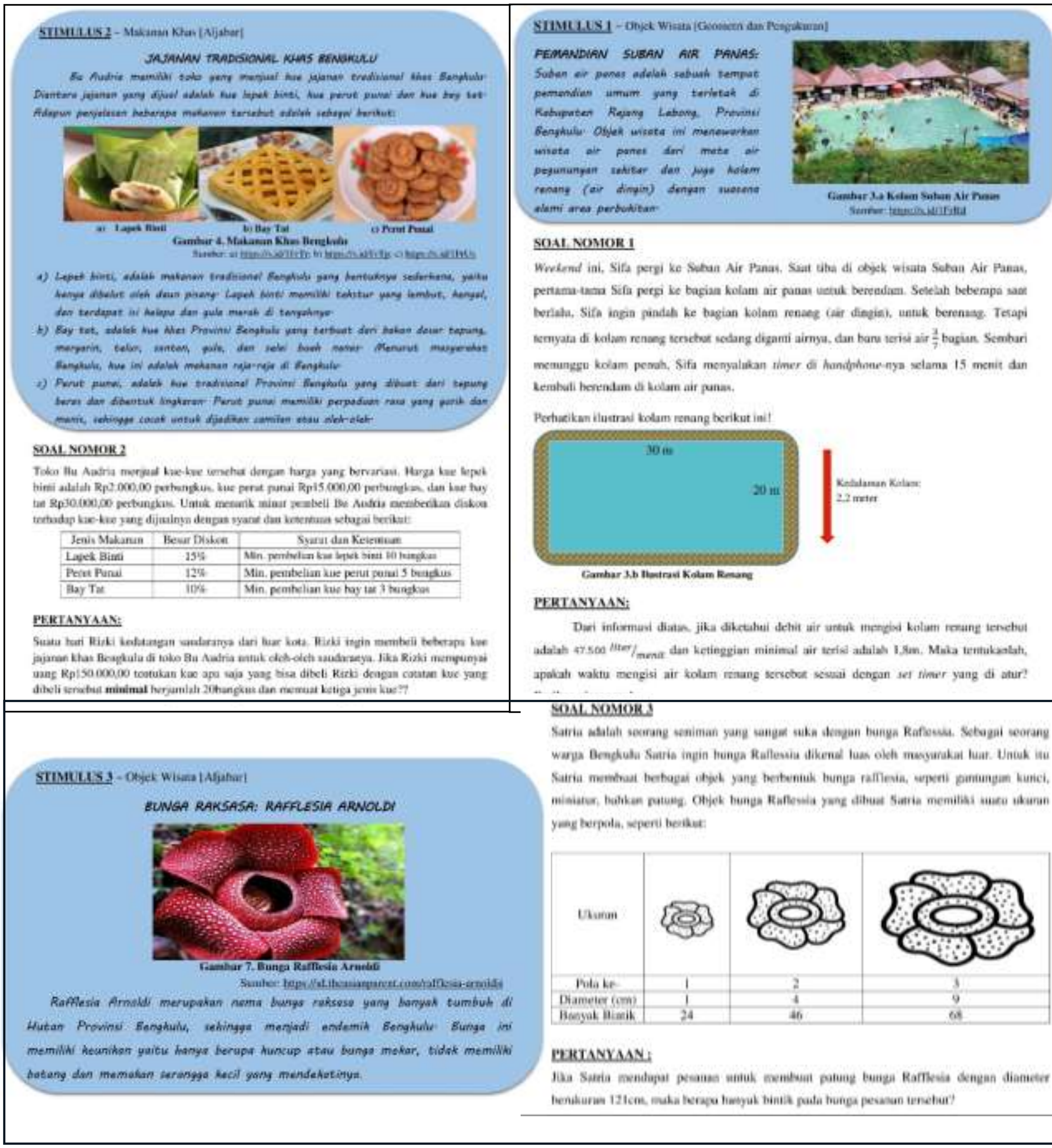




From the alternative answers, it can be seen that students did not use formulas to solve the problems, but rather solved them by naturally observing the patterns contained in the problem information.

Figure 2. Alternative Solutions by Student

Disseminate: the dissemination stage includes the field testing and distribution phases. The product that has been revised during the development stage is then applied in field testing to assess students' mathematical reasoning abilities. As for the dissemination, the questions were distributed to schools in Bengkulu City. However, due to time and cost constraints, the researchers limited the distribution of the developed questions to only three schools: one accredited A school, one accredited B school, and one accredited C school. The preview of the developed questions (Final Draft) are shown by Figure 3.



STIMULUS 2 – Makanan Khas [Aljabar]

JAJANAN TRADISIONAL KHAS BENGKULU

Bu Audria memiliki toko yang menjual kue jajanan tradisional khas Bengkulu. Diantara jajanan yang dijual adalah kue lepek binti, kue perut punai dan kue bay tat. Adapun penjelasan beberapa makanan tersebut adalah sebagai berikut:

a) Lapek Binti b) Bay Tat c) Perut Punai

Gambar 4. Makanan Khas Bengkulu

a) Lepek binti, adalah makanan tradisional Bengkulu yang bentuknya sederhana, yaitu hanya dibalut oleh daun pisang. Lepek binti memiliki tekstur yang lembut, kenyal, dan terdapat isi kelapa dan gula merah di tengahnya.

b) Bay tat, adalah kue khas Provinsi Bengkulu yang terbuat dari bahan dasar tepung, margarin, telur, santan, gula, dan selai buah nanas. Menurut masyarakat Bengkulu, kue ini adalah makanan raja-raja di Bengkulu.

c) Perut punai, adalah kue tradisional Provinsi Bengkulu yang dibuat dari tepung beras dan dibentuk lingkaran. Perut punai memiliki perpaduan rasa yang gurih dan manis, sehingga cocok untuk dijadikan camilan atau oleh-oleh.

SOAL NOMOR 2

Toko Bu Audria menjual kue-kue tersebut dengan harga yang bervariasi. Harga kue lepek binti adalah Rp2.000,00 perbungkus, kue perut punai Rp15.000,00 perbungkus, dan kue bay tat Rp30.000,00 perbungkus. Untuk menarik minat pembeli Bu Audria memberikan diskon terhadap kue-kue yang dijualnya dengan syarat dan ketentuan sebagai berikut:

Jenis Makanan	Besar Diskon	Syarat dan Ketentuan
Lapek Binti	15%	Min. pembelian kue lepek binti 10 bungkus
Perut Punai	12%	Min. pembelian kue perut punai 5 bungkus
Bay Tat	10%	Min. pembelian kue bay tat 3 bungkus

PERTANYAAN:

Suatu hari Rizki kedatangan saudaranya dari luar kota. Rizki ingin membeli beberapa kue jajanan khas Bengkulu di toko Bu Audria untuk oleh-oleh saudaranya. Jika Rizki mempunyai uang Rp150.000,00 tentukan kue apa saja yang bisa dibeli Rizki dengan catatan kue yang dibeli tersebut **minimal** berjumlah 20bungkus dan memuat ketiga jenis kue??

STIMULUS 1 – Objek Wisata [Geometri dan Pengukuran]

PEMANDIAN SUBAN AIR PANAS: Suban air panas adalah sebuah tempat pemandian umum yang terletak di Kabupaten Rejang Lebong, Provinsi Bengkulu. Objek wisata ini menawarkan wisata air panas dari mata air pegunungan sekitar dan juga kolam renang (air dingin) dengan suasana alami area perbukitan.

Gambar 3.a Kolam Suban Air Panas

SOAL NOMOR 1

Weekend ini, Sifa pergi ke Suban Air Panas. Saat tiba di objek wisata Suban Air Panas, pertama-tama Sifa pergi ke bagian kolam air panas untuk berendam. Setelah beberapa saat berlalu, Sifa ingin pindah ke bagian kolam renang (air dingin), untuk berenang. Tetapi ternyata di kolam renang tersebut sedang diganti airnya, dan baru terisi air $\frac{2}{7}$ bagian. Sembari menunggu kolam penuh, Sifa menyalakan *timer* di *handphone*-nya selama 15 menit dan kembali berendam di kolam air panas.

Perhatikan ilustrasi kolam renang berikut ini!

30 m
20 m
Kedalaman Kolam: 2,2 meter

Gambar 3.b Ilustrasi Kolam Renang

PERTANYAAN:

Dari informasi diatas, jika diketahui debit air untuk mengisi kolam renang tersebut adalah 47.500 $^{liter}/_{menit}$ dan ketinggian minimal air terisi adalah 1,8m. Maka tentukanlah, apakah waktu mengisi air kolam renang tersebut sesuai dengan *set timer* yang di atur?

STIMULUS 3 – Objek Wisata [Aljabar]

BUNGA RAKSASA: RAFFLESIA ARNOLDI

Gambar 7. Bunga Rafflesia Arnoldi

Sumber: https://id.theasianparent.com/rafflesia-arnoldi

Rafflesia Arnoldi merupakan nama bunga raksasa yang banyak tumbuh di Hutan Provinsi Bengkulu, sehingga menjadi endemik Bengkulu. Bunga ini memiliki keunikan yaitu hanya berupa kuncup atau bunga mekar, tidak memiliki batang dan memakan serangga kecil yang mendekatinya.

SOAL NOMOR 3

Satria adalah seorang seniman yang sangat suka dengan bunga Raflessia. Sebagai seorang warga Bengkulu Satria ingin bunga Raflessia dikenal luas oleh masyarakat luar. Untuk itu Satria membuat berbagai objek yang berbentuk bunga rafflesia, seperti gantungan kunci, miniatur, bahkan patung. Objek bunga Raflessia yang dibuat Satria memiliki suatu ukuran yang berpola, seperti berikut:

Ukuran			
Pola ke-	1	2	3
Diameter (cm)	1	4	9
Banyak Bintik	24	46	68

PERTANYAAN :

Jika Satria mendapat pesanan untuk membuat patung bunga Rafflesia dengan diameter berukuran 121cm, maka berapa banyak bintik pada bunga pesanan tersebut?

Figure 3. The Questions Development Result

Field tests were conducted on 31 students of class VIII.3. After the tests were conducted, the data obtained was analyzed and scored. The subjects were then grouped into categories of very low, low, medium, high, and very high reasoning abilities. The results of the analysis of the implementation of questions developed using the Bengkulu-based AKM model on students' mathematical reasoning abilities in the field tests are presented in Table 10.

Table 10. Mathematical Reasoning Ability Test Result

Score Range	Frequency	Category
0-20	3	Very Low
21-40	9	Low
41-60	10	Medium
61-80	7	High
81-100	2	Very High

From the data in the table above, 32.3% of students demonstrate moderate reasoning ability, 29% exhibit low reasoning ability, 22.6% possess high reasoning ability, 9.7% show very low reasoning ability, and 6.4% display very high reasoning ability. These results indicate that, overall, students' reasoning abilities in responding to the developed items are at a moderate level, suggesting that the items are effective in fostering students' reasoning skills.

Conclusion

The use of local context, particularly the Bengkulu context, in this study provides a unique appeal for students. The Bengkulu context is something new and unusual in mathematics learning, thus providing a different experience. Additionally, the Bengkulu context is close to the students because it is part of their surrounding environment, which is inseparable from their daily lives.

Local cultural context is one type of regional context. The Bengkulu region itself is highly suitable for integration into mathematics question development because it possesses many distinctive features containing mathematical elements, such as tabot, which is related to geometry. Furthermore, the Bengkulu region is also the local environment of the researcher and the students as research subjects, so using the Bengkulu context can also provide additional insights about the Bengkulu region to the students.

The AKM reasoning questions with a Bengkulu context developed in this study are capable of developing or potentially improving students' mathematical reasoning abilities. This can be seen from the field test results, where 32.3% of students obtained a score in the moderate category for mathematical reasoning ability. The findings of this study are in line with other studies that reveal that the use of interesting contexts can motivate and attract students' interest (Charmila et al., 2016; Widjaja, 2013). By linking mathematics learning to the culture of the students' place of residence, students' understanding of the material will be easier.

Thus, the results of this study can help students learn from their surroundings. In addition, this study is expected to encourage teachers to continue developing mathematical reasoning questions (non-routine questions) that utilize the local context around students. One of the shortcomings of the questions developed is that they do not represent all domains/subdomains and question types from the AKM model.

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