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Analysis of Students' Intuitive Thinking Abilities in Solving Mathematical Problems on Integer Topics

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ABSTRACT

This study aims to analyze and describe students' intuitive thinking abilities in solving mathematical problems on the topic of integers. This research employs a qualitative descriptive method. One research subject (S1) will be selected using purposive sampling based on their ability to demonstrate initial indications of intuitive thinking, such as the accuracy and speed of their initial response to a problem. The research instrument consists of one integer problem-solving test question designed to assess intuitive thinking abilities. Data is collected through triangulation using the think-aloud technique during the problem-solving process, followed by a semi-structured interview to explore the subject's (S1) reasoning and intuitive thought processes. Data is analyzed qualitatively through the stages of data reduction, data presentation, and conclusion drawing. The results reveal that intuition, specifically the common-sense type, acts as a cognitive bridge that accelerates the emergence of ideas and the formulation of problem-solving strategies. This intuitive thinking characteristic is demonstrated through the application of systematic strategies, logical reasoning, and a strong reliance on prior learning experiences. These findings indicate that learning experiences can serve as a crucial foundation in forming effective mathematical intuition. Therefore, mathematics instruction should be designed to enrich student experiences through a variety of problem-solving tasks to develop students' intuitive thinking abilitie.

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Introduction

School education aims to equip students with mastery of the subjects taught in the classroom. Beyond content mastery, students are also expected to develop their abilities and creativity. Mathematics is a compulsory subject in the Indonesian curriculum at all levels of schooling. According to the Kamus Besar Bahasa Indonesia (KBBI) (2025), mathematics is the science of numbers, the relationships among numbers, and the operational procedures used to solve numerical problems. Accordingly, learning mathematics demands strong reasoning, diligence, perseverance, attention, and motivation. Srimuliati & Wahyuni (2020) argue that mathematics teaching and learning in schools and universities is inseparable from mathematical problems. Mathematics is closely tied to problem solving. Consistent with this view, Davita & Pujiastuti (2020) state that problem solving is a crucial component of learning because it provides students with opportunities to apply prior knowledge and skills to both everyday and non-routine problems.

When solving problems, some students can quickly devise strategies, whereas others require much more time to reach a solution. This difference highlights the importance of understanding students' problem-solving ability across educational levels. During mathematical problem solving, students engage in cognitive processes to produce solutions related to the content being learned. However, students often experience difficulties, such as forgetting procedures or feeling uncertain about how to begin. In practice, teachers rarely examine students' thinking processes in depth while they solve mathematical problems. Zaporojets et al. (2021) note that mathematical problem solving often requires an analytic approach that emphasizes standard rules and formulas. This approach can elicit unenthusiastic and unmotivated responses, especially when students do not know where to start, which formula to choose, or how to proceed. Such conditions may restrict creativity in generating solution strategies. Evans et al. (2021) argue that limited flexibility and creativity reflect a poorly understood transfer problem in higher-level mathematics contexts. While this issue may be less visible among high-achieving students, it can become a major barrier for students with lower mathematical ability. In many classrooms, students with average to low mathematical ability constitute the majority. This situation strengthens the need to examine how students construct solutions using diverse approaches (Srimuliati & Wahyuni, 2020). Besides cognitive activity, mental activity also contributes to problem solving. This mental activity is supported by the ability to generate ideas spontaneously, which is commonly referred to as intuitive thinking.

In mathematics education, intuition can mediate students' understanding of abstract concepts such as spatial geometry, numbers, and probability (Fatima & Susanah, 2019; Musriroh et al., 2021). Researchers have long examined intuition in mathematical thinking (Fischbein, 1987; Henden, 2004). More recent studies (Mutia et al., 2021; Prameswari & Muniri, 2023) suggest that intuition is not merely supplementary, but can function as a foundation for learning higher-level mathematics. In learning contexts, intuition may support creativity by enabling non-conventional solutions to ill-defined problems. It may also bridge procedural knowledge and conceptual understanding, reduce cognitive load when learners face complex problems, accelerate comprehension and solution construction, and integrate patterns from experience and subconscious cues into coherent judgments.

Despite its potential role, conventional curricula often provide limited explicit training in intuition, which may constrain students' flexible thinking. Instruction therefore needs to incorporate insight-oriented activities, for example through problem posing or pattern exploration, use real-world contexts to connect intuition to meaningful situations, and implement assessments that capture not only final answers but also the insight processes that produce them (Mutia et al., 2021). Given the role of intuition in mathematics learning, understanding students' intuitive thinking is essential, particularly in problem-solving contexts. Accordingly, this study focuses on analyzing students' intuitive thinking in mathematical problem solving to clarify how intuition operates within students' thought processes and the extent to which students use it to generate solutions.

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Fischbein (1987) identified three main characteristics of intuitive thinking: (1) catalytic inference, the ability to draw conclusions quickly from one proposition to another without explicit reasoning; (2) power of synthesis, the ability to integrate multiple elements of information into a coherent whole; and (3) common sense, the ability to make intuitive judgments or solve problems based on general knowledge and prior experience. This study adopts these three characteristics as indicators for analyzing students' intuitive thinking in mathematical problem solving. Teachers have made efforts to foster intuitive thinking through instructional methods and problem-solving exercises that require insight. However, evidence suggests that students' intuitive thinking remains low. This indicates that current efforts have not yet produced substantial improvement.

One Grade VII junior high school topic that requires intuitive thinking is integers. Based on the researcher's observations and interviews at SMP Negeri 1 Kota Jambi, many Grade VII students still struggle to activate intuition when solving mathematics problems on integers. Therefore, further investigation of students' thinking processes in mathematical problem solving is necessary, particularly to understand what occurs when students use intuition. For this reason, the researcher conducts a study entitled "Analysis of Students' Intuitive Thinking Abilities in Mathematical Problem Solving on Integer Topics among Grade VII Junior High School Students." This study aims to describe and analyze Grade VII students' intuitive thinking abilities in solving mathematical problems on integers. Theoretically, the study is expected to contribute to research on intuitive thinking in the context of integer learning. Practically, the findings may support schools in improving the quality of mathematics instruction. For teachers, the study can provide insights into students' intuitive thinking during integer problem solving and inform efforts to strengthen it through instruction. For the researcher, the study offers an opportunity to integrate theoretical understanding with empirical analysis through direct observation and interpretation of students' intuitive thinking in mathematical problem solving.

Method

Types of Research

The approach used in this study is a qualitative descriptive approach. This study aims to describe students' intuitive thinking abilities in solving mathematical problems on integer topics among Grade VII students at SMP Negeri 1 Kota Jambi. A qualitative descriptive approach is used to portray phenomena as they naturally occur, without manipulation or intervention. Through this approach, the research findings are presented in narrative form to provide a clear and in-depth description of the field situation. The choice of a qualitative descriptive approach is based on the nature of the data, which are descriptive and derived from written responses, verbal expressions, and relevant documents obtained from credible informants and sources. This approach is therefore considered appropriate for capturing students' intuitive thinking processes as reflected in their problem-solving activities.

Subject

The subject selection technique used in this study is purposive sampling. According to Lenaini (2021), purposive sampling is a non-random sampling method in which the researcher deliberately selects participants who best match the research objectives and are expected to provide relevant information to address the research problem. In this study, the selection of the class and the participant was based on considerations and input from the Grade VII mathematics teacher at SMP Negeri 1 Kota Jambi. Because this study aims to examine students' intuitive thinking in solving mathematical problems on integer topics, the participant was selected from students who demonstrated indications of intuitive thinking ability. Based on the results of a preliminary test and teacher recommendations, one participant (S1) was chosen because the participant was considered capable of providing rich and relevant information about intuitive thinking during integer problem solving. After the participant was identified, the participant completed a problem-solving worksheet using a think-aloud protocol. The participant was then interviewed to further explore intuitive thinking processes used while solving integer problems.

Instruments

The data sources in this study include the research participant, test responses, and interview data. The required information concerns students' intuitive thinking in solving mathematical problems on integer topics. In qualitative research, the primary instrument is the researcher. Supporting instruments include students' written solutions to integer problem-solving tasks, think-aloud recordings, and interview transcripts.

Intuitive Thinking Test and Blueprint

A problem-solving test was used to elicit students' intuitive thinking during integer problem solving. The test was accompanied by a specification grid to ensure alignment between the task and the intended indicator.

Table 1. Test Blueprint for Assessing Students' Intuitive Thinking in Mathematical Problem Solving

Basic Competency	Test indicator	Test format	Item number
4.2 Solving problems related to operations of integers and fractions	Solving an item designed to elicit intuitive thinking in mathematical problem solving on integer topics	Essay	1

Interview Guidelines and Framework

Semi-structured interview guidelines were developed to explore the three indicators of intuitive thinking: catalytic inference, power of synthesis, and common sense. The interview prompts were designed to elicit students' immediate ideas, the basis of their decisions, and the structure of their reasoning during problem solving.

Table 2. Interview Guidelines for Exploring Intuitive Thinking in Problem Solving

No.	Intuitive thinking indicator	Descriptor	Interview guide
1	Catalytic inference	1) Answers immediately or spontaneously. 2) Provides brief, non-elaborated responses. 3) Cannot provide explicit logical justification.	1) "When you first read this problem, what immediately came to your mind?" 2) "Can you explain how you arrived at that answer?" 3) "If someone asked why you answered that way, what would you say?"
2	Power of synthesis	1) Produces an answer quickly. 2) Uses established rules or algorithms, or combines multiple methods/formulas. 3) The solution is partly unstructured.	1) "When you read the problem, did you immediately have an idea, or did you need time to think?" 2) "What methods or formulas did you combine to solve this problem?"

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			3) "Do you think your solution is already well organized, or did you write down your initial thoughts first?"
3	Common sense	1) Responds directly or spontaneously. 2) Draws on prior knowledge and experience. 3) Explains reasoning logically. 4) Produces systematic and organized steps independently.	1) "Did the answer come to you immediately, or did you work through it step by step?" 2) "Have you solved similar problems before? Where did you learn the method?" 3) "Why did you choose that method?" 4) "Did you go straight to the answer, or did you write the steps? Please show me your steps."

Data Collection

The data collection procedure in this study was conducted through several systematic stages. First, the researcher administered a test in the form of an integer problem-solving task to the student. This task was designed to elicit the student's intuitive thinking during mathematical problem solving. While the student worked on the problem, the researcher applied a think-aloud protocol, prompting the student to verbalize their thoughts, ideas, and reasoning processes as they solved each part of the task. After the problem-solving activity was completed, an in-depth interview was conducted to further explore the student's reasoning and considerations underlying their responses, thereby strengthening and clarifying the data obtained from the written work and think-aloud session. Following data collection, the data were analyzed through a coding process. In line with Miles & Huberman (1994), coding was treated as an integral part of analysis, involving the careful review, transcription, and synthesis of field notes and verbal data. This process required breaking the data into meaningful units while preserving the relationships among their components to construct a coherent interpretation of the student's intuitive thinking. To ensure data validity, source triangulation was employed by comparing information derived from the written test results, the think-aloud protocol, and the interview data. The interview data were transcribed verbatim, capturing both the researcher's questions and the student's responses. The interview was conducted in a comfortable setting to encourage open communication and was guided by the student's written answers and verbal expressions during problem solving. Throughout the interview, the researcher took reflective notes to support accurate interpretation of the student's intuitive thinking processes.

Analysis

Rifa'i (2023) explains that data analysis involves a series of processes for organizing, categorizing, and interpreting collected data in order to develop an in-depth understanding of the phenomenon under investigation. Millah et al. (2023) note that analysis can be conducted after the required information has been gathered. The credibility of a study's conclusions depends strongly on the appropriateness of the analytical procedures used. Therefore, data analysis is a critical stage that must be conducted carefully and systematically. This study adopted the analytical framework proposed by Miles & Huberman (1994), which consists of three interconnected activities: data reduction, data display, and conclusion drawing/verification. The analysis procedures are described below.

Data Reduction

Data reduction refers to the process of selecting, simplifying, abstracting, and transforming raw data into a more manageable form. This process occurs continuously throughout the study and is guided by the research questions, conceptual framework, and data collection strategies. In this study, data reduction was conducted through the following steps. First, the student's written responses to the integer problem-solving task were treated as raw data and converted into analytic notes that informed subsequent probing during the interview. Second, the think-aloud recordings were transcribed verbatim, and segments relevant to the research focus were identified and organized into a more systematic narrative. Third, interview recordings were transcribed and then refined into clear, well-structured text to facilitate coding and interpretation.

Data Display

Data display involves organizing and presenting information in a systematic form so that patterns can be identified and conclusions can be drawn. In this study, the displayed data included the student's written solutions, verbal data from the think-aloud protocol, interview transcripts, and the results of the analysis. Data were organized by classifying student responses according to the indicators of intuitive thinking and then interpreting them in relation to mathematical problem-solving indicators. This organization enabled the researcher to compare evidence across data sources and to identify consistent patterns in the student's intuitive thinking during problem solving.

Conclusion Drawing and Verification

Conclusion drawing and verification were conducted iteratively throughout the research process. From the early stages of data collection, the researcher noted emerging patterns, explanations, and relationships among the data sources. In this study, conclusions were derived by linking evidence from the student's written work, think-aloud data, and interview responses to the indicators of intuitive thinking and mathematical problem-solving. Verification was carried out by checking the consistency of interpretations across data sources and ensuring that the conclusions were supported by sufficient and coherent evidence.

Research Findings

This section presents the research results obtained from data analysis through the intuitive thinking ability test in mathematical problem-solving, think-aloud results, and interviews with the research subject. The collected data were then analyzed using qualitative descriptive analysis to describe the student's intuitive thinking ability in solving problems on integer material. During the given problem-solving process, the student was not restricted in using a specific strategy. Relying on everyday experience and basic concepts previously acquired, the student was expected to use their intuition as a bridge to generate ideas for finding an appropriate strategy as a solution to the given problem. The following presents one problem-solving question that the subject had to solve by involving their intuition:

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A mailman delivers mail to 3 villages.

- Village A receives 120 letters,
- Village B receives 150 letters,
- Village C receives 210 letters.

All letters must be placed into mailboxes with the same number of letters in each box, and each box contains letters from only one village. The delivery fee received by the mailman is Rp2,000 per box. If the delivery exceeds 20 boxes, the company adds a bonus of Rp15,000. Calculate the mailman's net profit.

Figure 1. Problem-solving question

After reading the problem aloud once in its entirety, S1 appeared more focused by re-reading specific parts of the problem. This was evident from S1's index finger movement, which followed each word being read at a slower pace and with emphasis, as if confirming their understanding of key conditions in the problem. This can be seen from S1's following think-aloud result:

S1 : *"...same number of letters in each box and each box only from one village... Fee... Rp2,000 per box... If delivery exceeds 20 boxes... bonus Rp15,000..."*

Based on this think-aloud result, the researcher conducted an interview to investigate S1's reason for focusing on re-reading specific parts. This can be seen from the following interview between the researcher (P) and Subject 1 (S1):

P : *"Earlier, you seemed to read the problem twice, and the second time you read more slowly in certain parts. Can you describe what you were thinking at that time?"*

S1 : *"Yes, Ma'am. When I finished reading the problem for the first time, the problem asks to calculate the mailman's profit. Profit is calculated from the number of boxes delivered, but the number of boxes to be delivered isn't given in the problem. So, I immediately thought to read again the part 'all letters must be placed into mailboxes with the same number of letters...' That's when it occurred to me to first find out how many boxes need to be delivered to each village. Since the problem asks for each box to contain the same number of letters, we can find the GCF first."*

Based on the interview, it is known that immediately after finishing the first reading, S1 grasped the core problem. S1 understood that to find the mailman's profit, it was first necessary to determine how many boxes needed to be delivered. The issue was that this information was not directly provided in the problem. This prompted S1 to re-read specific parts. S1's purpose for re-reading was not due to confusion but to confirm that the idea that emerged was correct in their view. This indicates that S1 could think quickly in generating ideas during the problem-understanding stage. This is supported by the following think-aloud result:

S1 : *"Hmm, the profit... that's from the fee for delivering boxes. But the number of boxes? (pauses briefly, reads slowly) ...each box has the same number of letters... Ohhh! This means we can use the GCF from the number of letters per village to find the number of letters per box... right, then we can calculate the total number of boxes, then find the profit."*

Based on this think-aloud, it is evident that S1 did not take long to realize the connection between the condition "each box must contain the same number of letters" and the concept of the Greatest Common Factor (GCF), which arose spontaneously in their mind. When S1 uttered "Ohhh! This means we can use the GCF," it signified an "aha moment!" they experienced.

Based on this think-aloud, it can also be inferred that, without conscious effort, S1 created a structured sequence of solution steps: S1 thought of finding the number of mailboxes to be delivered to each village using the GCF concept, then calculating the mailman's profit. This is seen from their statement, *"Ohhh! This means we can use the GCF from the number of letters per village to find the number of letters per box… then we can calculate the total number of boxes, then find the profit,"* which shows that S1 had a clear problem-solving flow in mind. This indicates that intuition emerged during the planning stage of problem-solving, with S1 demonstrating common sense in devising a solution plan.

Next, simultaneously with the emerging idea, S1 without hesitation immediately wrote down the known and asked information from the problem in a neat and structured manner. S1 wrote: Given: Village A = 120 letters, Village B = 150 letters, Village C = 210 letters, fee = 2,000, bonus = 15,000 if more than 20 boxes. The completeness in writing this information shows that S1 had identified all essential elements needed to formulate a solution strategy. Then S1 wrote: Question: Net profit of the mailman. This can be seen in Figure 2

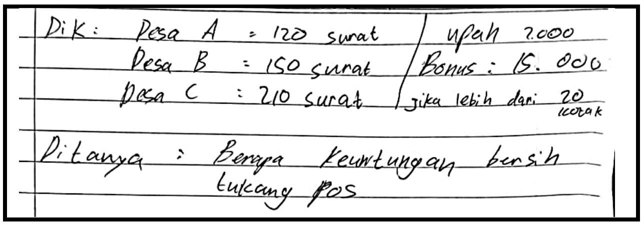

Figure 2. S1's written identification of known and required information

After writing down the known and required information as shown in Figure 2, S1 immediately proceeded to integrate the initial idea and previous plan into the problem-solving stage. S1 appeared highly focused and confident while writing the solution steps. S1 directly attempted to find the number of letters that should be placed in each box, given the condition that each box must contain the same number of letters. S1 wrote, Jawab: Find the FPB of 120, 150, and 210 using factor trees. After finding all factorizations for 120, 150, and 210, S1 wrote: $120 = 120 = 2^3 \times 3 \times 5, 150 = 2 \times 3 \times 5^2, 210 = 2 \times 3 \times 5 \times 7$ Then, S1 wrote, GCF = $2 \times 3 \times 5 = 30$ letters. Next, S1 calculated the number of boxes for each village 120 : 30 = 4, 150 : 30 = 5, dan 210 : 30 = 7, S1 then summed the total number of boxes = $4 + 5 + 7 = 16$ mailboxes, $2.000 \times 16 = 32.000$. This process can be observed in Figure 3

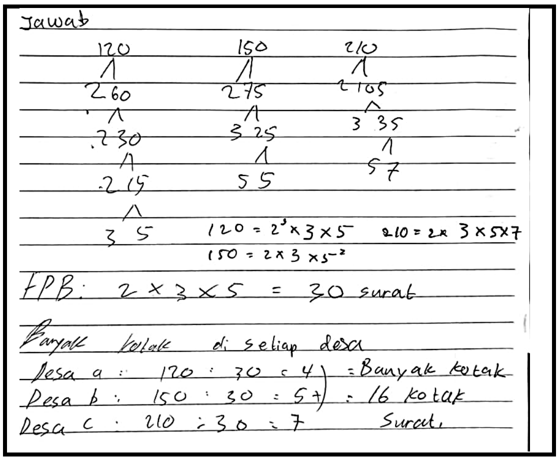

Figure 3. S1's written solution during plan implementation

Based on S1's written work in Figure 3, when writing out the factor trees, S1 completed them immediately without requiring additional written calculations. S1 sequentially and quickly

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wrote down the division results for each factor of 120. This was also evident when S1 divided 25 by 5 and 35 by 5. However, S1 performed written calculations for certain division steps, specifically when dividing 150 by 2 and 75 by 3, as well as when dividing 210 by 2 and 105 by 3.Subsequently, when S1 wrote the calculation $2 \times 3 \times 5 = 30$ and determined the number of boxes to be delivered, S1 did not perform written calculations to arrive at the answer. However, when writing the calculation $2.000 \times 16 = 32.000$, S1 required a written calculation to obtain the result of 32,000, as seen in Figure 3 above. This observation is supported by the following think-aloud transcript:

S1 : *"120 divided by 2... 60. 60 divided by 2... 30. 30 divided by 2... 15. 15 divided by 3... 5. Then 150 divided by 2... (pauses briefly, performs written calculation) so 75. 75 divided by 3... (pauses briefly, performs written calculation) 25. 25 divided by 5... gives 5.* $120 = 2^3 \times 3 \times 5, 150 = 2 \times 3 \times 5^2, 210 = 2 \times 3 \times 5 \times 7$*... GCF equals 2 times 3 times 5, 2 times 3... 6 times 5 equals 30. So 120 divided by 30... 4, 150 divided by 30... 5, 210 divided by 30 equals 7. 4 plus 5... 9 plus 7 (counting on fingers) 16. There are 16 mailboxes (rereads specific parts of the problem) 'all letters must be placed into mailboxes with the same number of letters and each box only contains letters from one village. The delivery fee received by the mailman is 2,000 per box. If delivery exceeds 20 boxes, the company adds a delivery fee bonus of 15,000...' There are 16 boxes, so 2,000 times 16 (seeks result via written calculation) equals 32.000"*

Overall, the steps in solving the problem during the plan implementation stage, as written by S1, from the factor trees, GCF calculation, box quantity determination, to fee calculation are organized systematically according to the unconsciously formed prior plan.

Next, in the final stage, S1 proceeded directly to write the conclusion based on the answer obtained without any attempt to double check each step of the solution already written. S1 immediately wrote the final conclusion: Therefore, the mailman's profit is Rp32,000. This can be seen in Figure 4

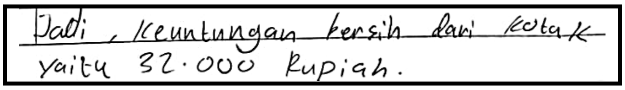

Figure 4. S1's written conclusion

To gain deeper insight into S1's confidence in their answer, the researcher conducted an interview by asking whether S1 felt any uncertainty during the problem-solving stages that would prompt them to recheck their answer. This is reflected in S1's response from the following interview transcript:

P : *"Did you feel any uncertainty at any step of your work that made you think you needed to recheck your answer?"*
S1 : *"No, Ma'am. In my opinion, that's just how it's done. The problem asks to find the mailman's profit, which is determined by the number of boxes delivered, but the number of boxes isn't given. So, we have to find that first, and then we get the mailman's fee: 32,000."*

Next, the researcher sought to determine further whether S1 had previously encountered similar problems, to see if prior experience helped shape the ideas, plans, or confidence that enabled S1 to successfully solve the given problem. This can be seen from the following interview conducted by the researcher with S1:

P : *"Have you ever worked on a problem like this before?"*
S1 : *"Yes, Ma'am, often. At my tutoring place, I often get word problems like this. Pak Dito (the math teacher) has already taught this too."*

Taken together, the results provide a detailed picture of the student's intuitive thinking across the stages of understanding, planning, implementation, and conclusion. These findings highlight the role of intuition as a cognitive mechanism that supports problem understanding, strategy formulation, and solution execution, which forms the basis for the discussion in the following section.

Discussion

The findings indicate that intuitive thinking plays a critical role from the earliest stage of mathematical problem solving, particularly in identifying hidden structural requirements within a task. The rapid recognition that net earnings depended on the number of boxes, despite this information not being explicitly stated, supports previous claims that intuition functions as a cognitive mechanism for detecting essential relationships before formal reasoning begins (Fischbein, 1987; Fatima & Susanah, 2019). This pattern reflects catalytic inference, whereby key information in the problem statement immediately triggers a necessary intermediate goal without extended analytical processing. Consistent with studies by Mutia et al. (2021) and Prameswari & Muniri (2023), intuition in this case did not operate as a mere guess but as a meaningful bridge between problem conditions and strategy selection.

The immediate activation of the Greatest Common Factor (GCF) strategy following the recognition of the equal-content constraint illustrates power of synthesis, as multiple elements of the task were integrated into a coherent solution pathway. This finding aligns with Evans et al. (2021), who argue that successful problem solving in mathematics depends on the ability to flexibly connect conditions, representations, and procedures rather than relying solely on formulaic rules. Furthermore, the role of prior learning experiences in shaping intuitive performance supports the view that intuition is developed through repeated exposure and practice, as suggested by Dewantara & Saraswati (2022) and reinforced by earlier work on experiential intuition in mathematics learning (Henden, 2004). The fluent execution of procedures and strong confidence observed during implementation correspond to Fischbein's (1987) common sense characteristic, in which intuitive judgments are grounded in accumulated experience and feel immediately reasonable to the solver.

Importantly, this case suggests that intuition in mathematical problem solving is not only a mechanism for generating initial insights, as emphasized in prior studies, but also functions as a sequential organizer that shapes planning and execution. This nuance extends existing accounts by showing that intuitive efficiency and metacognitive monitoring do not always develop in parallel. However, an important meaning emerging from the findings is that strong intuitive flow does not necessarily promote reflective verification. The absence of rechecking behavior suggests that intuition, while effective in supporting understanding, planning, and execution, may also foster premature closure through a sense of self-evidence. This observation echoes concerns raised by Zaporojets et al. (2021), who note that reliance on internal certainty can limit metacognitive monitoring in mathematical problem solving. From an instructional perspective, these findings imply that mathematics teaching should not only cultivate intuitive insight through rich problem contexts but also explicitly integrate verification routines to balance intuitive efficiency with analytical control. Such an approach is particularly relevant for integer problem solving at the junior high school level, where intuition can serve as a powerful entry point but must be guided toward reflective mathematical reasoning..

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Conclusion

The findings indicate that intuitive thinking emerged across multiple stages of mathematical problem solving on an integer-based task. At the problem-understanding stage, the solver rapidly identified the hidden structural requirement of the task and generated an initial strategy without lengthy analytical processing, reflecting catalytic inference. The subsequent selection of the GCF strategy and the construction of a coherent sequence of steps indicate power of synthesis, where key conditions and quantities were integrated into an organized solution pathway. Overall, intuition in this case functioned not only as a trigger for an initial insight but also as a sequential organizer that shaped planning and execution, supported by prior learning experiences, which aligns with the common sense characteristic of intuitive thinking. During implementation, the solver executed the selected strategy systematically, with intuitive efficiency appearing in parts of the computation that were completed fluently and with minimal written support. However, the review stage revealed limited verification behavior. The solver concluded the solution without rechecking prior steps, suggesting a strong sense of self-evidence and high internal certainty regarding the procedure and outcome. Importantly, this pattern implies that intuitive efficiency and metacognitive monitoring may not develop in parallel. Strong intuitive conviction can support fast and coherent solution production, yet it may also encourage premature closure and reduce the likelihood of deliberate checking. Therefore, mathematics instruction should not only cultivate students' intuitive insight for recognizing problem structure and selecting strategies, but also explicitly strengthen verification routines. Teachers can embed systematic checking prompts, such as validating whether computed results satisfy all problem conditions and re-evaluating key calculations, to balance intuitive efficiency with reflective accuracy. These conclusions are drawn from an in-depth single-case analysis and should be interpreted as a detailed account of how intuition operated in this context rather than as a generalization to all students.

Conflict of Interest

The author declares no conflict of interest.

Authors' Contributions

The first author, N.S., conceived the research idea, collected data, prepared research instruments, designed the methodology, organized and analyzed data, and contributed to the discussion of results. N.H. and A.K., as research supervisors, actively participated in theoretical guidance, methodology, data analysis, results discussion, and approval of the final version. All authors have read and approved the final manuscript. The total percentage contribution to the conceptualization, drafting, and revision of this paper is as follows: N.S.: 40%, N.H.: 30%, A.K.: 30%.

Data Availability Statement

The authors declare that data supporting the findings of this study will be made available by the corresponding author, [N.H.], upon reasonable request.

References

Badan Pengembangan dan Pembinaan Bahasa. (2025). *Kamus Besar Bahasa Indonesia (KBBI)*

Daring. Kementerian Pendidikan, Kebudayaan, Riset, Dan Teknologi. https://kbbi.kemdikbud.go.id

Davita, P. W. C., & Pujiastuti, H. (2020). Anallisis Kemampuan Pemecahan Masalah Matematika Ditinjau dari Gender. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *11*(1), 110–117. https://doi.org/10.15294/kreano.v11i1.23601

Dewantara, A. H., & Saraswati, S. (2022). Analisis Berpikir Intuitif Siswa dalam Menyelesaikan Masalah Persentase. *Didaktika : Jurnal Kependidikan*, *15*(1), 49–61. https://doi.org/10.30863/didaktika.v15i1.62

Evans, T., Klymchuk, S., Murphy, P. E. L., Novak, J., Stephens, J., & Thomas, M. (2021). Non-routine mathematical problem-solving: creativity, engagement, and intuition of STEM tertiary students. *STEM Education*, *1*(4), 256–278. https://doi.org/10.3934/steme.2021017

Fatima, A. A., & Susanah. (2019). *Profil Intuisi Siswa SMP dalam Pemecahan Masalah Matematika Ditinjau dari Gaya Kognitif Reflektif dan Impulsif*. *8*(3), 550–558.

Fischbein, E. (1987). Intuition in science and mathematics. *Mathematics and Computers in Simulation*, *30*(4), 372. https://doi.org/10.1016/s0378-4754(98)90009-x

Henden, G. (2004). Intuition and its Role in Strategic Thinking. *Series of Dissertations*, 1–189.

Lenaini, I. (2021). Teknik Pengambilan Sampel Purposive Dan Snowball Sampling. *HISTORIS: Jurnal Kajian, Penelitian & Pengembangan Pendidikan Sejarah*, *6*(1), 33–39. http://journal.ummat.ac.id/index.php/historis

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis*. SAGE Publications.

Millah, A. S., Apriyani, Arobiah, D., Febriani, E. S., & Ramdhani, E. (2023). Analisis Data dalam Penelitian Tindakan Kelas. *Jurnal Kreativitas Mahasiswa*, *1*(2), 140–153.

Musriroh, R. Z., Hidayanto, E., & Rahardi, R. (2021). Penalaran Spasial Matematis Dimensi Persepsi dan Visualisasi Kelas VIII dalam Pemecahan Masalah Geometri. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *6*(11), 1774. https://doi.org/10.17977/jptpp.v6i11.15144

Mutia, Rochmad, & Isnarto. (2021). Pentingkah Sebuah Intuisi dalam Pembelajaran Matematika? *Prisma*, *4*, 369–374. https://journal.unnes.ac.id/sju/index.php/prisma/

Prameswari, D. A., & Muniri, M. (2023). Karakteristik Berpikir Intuitif Siswa dalam Menyelesaikan Soal Matematika Ditinjau dari Kemampuan Matematika. *Lattice Journal : Journal of Mathematics Education and Applied*, *3*(1), 79. https://doi.org/10.30983/lattice.v3i1.6554

Rifa'i, Y. (2023). Analisis Metodologi Penelitian Kulitatif dalam Pengumpulan Data di Penelitian Ilmiah pada Penyusunan Mini Riset. *Cendekia Inovatif Dan Berbudaya*, *1*(1), 31–37. https://doi.org/10.59996/cendib.v1i1.155

Srimuliati, S., & Wahyuni, W. (2020). Kemampuan Berfikir Intuitif Mahasiswa Calon Guru dalam Penyelesaian Masalah Matematika. *Jurnal Ilmiah Pendidikan Matematika Al Qalasadi*, *4*(2), 98–109. https://doi.org/10.32505/qalasadi.v4i2.2186

Zaporojets, K., Bekoulis, G., Deleu, J., Demeester, T., & Develder, C. (2021). Solving arithmetic word problems by scoring equations with recursive neural networks. *Expert Systems with Applications*, *174*. https://doi.org/10.1016/j.eswa.2021.114704

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