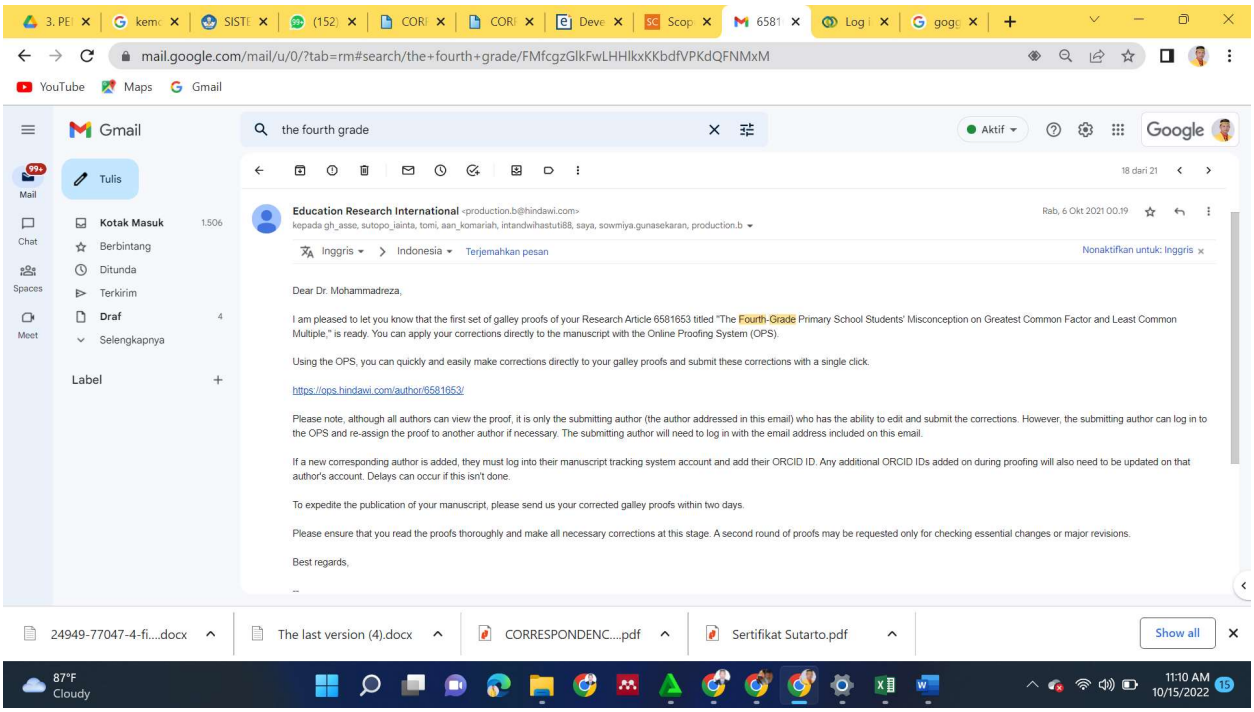
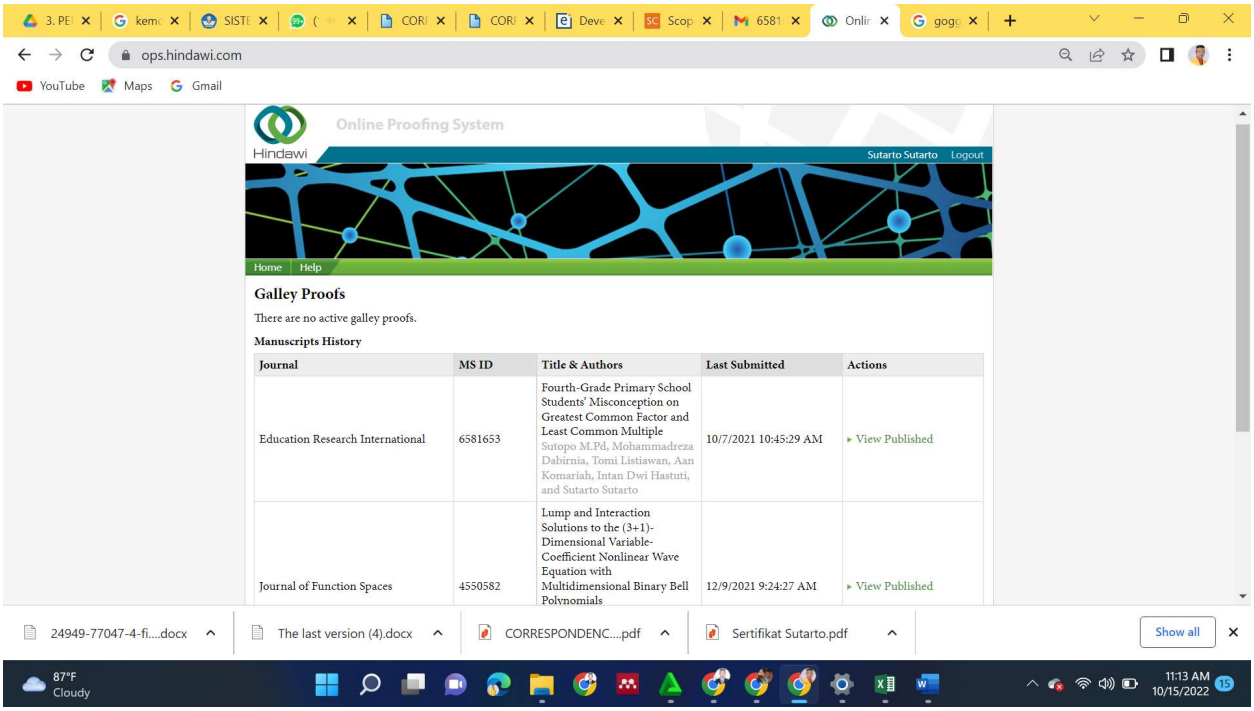
BUKTI CORESPONDING

The Fourth-Grade Primary School Students' Misconception on Greatest Common Factor and Least Common Multiple





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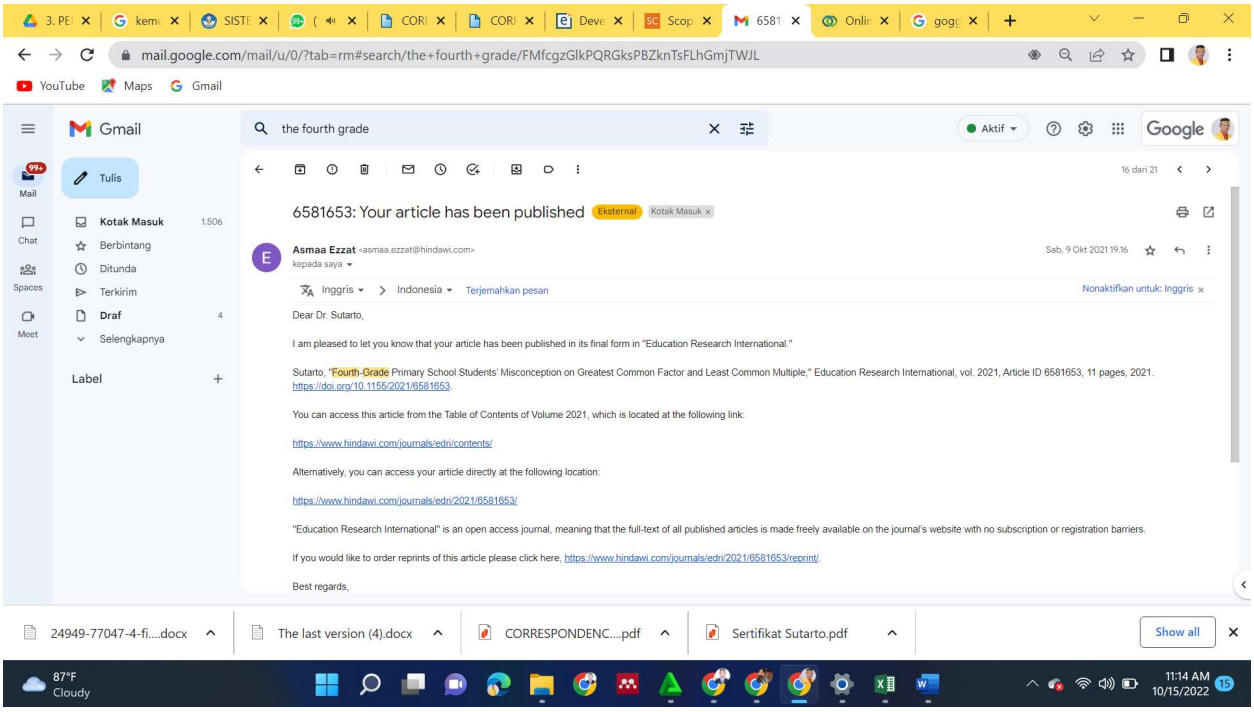

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Best regards,

The Fourth-Grade Primary School Students' Misconception on Greatest Common Factor and Least Common Multiple

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Abstract

This study is aimed at determining students' misconceptions on the teaching material of the greatest common factor and least common multiple. The sample of this study consisted of 124 fourth grade elementary school students in the academic year of 2019-2020 in areas of Mataram, West Lombok, North Lombok, and East Lombok at West Nusa Tenggara Province. The instrument of this study is a test covering five questions in the form of open questions. The data are analyzed based on the students' explanations while they answer the test. The students' wrong answers are grouped into categories. The interview activities are carried out for students who have a misconception. Then, researchers create a table of frequencies/presentations relating to each type of students' misconception. The results show that students experience misconceptions due to factors: having a weak multiplication concept, having a weak prime number concept, determining the least common multiple of two numbers by multiplying the two numbers, unable to distinguish between multiples and factors of a number.

Keywords: misconceptions, lowest common multiple, biggest common multiple

Introduction

The lowest common multiple and the biggest common factor are important materials that must be mastered by students at the fourth-grade primary schools in Indonesia. Factors and multiples are basic lessons of fractions. To simplify the fraction, students need to acquire the concept of the biggest common factor. To equalize the denominator in the fraction operation, students are required to master the concept of the lowest common multiple (Kolitsch & Kolitsch, 2011; Musser, Burger, dan Peterson, 2011).

The characteristic of mathematics is that in order to be successful in certain materials, students must master prerequisite materials. If a misconception happens on the prerequisite materials, it will give an effect of the misconception in the next teaching-materials. One of the most crucial things in solving math problems is the acquisition of mathematical concepts. The implementation of mathematics learning in the school environment does not always have the expected success because of misconceptions.

The misconception is the initial concept of incompatibility scientifically agreed upon by the expert with the concept of knowledge brought by students (Pesman & Eryilmaz, 2010; Caleon & Subramaniam, 2010, Mohyuddin & Khalil, 2016). Misconceptions can also be interpreted as differences in basic perceptions between students and experts, so it causes students' systematically incorrect understanding (Smith, diSessa, & Roschelle, 1993). Therefore, it can be concluded that the misconception is a mismatch in understanding concepts between students and experts.

Mathematics teaching-learning is interrelated instruction between a concept and the previous concept. If students are not able to assimilate and accommodate the relationship between these concepts, they will make continuous mistakes. Students create new concepts using their previous knowledge. The instruction of the lowest common multiple and the biggest common factor regardless of students' experience and the absence of teaching aids will generate misconceptions.

Based on the results of the study, students' misconceptions on teaching materials of the Biggest Common Factors and the Lowest Common Multiple are caused by several factors, namely the failure of students to understand the basic concepts of prime numbers, factors, and multiples (Triyani, Putri, & Darmawijoyo, 2012; Unaenah, et al. 2020; Latifah). Students' misconceptions on the lowest common multiple and the biggest common factor occur because students are confused about distinguishing the least common multiple with the greatest common factor (Halim, Shahrill, & Prahmana, 2017).

Students' misconceptions occur continuously because students have been taught only how to find the lowest common multiple and the biggest common factor. In addition, students are not taught the meaning or basic understanding of the lowest common multiple and the greatest common factor. Several effective methods can be used to determine the lowest common multiple and the biggest common factor. One of which is the prime factorization method using the factor tree (Manjanai & Shahrill, 2016). Students apply this factor tree method without learning what the underlying reasons are that the lowest prime factor must be used first as a numeric divisor. Even when using the prime factorization method to determine the lowest common multiple, students are directed to find the biggest rank while the greatest common factor is directed to find the lowest rank. Students do not have advanced thinking regarding the procedure of applying the factor tree method, and it is not clear whether the students really understand the concept that underlies the method. In this case, students are more likely to focus on procedural skills without a good concept

mastery. Suffolk (2007) added that a lot of schools did not even teach the basic meaning of least common multiple and greatest common factor.

Based on the results of observations by distributing questions about real life, namely, "Mother has 18 oranges and 12 apples. The mother wants to put 18 oranges and 12 apples into a plastic bag, provided that each plastic bag contains the same amount of oranges and also each plastic bag contains the same amount of apples. How many plastic bags are needed by the mother?". This question requires students to apply the concept of the biggest common denominator. From the observations, findings show that only 10% of students answered correctly, 60% of students answered wrongly, and 30% of students did not answer. This shows that students can only associate the question with the lowest common multiple or the greatest common factor if the problem formulation is clearly stated when answering a question. However, when they are faced with a problem without clearly stating the use of the lowest common multiple and the greatest common factor, students are unable to relate the question to the term of the greatest common factor due to lack of understanding.

Having a low multiplication concept is one of the reasons students at the primary school experience misconceptions of the multiplication material. Moreover, if students are asked to determine the multiple of a number whose value is large, most students are not careful in solving it. Basically, the prerequisite material for multiples is the multiplication material. In other words, so that students master the concept of multiples, the concept of multiplication should be strengthened.

The students' misconceptions on the material of the lowest common multiple and the greatest common factor occur because of the students' weakness in the concept of prime numbers. Most students do not understand the concept of prime numbers. When asked to determine the prime number between 8 and 25, most students solve the problem by finding a multiple of 8 so that the results are 8, 16, 24.

The students' misconception also comes from the assumption that to determine the lowest common multiple of two numbers is to multiply the two numbers. When students are asked in an opened-question, whether 8 is the lowest common multiple of 2 and 4. Most students answer that 8 is the lowest common multiple of 2 and 4 because 2 times 4 is 8.

The students' misconceptions also occur because they cannot distinguish between multiples and factors of a number. When they are asked to determine the common factor of 12 and 18, the first step that students do is to determine the factor of 12.

The students' misconceptions are necessary to be further analyzed so that the causes can be identified so that in the future, teachers can plan instructional methods directing aspects of students' conceptual understanding. he teachers are to create learning experiences to develop students' understanding of concepts, ideas and applications as an integrated whole process of learning mathematics (Chong, Shahrill, & Li, 2019). The questions proposed in this study are different from previous studies, where this study formulates open-ended questions that direct students to explain how they solve each question and solve it. Previous research examines more about the analysis of students' errors in solving the problem of lowest common multiple and greatest common factor. The students' mistakes in solving the smallest common multiple problems and the greatest common factor can be explored if teachers can first see the extent of students' basic concept mastery such as the concept of prime numbers, multiples, factors, biggest

common factor, and lowest common multiple. This study is expected to provide detailed information about students' thinking ways. By analyzing misconceptions at the primary school level, problem-solving can be immediately done effectively so that these misconceptions do not carry over to the next level of education.

The Research Goal

This study is aimed at determining students' misconceptions on prime numbers, factors, multiples, biggest common factors, and lowest common multiple at the fourth-grade primary schools in West Nusa Tenggara, Indonesia.

Research Problems

The main problem of this study is "what misconceptions are done by the 4th grade students regarding the material of the lowest common multiple and the biggest common factor? The sub-problems of this study are as follows.

1. What misconceptions occur to the fourth-grade students regarding prime numbers?
2. What misconceptions occur to the fourth-grade students regarding factors?
3. What misconceptions occur to the fourth-grade students regarding multiples?
4. What misconceptions occur to the fourth-grade students regarding the biggest common factor?
5. What misconceptions occur to the fourth-grade students regarding the lowest group multiple?

Methodology

Research Design

This study aims to uncover the misconceptions of the fourth-grade students about the lowest common multiple and biggest common factor and to find out more about misconception issues. This study is qualitative research using the case study method. The case study method is defined as the determination of the investigation status and in-depth examination from a certain situation (Bogdan & Biklen, 2007; Hastuti et al., 2020). This case study method is used when it is necessary to examine the situation as a whole and comprehensively (Feagin, Orum, & Sjoberg, 1991). The case study method was also used to determine the types of students' misconceptions about the lowest common multiple and the greatest common factor and to investigate these misconceptions in depth (Hastuti et al., 2020).

Research Instruments

The instrument of collecting data in this study is an interview in the form of 12 open-ended questions to investigate students' understanding of prime numbers, factors, multiples, greatest common factors, and least common multiples. In the first question, students are asked to determine the factor of a number along with the completion process. The second question leads students to determine the multiple of a number and the process of solving it. The third and fourth question direct students to determine the prime numbers and prime factors of a number. The fifth question leads students to determine true or false statements about the multiple of a number and is accompanied by the reasons why they chose the right or wrong answer. The sixth question leads students to determine the greatest common factor of a number. The students' answers and explanations are then

checked and determined whether there are misconceptions or not. Before the questions were given to fourth-grade students, the question items were validated first by an expert of mathematics education and elementary school teacher.

The Research Sample

The sample of this study consisted of 124 fourth-grade primary school students in the academic year of 2019-2020 in areas of Mataram, West Lombok, North Lombok, and East Lombok provinces at West Nusa Tenggara, Indonesia. The sampling method was random. In this sampling method, the probability of selecting each group is equal to one another (Çepni, 2010). The distribution of students who are participating in the study according to gender is presented in Table 1.

Table 1. *Distribution of Students According to Gender*

Gender	Frequence	Percentage
Male	60	48%
Female	64	52%
Total	124	100%

Table 1 shows that the percentage of male students who participated in this study was 48%, and the percentage of female students who participated in this study was 52%.

Data Analysis

Students' answers are checked into three categories, namely true, false, and blank (not answered) for each question. Students' misconceptions are determined by looking at the answers they gave, the explanations they made, and interviews with subjects who represent each type of misconception. The researchers divided the misconceptions into several categories based on the results of examining all students' answers. In data analysis, each student's response is coded by all the researchers independently. The data analysis technique employs descriptive statistical analysis (frequency/percentage) obtained from the test results. The analysis is carried out separately for each question. Examples of misconceptions for each question are also presented and shown in tables.

Findings and Discussion

In this section, the analysis of the students' answers to each question is described. The analysis is carried out separately for each question. The following are the results of the analysis of misconceptions for each question.

Analysis Results of Students' Misconception for Question 1

The first question is about the concept of factors. In this question, students are asked to determine the factor of a number as well as explain the finishing process. The first question of the test is shown in Figure 1.

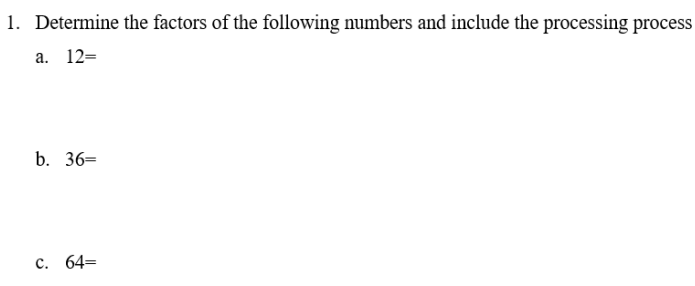

1. Determine the factors of the following numbers and include the processing process
   a. 12=
   b. 36=
   c. 64=

Figure 1. Questions of Factor Concepts

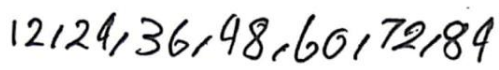
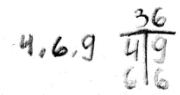
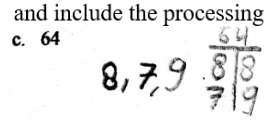
The distribution of students' answers to the first question is presented in Table 2.

Table 2. *Distribution of Students' Answer in the Question 1*

Evaluation	a		b		c	
	f	%	f	%	f	%
Correct	71	57	58	47	52	42
Incorrect	50	40	60	48	64	52
No-answer	3	3	6	5	8	6
Total	124	100	124	100	124	100

Table 2 provides a visual presentation of the percentage of students who answered incorrectly in point a is 40%. The percentage of students who answered incorrectly on point b is 48%, and point c is 52%. In other words, the students' errors in points a, b, and c have increased. The types of misconceptions and examples of students' answers to question number 1 are given in Table 3.

Table 3. *Students' Misconception in Question 1 and Examples of Students' Answer*

Misconception Types	Students Answer Sample
Determining factors from a number through seeking for its multiples	1. Determine the factors of the following numbers and include the processing process a. 12 
Seeing factors as multiples from two numbers under 10	1. Determine the factors of the following numbers and include the processing process b. 36 
	1. Determine the factors of the following numbers and include the processing process c. 64 

Based on the results of students' answers and interviews, the first misconception is that when they are asked to determine the factor of a number, they answer by looking for its multiples. There are students who answered that the multiples of 12 were 12, 24, 36, 48, 60, ... From the results of the interview, it was revealed that students have difficulties distinguishing between multiples and factors. The second misconception, when students are asked to determine the factors, they only focused on multiplying two numbers under 10. They answered 4, 6, and 9, when students are asked to determine a factor of 36. Thus they only focus on multiplying two numbers under 10. It should be noted that 18 and 2 are factors of 36 as well as 12 and 3 are factors of 36. From the results of the interviews, it was revealed that the concept of student multiplication is still low, especially multiples above 10 they still face difficulties.

Analysis Results of Students Misconception in Question 2

In question 2, students are asked to determine multiples of 5, which are less than 50, and those of 12, which are less than 100, along with the finishing process. Question 2 is presented in Figure 2 as follows.

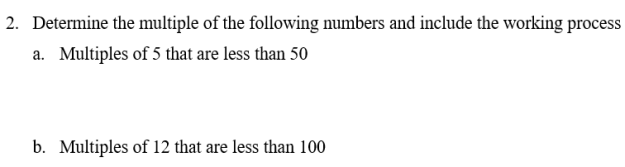

2. Determine the multiple of the following numbers and include the working process
   a. Multiples of 5 that are less than 50
   b. Multiples of 12 that are less than 100

Figure 2. Questions of Multiple Concept

The distribution of students' answers in Question 2 can be presented in Table 4 as follows.

Table 4. *Distribution of students' answer in Question 2*

Evaluation	a		b	
	f	%	f	%
Correct	70	56	56	46
Incorrect	47	38	60	48
No answer	7	6	8	6
Total	124	100	124	100

There are 38% of students answered incorrectly for the question in point (a), and 48% of students answered incorrectly for the question in point (b). Student misconceptions also occur in multiples of materials. The types of misconceptions and examples of students' answers to question 2 are shown in Table 5 as follows.

Table 5. *Students Misconception in Question 2 and Examples of Students' Answer*

Misconception Types	**Students Answer Sample**
Multiplying a number consistently	a. Multiples of 5 that are less than 50 5, 25, 125,
Low multiple concept	b. Multiples of 12 that are less than 100 12.24.31.88.45.52.62.74.81.88

Based on the results of students' answers and interviews with students to find multiples of a number, students multiply a number consistently. Students answering multiples of 5 is 5, 25, 125. Students assume that to find the multiples of 5 is to multiply the number 5 by 5 so that it produces 25 and then multiply 25 by 5 so that the result is 125. Actually, to determine the multiple of a number, students can multiply the number with the original number sequentially. Especially on the basis of revealed interviews that students are also weak in multiplication, especially multiplication above 10. This is seen from the student's answer when answering multiples of 12 is 12, 24, 31, 88. Students are also confused by the term "less than" on question number 2.

Analysis Results of Students' Misconception in Question 3

In question 3, students are asked to determine prime numbers. Question 3 can be presented in Figure 3 as follows.

3. Find the prime numbers between 8 and 25

Figure 3. Question 3

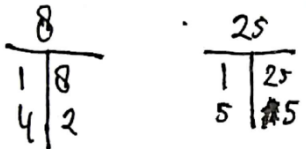
The distribution of students' answers in accomplishing question 3 is presented in Table 6 as follows.

Table 6. *Distribution of students' answer in Question 3*

Evaluation	a	
	f	%
Correct	40	32
Incorrect	49	40
No answer	35	28
Total	124	100

Table 6 shows that there are 40% of students answered incorrectly to question number 3, and 28% of students did not answer question 3. Students' misconceptions in question 3 are given in Table 7, along with examples of student answers. From the results of the analysis of students' answers and interviews, it was found that there are misconceptions which are described in detail in Table 7 as follows.

Table 7. *Students' Misconception in Question 3 and Examples of Students Answer*

Misconception Types	**Students' Answer Sample**
Considering prime numbers as composite numbers	3. Find the prime numbers between 8 and 25 

Based on the results of students' answers and interviews, the finding shows that students considered prime numbers as composite numbers. When answering prime Numbers between 8 and 25, students finished by looking for a factor of 8. This fact happens because the students' concept of prime numbers is still very low. Prime numbers are natural numbers that have exactly two factors, namely one and itself.

Analysis Results of Students' Misconception in Question 4

In question 4, students are asked to determine the prime factors of 20 and 42 along with the completing process. Question 4 can be seen in Figure 4 as follows.

4. Find the prime factors of 20 and 42

Figure 4. Question 4

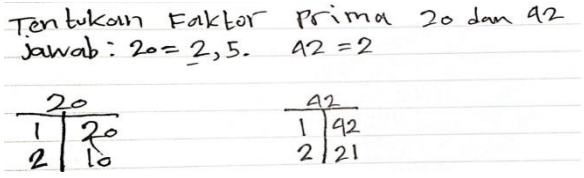
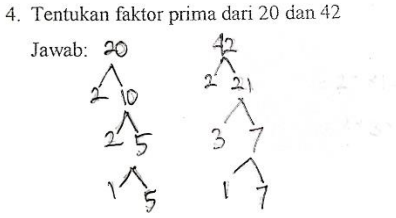
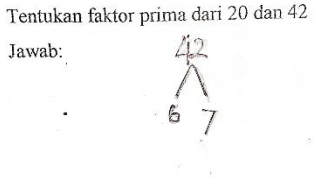
The distribution of students' answers in accomplishing question 4 is presented in Table 8 as follows.

Tabel 8. *Distribution of students' answer in Question 4*

Evaluation	a	
	f	%
Correct	40	32
Incorrect	54	44
No answer	30	24
Total	124	100

Based on Table 8, the data are obtained that there are 44% of students answered incorrectly and 24% of students did not answer. After analyzing student answers and conducting interviews, misconceptions are found as described in Table 9 as follows.

Table 9. *Students Misconception in Question 4 and Its Answer Category*

Misconception Types	**Students Answer Sample**
Cannot identify all prime factors	
Cannot distinguish between factors and prime factors	
Using tree method of factors but numbers sought for its prime factors are not divided with the least prime numbers	

Based on the results of student answers and interviews, the data show that there are several student misconceptions when determining the prime factors. First, students could not identify all prime factors. This misconception occurs because the students' concept relating to prime numbers is still weak. When students are asked to determine prime factors of 20 and 42, students can determine only factors from 20 and 42, in turn students cannot identify the primacy. Students do not fully understand the definition of prime numbers. Second, students cannot distinguish between prime factors and factors. Third, students use the factor tree method, but the number sought for the prime factor is not divided by the smallest prime number. Based on the results of the interview, the data show that the students do not find the smallest prime number, and they assume that 6 is the smallest prime number that could divide 42.

Analysis Results of Students' Misconception in Question 5

In question 5, students are given open-ended questions and are asked to determine whether they are true or false in relation to 3 statements of 8. Question 5 can be seen in Figure 5 as follows.

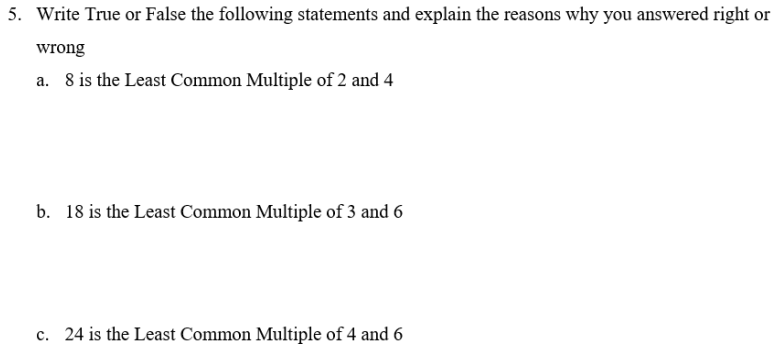

5. Write True or False the following statements and explain the reasons why you answered right or wrong
   a. 8 is the Least Common Multiple of 2 and 4
   b. 18 is the Least Common Multiple of 3 and 6
   c. 24 is the Least Common Multiple of 4 and 6

Figure 5. Question 5

The following is the distribution of students' answers in accomplishing question 5, and it can be presented in Table 10 as follows.

Tabel 10. *Distribution of students' answer in Question 5*

Evaluation	a		b		c	
	f	%	f	%	f	%
Correct	50	40	55	44	62	50
Incorrect	72	58	65	52	60	48
No Answer	2	2	4	4	2	2
Total	124	100	124	100	124	100

Based on Table 10, the data show there are 58% of students answered incorrectly to question 5 in point a, 52% of students answered incorrectly to the question in point b, and 48% of students answered incorrectly to question in point c. In addition, the percentage of students who do not answer the question in point a is 2%, point b is 4%, and item b is

2%. In more detail, the misconceptions made by students in solving question 5 can be seen in Table 11 as follows.

Table 11. *Students Misconception in Question 5 and Its Answer Category*

Misconception Types	**Student Answer Sample**
Determining the least common multiple from two numbers by multiplying the two numbers	a. 8 is the Least Common Multiple of 2 and 4 Benar karena $2 \times 4 = 8$ True, because $2 \times 4 = 8$
Choosing the greatest numbers	b. 18 is the Least Common Multiple of 3 and 6 3 : 3, 6, 9, 12, 15, (18) 6 : 6, 12 (18) Benar

Based on the results of students' answers and interviews, the finding shows that there are several student misconceptions when answering question 5. First, students determine the least common multiple of two numbers by multiplying the two numbers. Students correctly assume that 8 is a multiple of 2 and 4 on the grounds that 2 categories 4=8. The second misconception is that the students choose the largest number that becomes the least common multiple of two Numbers. At the first step the student properly identified the multiples of 3 and 6, but at the next step the student determined the largest number of 18 as the least common multiple. Based on the results of the interview, this misconception reveals that the students are successful in the first and second steps, namely determining the multiple of each number and determining the common. In the last step, students fail where they choose the largest number.

Analysis Results of Students' Misconception in Question 6

In question 6, students are asked to determine the greatest common factor. Question 6 can be seen in Figure 6 as follows.

6. Find the Greatest Common Factor from the following two numbers
   a. 12 dan 18

   b. 32 dan 48

Figure 6. Question 6

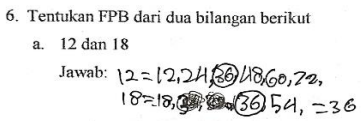
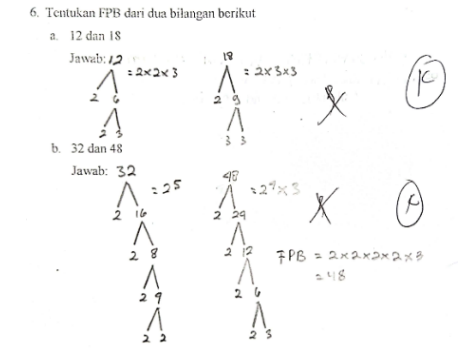
Tabel 12. *Distribution of students' answer in Question 6*

Evaluation	a		b	
	f	%	f	%
Correct	94	76	85	69
Incorrect	25	20	32	26
No answer	5	4	7	5

Total	124	100	124	100

Based on Table 12, the data show there are 20% of students answered incorrectly for question 6 in point a and 26% of students answered incorrectly for question in point b. In addition, the percentage of students who did not answer the question in point a is 4%, and point b is 5%. In more detail, the misconceptions made by students in solving question number 6 can be seen in Table 13 as follows.

Table 13. Students Misconception in Question 6 and Its Answer Category

Misconception Types	**Students Answer Sample**
Looking for number factors by determining its multiples	
Looking for the same factors with the largest rank	

Based on the results of students 'answers and interviews, the data show that there are several students' misconceptions when answering question 6. First, the students look for the number factors by determining their multiples. Based on the results of the interview, this misconception occurs because students cannot distinguish between the concept of factors and multiples. Second, a misconception occurs to find an equal number to the greatest rank. Based on the results of the interview, this misconception occurs because students think that after looking for the prime factorization, to determine the biggest common factor is to look for the same factor with the largest rank.

Conclusion, Discussion, and Recommendation

There are several students' misconceptions in completing the least common multiple and the biggest common factor, and the influential factors. In question 1 relating to determining factors, it appears that students experience misconceptions. Students' answers to question 1 relating to determining the factors of a number, there are two types of misconceptions. The first misconception is because students see the factor as the multiplication of two numbers under ten only. Based on the results of the interview, it was revealed that the cause of this misconception is that students' multiplication concept is still low, especially multiplication above 10. When large numbers are involved, students have difficulties determining the factors so that the percentage of students' errors increased in item c. To minimize this misunderstanding, the concept of student multiplication needs to be strengthened especially for multiplication above 10. The second misconception is that students determine the factor of a number by finding its

multiples. The cause of this misconception is that students feel difficult to distinguish between multiples and factors. If the concept of factors is well understood, students' misconceptions about the common factor will not occur. This finding is in consistent with Mohyuddin's research that a considerable number of students lack clarity that 1 is factor of all numbers and they mixed factors with multiples (Mohyuddin & Khalil, 2016)

Student misconceptions also occur when students solve question 2 regarding determining the multiple of a number. From the results of the student work on question 2, there are two types of multiple misconceptions. The first misconception is multiplying by a consistent number. Based on the results of the interview, students are low in understanding the definition of multiples in question 2a. When asked to determine the multiple of 5, students answer 5, 25, 125,…. From this task, the data show students determine the next number by multiplying the previous number by 5. It is supposed to determine the multiple of a number, and students can multiply the number with the original number sequentially. The second misconception is the misconception of the concept of multiplication, especially if it involves multiplying large numbers. To correct students' misconceptions regarding multiples, the first step that must be taken is to strengthen the concept of multiplication, especially the concept of multiplication 1-10, and give tricks to teach multiplication above 10 for students.

Student misconceptions also occur when students complete question 3 related to prime numbers. The percentage of student misconceptions in this section reached 48%. The first misconception is to think of prime numbers as composite numbers. Based on the results of the interview, students are still low in understanding the definition of prime numbers. Children construct erroneous rules without reference to the conceptual content or the meaning of arithmetic (Mohyuddin & Khalil, 2016)

In question 4, relating to prime factors, students also experience misconceptions. First, students cannot identify all prime factors. This misconception occurs because the students' concept regarding prime numbers is low. Students do not fully understand the definition of prime numbers. Second, students cannot distinguish between prime factors and factors. Third, students use the factor tree method, but the number looking for the prime factor is not divided by the smallest prime number. The misconception that occurs in question 4 is because there are several related concept sequences that fail to be understood properly. Students fail to understand the concepts of factors and prime numbers. Question 4 relates to the question 1 and 3. If students experience misconceptions in question 1, students will fail to answer question 4 correctly. To understand the concept of prime factors, students must understand the concept of factors and the concept of prime numbers, respectively (Triyani, Indra, Darmawijoyo, 2012; Halim, Shahrill, & Prahmana, 2017).

Some misconceptions also occur when students answer question 5. The first misconception is that students determine the least common multiple of two numbers by multiplying the two numbers. The second misconception is students choose the largest number, which becomes the least common multiple of two numbers. Based on the results of the interview, students are successful in the first and second steps, namely determining the multiple of each number and determining the association. Still, in the last step, the students failed, where they chose the largest number as the lowest common multiple. The difficulties in understanding the concepts of Least Common Multiple are based on the

teaching practices at the formal level that are often regarded as procedural and manipulative (Triyani, Indra, Darmawijoyo, 2012; Mohyuddin & Khalil, 2016)

Based on the results of students 'answers and interviews, the findings show that there are several students' misconceptions when answering question 6. First, the students looked for the number factors by determining their multiples. Based on the results of the interview, this misconception occurs because students cannot distinguish between the concept of factors and multiples. When listing the numbers that are a factor of 12, the answer is that factor 12 is 12, 24, 36, … The second misconception is to look for equal prime factors to the greatest rank. Based on the results of the interview, this misconception occurs because students think that after looking for the prime factorization, to determine the biggest common factor is to look for the same factor with the largest rank. The student expressed that they were using the shortcut method without prior learning to the reason why the lowest prime factor needed to be used first as the divisor for the numbers. The student to know how to use these methods of prime, there was no afterthought towards the answer or any discussions regarding it, and it was unclear whether the students really understood the concept that underlies the operation (Halim, Shahrill, & Prahmana, 2017).

Based on the findings from the research results, the following suggestions are distributed: 1) In learning mathematics relating to the materials of the least common multiples and the greatest common factor. The most important is the basic concepts in accordance with prime numbers, factors, and multiples that must be strengthened first, 2) instruction should be supported with concrete material so that there are no misconceptions about the concept of the least common multiple and the greatest common factor, 3) instruction is not only emphasized on the procedural aspects through the factor tree, but students need to emphasize the meaning, 4) instruction should be done by paying attention to the difference in meaning between multiples and factors.

REFERENCES

Bogdan, R. C., & Biklen, S. K. (2007). *Qualitative Research For Education: An Introduction To Theory And Methods*. USA: Pearson Education, Inc.

Caleon, I. S., & Subramanlan, M. Do Students Know What They Know and What They Don't Know? Using a Four-Tier Diagnostic Test to Assess the Nature of Students' Alternative Conceptions. *Research in Science Education*, 40(1), 313-337. https://doi.org/10.1007/s11165-009-9122-4

Çepni, S. (2010). Introduction to research and project studies. Trabzon: Erol Ofset.

Chong, M. S. F., Shahrill, M., & Li, H. C. (2019). The Integration of A Problem-Solving

Feagin, J. R., Orum, A. M., & Sjoberg, G. (Eds.) (1991). A case for study. Chapel Hill, NC: University of North Carolina Press.

Framework For Brunei High School Mathematics Curriculum In Increasing Student's Affective Competency. Journal on Mathematics Education, 10(2), 215-228. https://doi.org/10.22342/jme.10.2.7265.215-228

Halim, N. L. A., Li, H. C., Shahrill, M., & Prahmana, R. C. I. (2017). Teaching Strategies In The Learning Of Highest Common Factor And Lowest Common Multiple. *Journal of Physics: Conference Series*, 943(1), 1-9. https://doi.org/10.1088/1742-6596/943/1/012041

In The Learning Of Year Nine Factorization. *International Journal of Interdisciplinary Educational Studies*, 11(4), 35–55. https://doi.org/10.18848/2327-011X/CGP

Hastuti, I. D. (2020). The Effect of Guided Inquiry Learning in Improving Metacognitive Skill of Elementary School Students. *International Journal of Instruction*, *13*(4).

Hastuti, I. D., Surahmat, & Sutarto. (2020). Development of Collaborative Inquiry-Based Learning Model to Improve Elementary School Students 'Metacognitive Ability. International Journal of Scientific and Technology Research, 9(2), 1240–1247

Manjanai, S. N. N. P., & Shahrill, M. (2016). Introducing The Flipped Classroom Strategy

Mohyuddin, R. G., & Khalil, U. (2016). Misconceptions of Students In Learning Mathematics At Primary Level. *Bulletin of Education and Research*, 38(1), 133-162

Musser, G. L., Burger, W. F. & Peterson, B. E. (2011). *Mathematics For Elementary Teachers. Ninth Edition*. United States: John Wiley & Sons, Inc.

Pesman, H., & Eryilmaz, A. 2010. Development of a Three-Tier Test to Assess Misconceptions About Simple Electric Circuits. *The Journal of Educational Research*, 103(1), 208-222. https://doi.org/10.1080/00220670903383002

Smith, J. P., diSessa, A. A., & Roschelle, J. (1993). Misconceptions reconceived: A Constructivist Analysis of Knowledge in Transition. *The Journal of Learning Sciences*, 3(2), 115-163.

Suffolk, J. (2007). Making the teaching of mathematics more effective. *Proceedings of the Redesigning Pedagogy: Culture, Knowledge and Understanding Conference Singapore*

Triyani,S., Putri, R. I. I., & Darmawijoyo. (2012). Supporting Student's Ability in Understanding Least Common Multiple (LCM) Concept Using Storytelling. *Journal on Mathematics Education*, 3(2), 151-164. https://doi.org/10.22342/jme.3.2.572.151-164

Unaenah, E., Oktavia, A, Indah, N., & Hadisumarno, N. (2020). Miskonsepsi Materi Tentang FPB Dan KPK Pada Siswa SD Di Kelas Tinggi. *Jurnal Pendidikan Dan Ilmu Sosial*, 2(2), 276-282