



## THE INTEGRATION OF MATHEMATICAL LOGIC IN SURAH AL-BAQARAH AND SURAH AN-NISA IN ACCORDANCE WITH RATIONAL NUMBERS

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### Abstract

*The Qur'an is a spiritual guide that contains profound logical insights and mathematical regularities that are essential for humanity to understand. However, empirically, the integration of logic and the regularity of rational numbers present in the verses of the Qur'an has not been widely acknowledged in mathematics education. This study aims to explore the integration of mathematical logic through rational numbers found in Q.S. Al-Baqarah and Q.S. An-Nisa. A descriptive method was employed, utilizing literature study research. The results indicate that verse 237 of Q.S. Al-Baqarah integrates mathematical logic with rational numbers, specifically in the context of dowry. Verses 11, 12, and 176 of Q.S. An-Nisa, which address inheritance division, also demonstrate this integration. The presence of mathematical logic related to rational numbers in the Qur'an implicitly contributes to the development of systematic thinking skills, which are essential for solving real-life problems. This integration serves as a rationale for modern mathematics education and strengthens numerical literacy and rationality among humanity.*

**Keywords:** *Integration of Mathematics in the Qur'an, Mathematical Logic, Qur'anic Verses, Rational Numbers*

### INTRODUCTION

The Qur'an, as a source of guidance for Islamic teachings, reveals the intellectual depth of various aspects of human life, including rational and mathematical dimensions. One form of rationality manifested in the Qur'an is the application of rational numbers,

which are expressed as ratios between two integers, such as  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ , and so on. These numbers are utilized in the context of inheritance laws, dowries, and the distribution of rights in various social relationships.

Rational numbers are also found in Surah Al-Baqarah, verse 237, which



regulates the restitution of dowries for women who are divorced before consummation of the marriage and when the dowry has not been definitively determined. In this verse, Allah mentions that the husband is obliged to provide half of the dowry that has been specified, unless the wife or her guardian forgives him. The phrase "half of the dowry that has been specified" clearly demonstrates the use of fractional numbers as a representation of justice and rationality in the resolution of marital conflicts.

In Surah An-Nisa, verses 11, 12, and 176, the Qur'an systematically regulates the distribution of inheritance to heirs using mathematical fractions such as  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{6}$ , and  $\frac{1}{8}$ . This elaboration represents a concrete application of mathematical logic in the context of social law. These verses not only contain numerical distribution but also require logical reasoning to understand and implement the system of *faraidh*, particularly when the number of heirs is large and the categories of rights vary.

According to Al-Faruqi (1982), Islam integrates revelation with reason, encouraging Muslims to develop knowledge based on divine teachings. This view is reinforced by Nasr's (1994) perspective, which emphasizes that knowledge in Islam is holistic and does not separate rationality from spirituality. In this context, the use of rational numbers in the Qur'an can be seen as an indication of the importance of logical thinking as a part of religious life.

The Qur'an not only provides a source of law but also contains knowledge; in fact, the Qur'an explains science and knowledge both implicitly and explicitly (Suriyanto, 2022). Al-

Ghazali supports this view in *Ihya Ulumuddin*, stating, "If someone seeks knowledge of the past and the future, they should contemplate the Qur'an" (Azhari, 2022). It is widely acknowledged that Islam highly values knowledge, as evidenced by several verses in the Qur'an that highlight the nobility and grandeur of knowledge (Yolanda Eka Putri & Wahyuni, 2023). Additionally, there is a hadith cited in the research by Prasetyo & Ahmad (2020), where the hadith narrated by Ibn Majah states, "Seeking knowledge is obligatory for both Muslim men and women." Therefore, due to their faith and elevated knowledge, humans are raised to the status of Allah's vicegerents. The Qur'an encompasses vast knowledge, including theology, ethics, sharia, and much more. Knowledge is defined as something gathered by humans through experience, feelings, information, or intuition.

Essentially, knowledge comes from Allah and will ultimately return to Him. The verses in the Qur'an and Hadith indicate that those who possess knowledge and apply it will receive respect from both humans and Allah SWT (Yolanda Eka Putri & Wahyuni, 2023). The knowledge that has been absorbed will, in essence, be processed in a way that fosters belief and confidence in the individual who receives it (Cahya & Ahmadi, 2020). One of these fields of knowledge is mathematics, as mathematical knowledge influences other branches of science. This aligns with the view of Nyoman (2022) that mathematics is a fundamental science that serves as a standard for the advancement of knowledge and technology.

Mathematics is one of the most important fields of knowledge for human life because it is interconnected with various other aspects. This aligns with the view of Atieq (2020), who asserts that mathematics is considered crucial for human life because it supports various aspects of life and is related to multiple sciences. Moreover, mathematics is regarded as the queen of sciences, or the supreme discipline, which is philosophically used by humans in daily life (Situngkir & Dewi, 2022). Ernest, as cited in Yolanda Eka Putri & Wahyuni (2023), states that mathematics is regarded as the language of humans, and that as a result of social construction processes, rules and conventions play a crucial role in constructing and validating mathematical truths.

The logic behind Galileo's statement that if mathematics is the language used to describe the wonders of the universe, and the language of God is the language of religion, can be concluded that understanding the wonders of the universe through mathematics and understanding mathematics through the language of religion is interconnected. In Islam, the Qur'an is written as the language of religion, a source of solace for the hearts of the devout Muslims, and a source of knowledge for people (Nasution, 2017). Mathematics is a field derived from philosophy, particularly arithmetic and logic. Therefore, the truth of mathematics is also related to the proof that philosophy is its origin. Furthermore, as stated by Hans Freudenthal in Ariyadi Wijaya, mathematics is part of human endeavor (Wijaya, 2012).

Mathematics is taught to enhance problem-solving,

communication, and reasoning skills, enabling students to confront any problem or situation in life (Abdussakir & Rosimanidar, 2020). Agustina (2019) states that "learning mathematics helps individuals understand mathematical concepts and develop critical thinking skills, thus linking the two aspects together." Moreover, mathematics is used in daily activities without us realizing it, even in the form of simple numbers and operations (Oktavia & Qudsiyah, 2023). Numerical operations are a crucial topic in mathematics (Yolanda Eka Putri & Wahyuni, 2023). Initially, mathematics was used merely for counting, but over time, some mathematics experts introduced more precise terms and symbols to represent numbers, making mathematics an essential aspect of human life in daily activities (Huda & Mutia, 2017). They believe that mathematics and the Qur'an are closely connected to real life, much like realistic mathematics, which is an approach that links mathematics to the real world (Yolanda Eka Putri & Wahyuni, 2023).

In mathematics and many other branches of science, numbers are the foundation or core of calculations (Nasution, 2017). In the Qur'an, there are rewards and threats of hell based on the calculation of sins. Through a meticulous process of calculation, Allah offers humans a choice between these two options. It is possible that Allah has interpreted the value of calculation in the Qur'an. Therefore, further investigation is carried out on the concepts of calculation in the Qur'an and how they relate to religious values that can be understood by Muslims.

The authors limit their analysis of the concept of numbers in the Qur'an to the set of integers and fractions, specifically rational numbers. The authors study the set of integers, including natural numbers, whole numbers, prime numbers, composite numbers, odd numbers, and even numbers. Therefore, the authors employ the concept of prime number applications, such as the number pattern 19 and the concept of twin prime numbers, to demonstrate that numbers belong to the subset of rational numbers, indicating that the position of revelation and knowledge are integrated with one another.

Numbers and figures are the foundation of calculations. They allow us to measure the passage of time and draw accurate conclusions that humans must fill their time with meaningful activities, as mentioned in the Qur'an in Surah Al-'Asr, verses 1-3, which means: "By time. Indeed, mankind is in loss. Except for those who have believed and done righteous deeds and advised each other to truth and advised each other to patience" (Qur'an, Surah Al-'Asr, 1-3) (DEPAG RI, 2010).

Another foundation for this article is previous research that serves as inspiration, including: 1) "Exploration of Mathematical Number Concepts in Surah Al-Baqarah," which discusses prime numbers, the concept of integer operations, and number patterns (Yolanda Eka Putri & Wahyuni, 2023); 2) "Integration of Mathematical Operation Concepts in the Qur'an," which examines mathematical operations in the Qur'an, including addition in Surah Al-A'raf, verse 142, subtraction in Surah Al-Muzzamil, verses 3-4, multiplication in Surah Al-Baqarah, verse 261, and

division in Surah Al-Muzzamil, verse 20 (Cahya & Ahmadi, 2020); 3) "Mathematics Learning Through the Perspective of Qur'anic Verses," which discusses the concept of mathematics in the Qur'an, highlighting numerous verses explaining mathematical concepts such as integers, sets, ratios, whole numbers, circles, speed, distance, time, number patterns, and sequences (Azizah et al., 2023); 4) "Mathematical Concepts from the Qur'anic Perspective," which discusses verses on mathematics explaining concepts such as sequences, whole numbers, fractions, and circles (Soimah & Fitriana, 2020). However, none of the previous studies has addressed the topic of rational numbers in Surah Al-Baqarah and Surah An-Nisa.

In the Qur'an, Allah SWT states that the sky has seven layers. The creation of these seven heavens can be linked to significant prophetic events such as the Isra' and Mi'raj and the revelation of divine messages. This may represent a mathematical secret that is unknown to us. Furthermore, the Qur'an has numerous connections with mathematics, containing many mathematical secrets, which will certainly be explained in this paper, particularly in Surah Al-Baqarah and Surah An-Nisa.

Thus, the study of Qur'anic verses that contain mathematical logic in relation to rational numbers offers a significant opportunity to understand that mathematics is not merely an exact science, but also encompasses ethical and spiritual dimensions that can enrich the process of education and character development. The aim of this research is to identify the verses in Surah Al-Baqarah and Surah An-Nisa

that contain the concepts of mathematical logic and the order of rational numbers, either directly or through interpretation.

### **METHOD**

This research uses a descriptive method, specifically a literature study, to investigate and collect data and information from various sources, including journal articles, the Qur'an, Tafsir Ibnu Kathir, and books. Through theoretical analysis, references, and other scholarly literature, the primary source of this research is derived from academic works discussing mathematics in the Qur'an. These sources are reinforced and supported by relevant or secondary data from various books or other sources by different authors that discuss mathematics in the Qur'an, particularly in the study of Surah Al-Baqarah and Surah An-Nisa, which contain concepts of mathematical logic with rational numbers. This analysis combines, compares, and selects appropriate supporting sources.

### **RESULT AND DISCUSSION**

Logic is a branch of philosophy that studies principles, foundations, laws, and how to acquire knowledge in a logical and correct manner (Sobur, 2015). Logic is essential in the thinking process because reasoning about something needs to be assessed for its truth value. According to Nirfayanti et al. (2022), "One of the important skills in learning mathematics is reasoning, which must be learned as it is a sign of the improvement of quality human resources." Furthermore, the role of reasoning becomes very interesting and important, and it must be studied further to form the foundation for other thinking processes (Mutia et al., 2022).

Therefore, the study of logical reasoning is crucial.

In mathematics, there is an important concept of logic because the process of searching for truth is based on specific truths that must be tested to reach a general conclusion (Juhaevah, 2021). Mathematics, which studies quantity, structure, space, and change, involves the development and application of concepts such as patterns, space, structure, and other related concepts, including numbers (Jannah & Hayati, 2024). Numbers in mathematics are divided into several set concepts. This statement was made by Amir & Prasajo (2017), where sets of numbers contain the most important concepts for further mathematics, including the set of natural numbers, whole numbers, integers, rational numbers, irrational numbers, and real numbers. This research focuses on rational numbers as any number that can be written as a fraction and can be written as a terminating or repeating decimal (Walle, 2008). Rational numbers in the Qur'an are not widely studied, and the fact that the concept of numbers existed in the Qur'an even before prominent mathematicians discovered and created them. This study will ultimately prove the greatness of Allah (Mas'ud, 2011).

Mathematical logic is related to the Qur'an, as concluded by Febiani et al. (2024), who stated that the Qur'an provides the foundation for mathematical logic. Thus, both mathematical logic and the Qur'an can be integrated. Integration involves combining two elements into a single learning process (Imamuddin & Isnaniah, 2023). Additionally, integration can involve uniting various contexts into a cohesive and complete

whole (Permana et al., 2022). If this integration context is linked with the verses of the Qur'an, it means aligning a particular science with the Qur'anic verses. This is in line with Anggriani's (2023) view that integrating knowledge with the verses of the Qur'an is essential.

The integration of mathematics and the Qur'an has several models, including: 1) Mathematics from the Qur'an; 2) Mathematics for the Qur'an; 3) Mathematics to the Qur'an; and 4) Mathematics with the Qur'an (Abdussakir & Rosimanidar, 2017). Among these models, this research uses the model of integration \*mathematics from the Qur'an\*, which means the research topic, namely the concept of mathematical logic in relation to rational numbers, will be derived from the Qur'anic verses, specifically Surah Al-Baqarah and Surah An-Nisa, using the Tafsir of Ibn Kathir.

#### **A. Rational Numbers and Mathematical Logic in Surah Al-Baqarah**

Based on the examination of Surah Al-Baqarah, which contains 286 verses, one verse was found that includes elements of rational numbers and mathematical logic, namely in Surah Al-Baqarah, verse 237:

Surah Al-Baqarah, Verse 237:

إِنْ طَلَّقْتُمُوهُنَّ مِنْ قَبْلِ أَنْ تَمْسُوهُنَّ وَقَدْ فَرَضْتُمْ لَهُنَّ فَرِيضَةً فَنِصْفُ مَا رَضَيْتُمْ إِلَّا أَنْ يَعْفُوَنَّ أَوْ يُعْفُوا الَّذِي بِيَدِهِ عُقْدَةُ النِّكَاحِ وَأَنْ تَعْفُوا أَقْرَبُ شَفَؤًى وَلَا تَنْسُوا الْفَضْلَ بَيْنَكُمْ إِنَّ اللَّهَ بِمَا تَعْمَلُونَ بَصِيرٌ ﴿٢٣٧﴾

**Figure 1.** Surah Al-Baqarah, verse 237:

"If you divorce them before you have touched them, and you have specified

for them a dowry, then pay half of what you had specified, unless they forgive or the one in whose hand is the marriage contract forgives. Your forgiveness is closer to righteousness. And do not forget graciousness between you. Indeed, Allah is Seeing of what you do." (Al-Baqarah, 2:237)

According to Ibn Kathir's tafsir (Isma'il & Ad-Dimasyqi, 2000), Surah Al-Baqarah, verse 237 indicates that this verse is a proof of the specificity of mut'ah (provision) as shown in the preceding verse, as this verse only obligates half (1/2) of the specified dowry to be paid if a husband divorces his wife before consummating the marriage. If there were other obligations related to mut'ah, Allah would have explained them clearly, especially since this verse follows the previous one, which limits the issue of mut'ah. Based on this tafsir explanation, the rational number in verse 237 refers to the ordinal number  $\frac{1}{2}$ , indicating the obligation to pay the dowry when a husband divorces his wife before consummating the marriage.

This verse contains elements of mathematical logic, particularly implications, which can be found in the beginning portion of the verse. The implication is present in the phrase "If you divorce them before you have touched them, and you have specified for them a dowry, then pay half of what you had specified..." where two clauses begin with the word 'if' and are connected with the word 'then.' Additionally, there is a disjunction with the word 'or' in the phrase "...except if they or the one in whose hand is the marriage contract forgives." Lastly, mathematical logic in the form of negation is found in the phrase

"...Do not forget graciousness between you..."

The explanation provided shows that in Surah Al-Baqarah, the verse that is related to rational numbers and mathematical logic is only verse 237, which explains the dowry that must be paid if a husband has not yet consummated the marriage with his wife but has already set the dowry. The husband is required to pay half ( $\frac{1}{2}$ ) of the specified dowry. The rational number found is of the ordinal type, and there is only one rational number, which is  $\frac{1}{2}$ . However, the mathematical logic found in Surah Al-Baqarah, verse 237, includes three types: implication, disjunction, and negation.

## B. Rational Numbers in Surah An-Nisa

Based on the search in Surah An-Nisa, which contains 176 verses, 1 verse was found that contains elements of rational numbers and mathematical logic. Some of the verses are:

### Surah An-Nisa, verse 11:

يُوصِيكُمُ اللَّهُ فِي أَوْلَادِكُمُ لِلذَّكَرِ مِثْلُ حَظِّ الْأُنثَيَيْنِ فَإِنْ كُنَّ نِسَاءً فَوْقَ اثْنَتَيْنِ فَلَهُنَّ ثُلُثَا مَا تَرَكَ وَإِنْ كَانَتْ وَاحِدَةً فَلَهَا النِّصْفُ وَلِأَبَوَيْهِ لِكُلِّ وَاحِدٍ مِمَّنْهَا الشُّدُسُ مِمَّا تَرَكَ إِنْ كَانَ لَهُ وَلَدٌ فَإِنْ لَمْ يَكُنْ لَهُ وَلَدٌ وَوَرِثَتْهُ أَبَوُهُ فَلِلْأُمِّهِ الثُّلُثُ فَإِنْ كَانَ لَهُ إِخْوَةٌ فَلِلْأُمِّهِ الشُّدُسُ مِنْ بَعْدِ وَصِيَّةٍ يُوصِي بِهَا أَوْ دَيْنٍ آبَاؤُكُمْ وَأَبْنَاؤُكُمْ لَا تَدْرُونَ أَيُّهُمْ أَقْرَبُ لَكُمْ نَفَعًا فَرِيضَةٌ مِنَ اللَّهِ إِنَّ اللَّهَ كَانَ عَلِيمًا حَكِيمًا

### Figure 2. Surah An-Nisa, verse 11:

"Allah has decreed for you regarding your children: the share of a male is like the share of two females. If there are only daughters, more than two, they share two-thirds of what the deceased left. If there is only one daughter, she gets half. For the parents, each has a sixth of what the deceased leaves if the deceased has children. If

the deceased has no children and only the parents inherit, then the mother gets a third. If the deceased has siblings, the mother gets a sixth. This is after any bequest that the deceased made or any debt that needs to be paid. (As for) your parents and your children, you do not know who is more beneficial to you. This is an ordinance from Allah. Indeed, Allah is All-Knowing, All-Wise."

### Surah An-Nisa, verse 12

وَلَكُمْ نِصْفُ مَا تَرَكَ أَزْوَاجُكُمْ إِنْ لَمْ يَكُنْ لَهُنَّ وَلَدٌ فَإِنْ كَانَ لَهُنَّ وَلَدٌ فَلَكُمْ الرُّبُعُ مِمَّا تَرَكَنَّ مِنْ بَعْدِ وَصِيَّةٍ يُوصِي بِهَا أَوْ دَيْنٍ وَلَهُنَّ الرُّبُعُ مِمَّا تَرَكَنَّ إِنْ لَمْ يَكُنْ لَكُمْ وَلَدٌ فَإِنْ كَانَ لَكُمْ وَلَدٌ فَلَهُنَّ الثُّمُنُ مِمَّا تَرَكَنَّ مِنْ بَعْدِ وَصِيَّةٍ يُوصِي بِهَا أَوْ دَيْنٍ وَإِنْ كَانَ رَجُلٌ يُورَثُ كَلَالَةً أَوْ امْرَأَةٌ وَلَهُ أَخٌ أَوْ أُخْتُ فَلِكُلِّ وَاحِدٍ مِمَّنْهُمَا الشُّدُسُ فَإِنْ كَانُوا أَكْثَرَ مِنْ ذَلِكَ فَهُمْ شُرَكَاءُ فِي الثُّلُثِ مِنْ بَعْدِ وَصِيَّةٍ يُوصِي بِهَا أَوْ دَيْنٍ غَيْرَ مُضَارٍّ وَصِيَّةٌ مِنَ اللَّهِ وَاللَّهُ عَلِيمٌ حَلِيمٌ

### Figure 3. Surah An-Nisa, verse 12:

"To you (husbands) is half of what your wives leave if they have no children. But if they have children, you get a quarter of what they leave after any bequest they made or any debts they owe. For them (wives) is a quarter of what you leave if you have no children. If you have children, for them is one-eighth of what you leave after any bequest you made or debts you owe. If a person, whether male or female, dies and leaves no father or children, but has a brother or sister from the same mother, each of them gets one-sixth of the inheritance. But if there are more than one of these (siblings from the same mother), they share one-third of the inheritance, after any bequest made or debts paid, without causing harm to the heirs. Such is the command of Allah. Allah is All-Knowing, Most Forbearing."



Surah An-Nisa, verse 176

سَمِعْتُمْ نَكَ قُلِ اللَّهُ يُفْتِيكُمْ فِي الْكَلَالَةِ إِنْ امْرُؤٌ هَلَكَ لَيْسَ لَهُ وَلَدٌ وَلَهُ أُخْتُ  
فَإِذَا كَانَ لِأَخِيهِ وَلَدٌ فَإِنْ كَانَ لَهَا وَلَدٌ فَإِنْ كَانَتْ ابْنَتَيْنِ فَلَهُمَا  
ثُلُثُ مِمَّا تَرَكَ وَإِنْ كَانُوا إِخْوَةً رَجُلًا وَنِسَاءً فَلِلَّذَكَرِ مِثْلُ حِظِّ الْأُنثَيَيْنِ يُبَيِّنُ  
لَكُمْ أَنْ تَصِلُوا إِلَى اللَّهِ بِكُلِّ شَيْءٍ عَلِيمٌ

**Figure 4.** Surah An-Nisa, verse 176:

"They ask you for a legal verdict regarding kalaalah. Say, 'Allah gives you the verdict concerning kalaalah: If a man dies and leaves no children but has a sister, her share is half of what he leaves. If he has a brother, the brother inherits the whole estate of the deceased, if the deceased has no children. But if the deceased has two sisters, they share two-thirds of what he leaves. If the heirs are a mixture of brothers and sisters, the share of a brother is equal to that of two sisters. Allah makes clear His rulings to you so that you do not go astray. Allah is All-Knowing of everything."

From the above verses, there are rational numbers, including:

**Table 1.** The continuity of surah An-Nisa with rational numbers

Verses in Surah An-Nisa	Rational Numbers
Verse 11	$\frac{1}{2}$ , $\frac{1}{3}$ , $\frac{1}{6}$ , and $\frac{2}{3}$
Verse 12	$\frac{1}{2}$ , $\frac{1}{3}$ , $\frac{1}{4}$ , $\frac{1}{6}$ , and $\frac{1}{8}$
Verse 176	$\frac{1}{2}$ and $\frac{2}{3}$

According to Tafsir Ibn Kathir (Isma'il & Ad-Dimasyqi, 2000), it is mentioned that these three verses are interconnected as they discuss the science of inheritance (fara'idh). On page 477 of the book "Tafsir Ibn Kathir

Juz 4", after the translation of Q.S. An-Nisa verse 11, it is stated: "This noble verse, the one following it, and the verse concluding this chapter, all of them are verses that discuss the science of inheritance. The science of inheritance is detailed in these three verses, and the hadiths that explain them serve as the interpretation of these verses." Therefore, these three verses are closely related to each other in their interpretation.

The three verses contain elements of mathematical logic. Starting with Q.S. An-Nisa verse 11, there is an implication in the phrase "...If all the children are girls and their number exceeds two, their share is two-thirds of the inheritance...", "...If she (the daughter) is the only child, she receives half (of the inheritance)...", "...If she (the deceased) has no children and is inherited only by her parents, the mother receives one-third...", and "...If she (the deceased) has several siblings, the mother receives one-sixth...". In these fragments, there are two sentences beginning with the word 'if', although without the word 'then', the meaning of the first sentence implies the second sentence. Next, there is a mathematical logic of conjunction because of the word 'and' in the phrase "... (Regarding) your parents and children...", and disjunction in the phrase "... (The inheritance is divided) after (fulfilling) the will made by him or (and settling) his debts...", where the word 'or' is used. Additionally, there is a negation with the word 'not' in the translation of the verse in the phrases "... he has no children..." and "... you do not know who among them is more beneficial to you...".



Next, in Q.S. An-Nisa verse 12, there is mathematical logic, including implication. The implication in this verse is present in the translation of the verse: "...If they (your wives) have children, you get one-quarter of the inheritance after (fulfilling) the will they made or (and after paying) their debts...", "...If you have children, they (the wives) get one-eighth of the inheritance you leave (after fulfilling) the will you made or (and after paying) your debts...", "...If someone, whether male or female, dies without leaving a father or children, but has a brother (from the same mother) or a sister (from the same mother), each of these siblings receives one-sixth of the inheritance...", and "...if they (the maternal siblings) are more than one, they share one-third of the inheritance...". These sentence fragments share the same characteristics as the implication in the previous verse, where there are two sentences that begin with the word 'if', even though the word 'then' is not used.

In Q.S. An-Nisa verse 12, there are additional elements of mathematical logic, namely disjunction and negation. The disjunction is found in the translation of the verse, which states: "...after (fulfilling) the will they made or (and after paying) their debts..." and in the sentence "...having a brother (from the same mother) or a sister (from the same mother)..." because there are two clauses connected by the word 'or'. Additionally, negation is present in the verse with the phrases "...they do not have children..." and "...you do not have children..." due to the use of the word 'not' in both of these sentences.

Finally, in Q.S. An-Nisa verse 176, there are elements of mathematical logic, including implication, conjunction, and negation. The implication in this verse is found in several parts of the verse translation, such as "...if someone dies and has no children, but has a sister, her share (of the inheritance) is half of the property left..." and "...if there are two sisters, they together receive two-thirds of the inheritance left..." and "...if the heirs consist of several male and female siblings, the share of a male sibling is equal to that of two female siblings..." In these fragments, there is a characteristic similar to the previous two verses, where two clauses are preceded by the word 'if', even though the word 'then' is not present.

In Q.S. An-Nisa verse 176, there is also an element of mathematical logic in the form of conjunction, where the word 'and' appears in the translation of the verse, as seen in the phrase "...if someone dies and has no children...". Lastly, the verse contains an element of negation, where the word 'not' appears in the translation of Q.S. An-Nisa verse 176 in the phrases "...he has no children..." and "...you will not go astray...".

The explanation provided shows that in Q.S. An-Nisa, which is related to rational numbers and mathematical logic, there are three verses: verse 11, verse 12, and verse 176, which discuss the science of Faraidh, or the science of inheritance distribution. The rational numbers identified are of the ordinal type, with six rational numbers found across the three verses: 12, 13, 14, 16, 18, and 23. Additionally, mathematical logic is present in Q.S. An-Nisa verses 11, 12, and 176, containing four types:

implication, conjunction, disjunction, and negation.

This study found that the integration of mathematical logic in the Qur'an can serve as an alternative solution for understanding rational numbers, such as in the payment of mahr (dowry) by a husband to his wife whom he has divorced but not yet consummated, as found in Q.S. Al-Baqarah verse 237, and in inheritance law (Ilmu Faraidh) in Q.S. An-Nisa verses 11, 12, and 176. This research also teaches us that mathematics is a discipline closely related to daily life, and its scope is broad, allowing it to integrate with other fields of knowledge, including the science of the Qur'an. This further affirms that mathematics is inseparable from other disciplines.

## CONCLUSION

There are verses in Q.S. Al-Baqarah and Q.S. An-Nisa that integrate mathematical logic corresponding to rational numbers, which are expressed as fractions, and involve mathematical logic types such as implication, conjunction, disjunction, and negation. In Q.S. Al-Baqarah, the verse that integrates rational numbers with mathematical logic is verse 237, which discusses mahr. The rational number found in this verse is  $\frac{1}{2}$ , and the integrated mathematical logic includes implication, disjunction, and negation. In Q.S. An-Nisa, the verses that integrate rational numbers with mathematical logic are verses 11, 12, and 176, which discuss the science of inheritance (ilmu mawaris). The rational numbers found in these verses are  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{6}$ ,  $\frac{1}{8}$ , and  $\frac{2}{3}$ , and the

integrated mathematical logic includes implication, conjunction, disjunction, and negation. This demonstrates the integration of mathematical logic related to rational numbers in the Qur'an, affirming the presence of mathematical knowledge within the Qur'an.

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