Mathematical Elements and Concepts in the Quran

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Abstract
Ethnomathematics encompasses mathematical practices within cultural groups, reflecting shared experiences, customs, and interests. This study focuses on the Muslim cultural group, characterized by adherence to the Quran as a guiding text, shaping their lifestyle and regulations. The research aims to elucidate mathematical elements and concepts present in the Quran, employing an exploratory methodology. Through the identification and evaluation of Quranic verses, the study reveals numerous mathematical concepts, including arithmetic operations, ratios, temporal measurements, spatial dimensions, and directional bearings. These mathematical elements manifest in diverse contexts within the Quran, such as the computation of rewards, distribution of inheritance, determination of the qibla direction, calendrical calculations based on solar and lunar cycles, and the temporal perspective concerning worldly life versus the hereafter. The findings offer valuable insights for educational purposes, suggesting the Quran as a rich resource for enhancing students' mathematical understanding. Integrating Islamic teachings and values into education can be effectively achieved through contextual and discovery-oriented approaches, utilizing the Quran as a foundational text.

Keywords: Al-Quran, Concepts, Ethnomathematics, Islamic Knowledge, Mathematics Elements

Introduction

In mathematical education, D'Ambrosio (1985) defined ethnomathematics as mathematics that is practiced among identifiable cultural groups. Ethnomathematics is a mathematics that is practiced by a cultural group that has the same or shares similar experiences, practices, and interests. Several research on mathematical elements, concepts, and practices by specific cultural groups were carried out regarding traditional arts and crafts such as motives design in textiles, mats, traditional games, and many others (Maidinsah et al., 2021; Afiqah, 2019).

In this study, the cultural group under investigation is defined as Muslims, who regard the Quran as their primary reference and guiding principle in life. Wan Bakar (2011) elucidates the historical significance of mathematics within Islam, portraying it as an ancient wisdom disseminated to both the Eastern and Western realms through divine revelation, perceived as a gift from God to His followers. Mathematics holds profound importance among Arabic communities, serving as a fundamental reservoir of knowledge crucial for various endeavors, including commerce, estate management, and more. Moreover, the utilization of mathematics predates and permeates Prophet Muhammad's era, being applied in realms such as commerce, warfare, and architectural endeavors. This mathematical legacy proliferated globally during the Islamic Golden Age, spanning from the 7th to the 13th centuries CE.

The Holy Quran

The Quran is the last words of Allah that were verbally revealed by Him to the final prophet, Muhammad (peace be upon him, pbuh), through the angel Jibril, and it is as a miracle that proves the apostleship of the Prophet Muhammad (pbuh) and the existence of Allah SWT. The Quran guides every aspect of human life, such as in the economics and ethics of trade, marriage and divorce, gender issues, inheritance, and parenting. It is the primary reference for Muslims and is used with the Sunnah of the Prophet. The Quran's message is universal and eternal regardless of race, color, ethnicity, and nationality.

The Quran is the whole of knowledge, including mathematics. The Quran is the only book that everyone can use as a reference to find truth and justice because the contents of the Quran are perfect, intact, and universal and cannot be changed. Knowledge of the Quran covers all aspects, including science, mathematics, agriculture, society, nation, marriage, humanities, business, and leadership. Specifically, knowledge of mathematics can be extracted from the Quran relating to mathematical concepts such as the regulation of the lunar calendar and the timing of the five daily prayers, the determination of the direction of the Qibla, the distribution of inheritance, and the geometrics of Islamic decorative art (Awan, 2009).

A Surah represents a chapter in the Quran. The surahs were revealed over a period of 23 years, and every surah has its own name, story, character, and chronology. The total number of surahs in the Quran is 114 surahs, and the order of the verses in each surah is according to the provisions that Allah has set and taught by the Prophet Muhammad. The Surahs in the Quran have been classified into several characteristic categories, namely, place of revelation and their length. The surah has many applications in human life, including in terms of economics, politics, wealth, and many more. Some of the verses contain the language of mathematics related to fractions, measurements of time, distance, quantifiers, logic, direction, classification (set), and many more. Every surah in the Quran has its own stories, guidance, and specialty. Surah is an Arabic word that represents the chapter in the Quran. For instance, surah An-Nisaa narrates the distribution of inheritance. Surah Hud verses 83 to 85 mention measurement and weighing in business transactions. The verses are about Prophet Shuib, who preached to his people to measure and weigh fairly to their customers and that they will benefit with more prosperity later. Hence, mathematics is universal and is used comprehensively by Muslims in all aspects.

Concepts of Mathematics

A mathematics concept is the general idea of mathematics. Knowing a mathematics concept means understanding the reasons behind the answers to the mathematical problem. Reid et al. (2003) identified that the conceptions of mathematics are in three hierarchies. Mathematics is presented as a toolbox of individual components and procedures at the narrowest level. At the intermediate level, the

focus is on the models built and used to explain the actual situation; at the broadest level, mathematics is a method of life and thought. Students have a spectrum of conceptions between fragmented and cohesive. Fragmented conceptions are characterized as limited awareness of a phenomenon. Cohesive conceptions are characterized by a more inclusive, complex, and complete understanding of a phenomenon.

Some of the mathematics concepts, such as measurement and geometry, can be found in the Quran. Measurement is a method to determine the value of physical quantities that consist of base quantities. A base quantity is a physical quantity that cannot be derived from another physical quantity. Bearing is the angle in degrees measured clockwise from north, which is a clockwise angular between two distance planes (EduwebTV, 2015). Every Muslim is required to perform prayers five times a day, and one of the pillars of prayer is facing the Qibla. The concept of bearing can be applied to determine the qibla from a specific location by observing the shadow of a vertical rod on twice-yearly occasions once the sun is directly overhead.

However, the Qibla is not only used for prayer but also the burial of the dead, slaughtered animals, and sleep are interred facing Mecca (Britannica, 2020). In determining the direction of the qibla, not only can the concept of bearing be used, but the concepts of geometry, trigonometry, and spheres are also used in calculating the direction of the qibla (Awan, 2009). The topic of coordinate geometry can be found in the Form Five mathematics syllabus (Ng et al., 2020). In mathematics, coordinates are the values of x and y (x,y) used to determine a point's position in a line in the plane.

Many Quran verses related to mathematics can be systematically explored and elaborated. Besides reading the translation and understanding the content of the Quran, Muslim educators at university or school levels could further try to extract the mathematics language in it. Some efforts are needed to clearly explain the concepts of mathematics which are implicitly embedded in the Quran. Hence, an alternative approach to redesigning some of the mathematics learning materials for schools' syllabi can be considered. This research intends to lay a basic and creative strategy for Muslim students to learn and understand mathematics. It encourages them to explore the knowledge in the Quran in relation to mathematics from various angles.

Hence, this research aims to identify elements and concepts of mathematics in the Quran and evaluate the mathematical application of the concepts. The project's significance is to understand the specific contents of the Quran's verses mathematically and discover the rules and regulations prescribed in the Quran in a meaningful and contextual way. This research explored elements and concepts of mathematics, which are limited to numbers, operation of arithmetic, ratios, and measurement.

Methods

This research used an exploration or discovery approach. The exploration of verses that contain mathematics elements, which have some words and meanings related to numbers, arithmetic operations, measurement, and geometry elements, were analyzed. Two approaches were used to select verses.

Step 1: Find any number mentioned in a particular verse.

Example 1: "And built above seven mighty heavens." from surah An-Naba' verse 12 (78:12)

Step 2: Find mathematical concepts in specific words.

Example 2: Arithmetic operations such as addition, multiplication and division, fractions, ratio, and geometrical elements which are related and associated with the syllabus in school mathematics:

a) Fraction/division: Distributing a group of things into equal components. It is one of the four basic operations of arithmetic. It determines the distribution of certain entities in terms of percentage and ratio to be shared. In the Quran, the division concept can be extracted from Surah An-Nisaa' verse 11 (4:11).

b) Increment/ increasing: It can be in the form of multiplication, such as stated in surah Al-Baqarah (2:261), which shows the advantage of giving some alms.

Geometry and measurement concepts are discussed further in the results and discussion section.

Results and Discussions

The results and discussion for the Quran verses, which contain several mathematics elements and concepts of mathematics, are explained as follows:

Numbers

Several verses in the Quran mention numbers, as listed in Table 1. From the numbers mentioned in the verses, descriptions and illustrations of the meaning can be explained in more detail. In verse seven in Al-Waqiah, you will all be divided into three groups. Hence, one can read the following verses to learn more out of curiosity. The three groups of people are (1) right, who will be blessed by Allah (2) left, who will be miserable; and (3) foremost in faith, who will be the foremost in Paradise. To understand the three groups' characteristics and why the verses are being revealed, one must learn through tafsir and tadabbur of the Quran with their teachers. The same goes for other explanations and meanings of the numbers mentioned in the Quran.

Table 1. List of numbers occurs in several verses in the Quran

No	Verse	Surah (no: verse)	Quantity/ position
1	How long have you remained ˹in this state˺?" He replied, "Perhaps **a day** or **half of a day**." Allah said, "No! You have remained here for **a hundred years**!	Al-Baqarah (2:259)	1, ½ , 100
2	Surely your Lord is Allah Who created the heavens and the earth in six days	Yunus (10:3)	6
3	(Of these stories mention) when Yusuf said to his father. O my father, indeed I have seen (in a dream) **eleven** stars and **the sun** and **the moon**; I saw them prostrating me.	Yusuf (12:4)	11, 1
4	They had remained in their cave for **three hundred** years, adding **nine**."	Al-Kahf (18: 25)	300, 9
5	Some will say, "They were **three**, their dog was the **fourth**," while others will say, "They were **five**, their dog was the **sixth**," ˹only˺ guessing blindly. And others will say, "They were **seven** and their dog was the **eighth**."	Al-Kahf (18: 22)	3, 4th , 5, 6th ,7 , 8th
6	O Prophet˺ an example of **two** men. To the disbelieving one, We gave **two** gardens of grapevines, which We surrounded with palm trees and placed ˹various˺ crops in between.	Al-Kahf (18: 32)	2
7	"And We sent him to (his people of) **a hundred thousand** or more."	As-Saffat: (37:147)	100000
8	And below these **two** 'Gardens' will be **two** others.	Ar-Rahman (55:62)	2
9	In each will be **two** gushing springs.	Ar-Rahman (55:66)	2
10	In the **two** 'Gardens' will be fruit, palm trees, and pomegranates.	Ar-Rahman (55:68)	2
11	He will grant you a **double** share of His mercy, provide you with a light to walk in on Judgment Day, and forgive you.	Al-Hadid (57: 28)	2
12	you will all be divided into **three** groups	Al-Waqiah (56:7)	3
13	If **three** converse privately, He is their **fourth**. If **five**, He is their **sixth**. Whether fewer or more, He is with them wherever they may be.	Al_Mujadalah (58:7)	3, 4th, 5, 6th
14	then tie them up with chains **seventy** arms long	Al-Haqqah (69:32)	70
15	It is overseen by **nineteen** keepers.	Al-Muddathir (74:30)	19
16	And built above **seven** mighty 'heavens'.	An-Naba (78:12)	7

17	On the Day the blast (of the Horn) will convulse (creation). Followed by a **second** Blast.	An-Nazi'at (79:6-7)	1st and 2nd
18	But indeed, it will take only **one** ˈmightyˈ Blast,	An-Nazi'at (79:13)	1
19	And the **ten** nights. And the **even** and the **odd**.	Al-Fajr (89: 2-3)	10, odd, even numbers
20	The Night of Glory is better than **a thousand** months.	Al-Qadr (97:3)	1000

Arithmetic Operations

The arithmetic operations discussed are multiplication, division, and subtraction.

Multiplication

In the Quran, Allah, the creator, stated that if someone gives alms to others in need, they will get multiple rewards in return (Figure 1). In verse, the word 'multiplies' means that Muslims can get many rewards if they perform the act. From the verse in Surah Al-Baqarah (2:261), certain words relate to the mathematics concepts of multiplication.

The example of those who spend in the way of Allah is just like a grain that produced seven ears, each ear having a hundred grains, and Allah multiplies (the reward) for whom He will. Allah is All-Embracing, All-Knowing. The mathematical sentence is 1 grain x 7 ears x 100 grains = 700 grains. Hence, supposed that a Muslim donated RM200, the amount of reward is calculated as 200 x 7 x 100 = RM140,000 (in terms of rewards, maybe in other forms)

Division and Fraction

Fraction is related to the mathematical concept of division. Its application can be found in the distribution of heritage in the Quran, which is called 'Faraid.' In the Quran, the distribution of heritage in surah An-Nisaa's verses 7, 11, and 12 ensures that everyone in the family gets their rights fairly. This concept is related to fractions because it uses ratios to distribute heritage. From what is left by parents and those nearest related, there is a share for men and a share for women, whether the property be small or large, a determinate share (An-Nisaa' 4:7).

In the verse, the concept of division is applied in the distribution of the heritage after a family member passes away. This law will ensure justice for everyone in the family. They will get their respective rights based on the will that has been made by the deceased. The concept of ratio can also be used in the distribution of heritage matter as it is like the concept of division. Ratio can be defined as the comparison between two quantities of the same kind by division process. In other words, a ratio is a number that can be used to express an amount as a fraction of the other ones.

Allah directs you concerning your children: for a male, there is a share equal to that of two females.

But if they are (only) women, more than two, then they get two-thirds of what one leaves behind. If she is one, she gets one-half. As for his parents, for each of them, there is one-sixth of what he leaves in case he has a child. But if he has no child and his parents have inherited him, then his mother gets one-third. If he has some brothers (or sisters), his mother gets one-sixth, all after (settling) the will he might have made or a debt. You do not know who, out of your fathers and your sons, is closer to you in benefiting (you). Allah determines all this. Indeed, Allah is All-Knowing, All-Wise. (An-Nisaa' 4:11)

The distribution for a mother and father with or without children is described in Table 2. For you, there is one-half of what your wives leave behind in case they have no child. But if they have a child, you get one-fourth of what they go after (settling) the will you might have made or a debt. For them (the wives), there is one-fourth of what you leave behind if you have no child. But if they have a child, they get one-eighth of what you go after (settling) the will you might have made or a debt. And if a man or a woman is Kalalah (has neither parents alive nor children) and has a brother or a sister, then each one of them will get one-sixth. However, if they are more than that, they will be sharers in one-third, after (settling) the will that might have been made or debt, provided that the will must not be intended to harm anyone. This is a direction from Allah. Allah is All-Knowing and forbearing (An-Nisaa' 4:12).

Table 2. Distribution of wealth for a wife or a husband when one of them passed away (Maidinsah, 2021)

Person	The Distribution
Ibu ⅓ ⅙ mother	Verse: *For parents, a <u>sixth</u> share of the inheritance to each, if the deceased left children; if no children, and the parents are the (only) heirs, the mother has a <u>third</u>, if the deceased Left brothers (or sisters) the mother has a <u>sixth</u>....* Explanation: • With children: parents will get 1/6 share. • No children: the mother will get 1/3 share if the parents are the only heirs • With brothers or sisters: the mother will get 1/3 share
Bapa ⅙ father	Verse: *For parents, a <u>sixth</u> share of the inheritance to each, if the deceased left children* Explanation: • the father will get 1/6 share if the deceased have children

The verses can be explained in an example, such as in the following situation: Siti is a single parent. She has two sons, and her parents-in-law are still alive. The amount of RM200,000 is to be distributed according to the given formula. From Table 3, Siti gets 1/8 share, which is RM25,000. Her parents-in-law

get 1/6 each because Siti has two sons, and the price is RM33,333.33. At the same time, her sons get the remaining heritage and divide equally. For this case, each of them acquires 13/48, which is RM54,166.67.

Table 3. Distribution of heritage in Siti's family

Relative	Shared Distribution		Shared Percentage
Wife	1/8	6/48	12.5
Father	1/6	8/48	16.67
Mother	1/6	8/48	16.67
Son 1	Asobah (remaining)	13/48	27.08
Son 2	Asobah (remaining)	13/48	27.08

The calculation can also be done through the Faraid calculator, which can be accessed from the e-Faraid link (n.d.). The calculator gives guidelines and educates Muslims in wealth or heritage distribution according to Islamic law.

Subtraction

The concept of subtraction can be found in the story of the Battle of Badr on the 17th of Ramadhan in the year 2nd Hijrah (Shihabudin, 2011). Surah Al-Imran:123 stated that the Muslims won the battle despite having fewer numbers and lacking weapons. Allah had helped you at Badr, when ye were a contemptible little force; then fear Allah. Thus, May ye show your gratitude. The lesson learned from the Battle of Badr, the Quraish had a force of 1000 soldiers, 600 complete armaments, 700 camels, and 300 horses, while the Muslims had 313 soldiers, 8 swords, 6 armor, 70 camels, and 2 horses. From this information, the mathematics equation can be written as a concept of subtraction. The difference between the forces for soldiers is 1000 – 313 = 687; for camels, 700 – 70 = 630; and for horses, 300 – 2 = 298.

Measurement

The concepts of measurement in terms of days/ years, time, and distance exist in many verses in the Quran.

Day and Year

The story about cave dwellers, where seven young men who were believers left the town and went to a cave for the sake of Allah to save their faith, is stated in Surah Al-Kahfi (18:25). So, they stayed in their Cave three hundred years, and (some) add nine (more). Allah made them sleep for 300 years based on the sun calendar or 309 years based on the moon or Lunar calendar. A Calendar based on the earth's rotation around the sun is called the Syamsiah calendar, also known as the Solar or Gregorian calendar, used by the Roman and Greek civilizations (Mufti, 2017; HistoryPod, 2017). It takes a year or 365.242191(365 days, 5 hours, 48 minutes, 46.8 seconds) for the Earth to complete an orbit around the

sun. The Arab, Chinese, and Hindu civilizations use the moon, which rotates around the planet, as the primary reference for the Qamariyah calendar, known as the Lunar calendar. The rotation period of the moon is known as a month, which is 29.530589 days (29 days, 12 hours, 44 minutes, 2.89 seconds), and the period for a year is 354.367068 days (354 days, 8 hours, 40 minutes, 34.67 seconds). These can be seen in Surah Yunus (10:5): It is He Who made the sun to be a shining glory and the moon to be a light (of beauty) and measured out stages for her; that ye might know the number of years and the count (of time). Nowise did Allah create this but in truth and righteousness. (Thus) doth He explain His Signs in detail, for those who understand. From both verses, mathematical equations can be constructed using arithmetic operations such as subtraction, multiplication, and division:

a) The difference of days between the calendars Syamsiah calendar - Qamariyah calendar = 365 - 354 = 11 days

b) Conversion of Syamsiah calendar to Qamariyah calendar: (300 x 365) /354 = 309.32 ≈ 309 days

The extension of the calendar conversion is applied in the birth year in the Lunar (Qamariah) calendar converted into the Gregorian (Syamsiah) calendar. For example, the first day of Muharram of year one of the Lunar calendar was the Gregorian date of Friday, July 16, 622 (JustinTOOLs.com, 2020; HistoryPod, 2017). The formula used to convert a year in Lunar to Gregorian and vice versa are as follows:

a) Gregorian (2022) to Lunar conversion Year Lunar = (Year Gregorian - 622) / 0.97 = (2022 - 622) / 0.97 = 1443.229 ≈1443 Hijrah

b) Lunar to Gregorian conversion Year Gregorian = (Year Lunar x 0.97) + 622 = (1443 x 0.97) + 622 = 2021.71 ≈ 2022 Masihi

Time

Many verses in the Quran stress the importance of time in our daily lives. There is a difference between the lengths of time in this living world and the hereafter. It can be found in Surah At-Taubah (22:47). They challenge you 'O Prophet' to hasten the torment. And Allah will never fail in His promise. But a day with the lord is indeed like a thousand years by your counting.

The verse reveals that Muslims must imagine and understand the sense of time and the difference between time in this world and the hereafter. The comparison of time in a world is shorter than in the hereafter, which is a day in the hereafter, which is like 1000 years in the world. If a person lives for 60 years in this world, the estimated length of time in the hereafter is as follows:

1000 years in world = 1 day in hereafter @ 24 hours @ 1440 minutes

(60/1000) x 24 hours = 1.44 hours @ 86.4 minutes

Hence, 60 years in this world is only as short as less than 2 hours in the hereafter.

Distance

Distance is the length of the space between two points. Several verses state the location of travel without saying the actual distance. For example, the first verse in surah Al-Isra' (17:1) mentions the prophet Muhammad's journey, Isra' and Mi'raj. Glory be to the One Who took His servant ˈMuhammadˈ by night from the Sacred Mosque to the Farthest Mosque whose surroundings We have blessed, so that We may show him some of Our signs.

This verse describes the miracle journey of Prophet Muhammad from the Sacred Mosque (Masjid al-Haram) in Mecca to the Farthest Mosque (Masjid Al-Aqsa) in Palestine. From Figure 1, the total distance if traveling using a car is 1464 kilometers and takes 18 hours and 18 minutes.
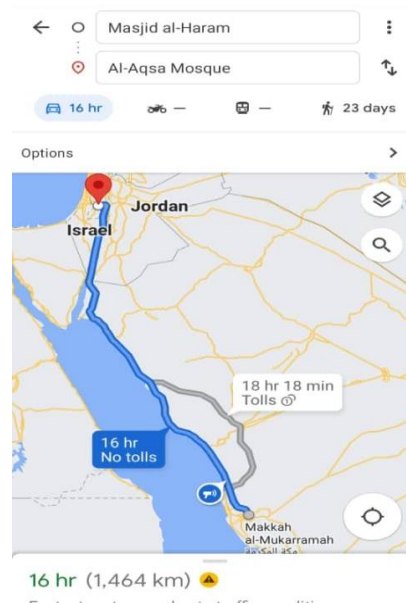

Figure 1. Distance from Masjid al-Haram to Masjid al-Aqsa

Another example of distance that can be extracted from the Quran is surah al-Baqarah verse 2:158: Indeed, 'the hills of Safa and Marwah are among the symbols of Allah. So, whoever performs the pilgrimage or minor pilgrimage, two let them walk between the two hillsˈ... The verse relates to one of the pillars of Hajj and Umrah, Saie. Saie is an act of walking back and forth or brisk walking between the hills of Safa and Marwa for seven laps back and forth. The distance between Safa and Marwa is approximately 450 meters, and for seven trips back and forth, the calculation is as follows:

1 kilometers = 1000 meters

7 x 450 meters = 3150 meters or 3.15 kilometers

Geometry

One of the factors in Muslim scholars' motivation and development of knowledge of geometry is to determine the direction of the Qibla (Yusof, 2018). The direction of Qibla is based on the position and the distance from Mecca, which applied the concepts and formulae such as trigonometry identities and rules

of sine and cosine that are related to the sphere.

Bearing

Based on previous studies by Sheikh Husain (n.d.), Yusof (2018) and Jamali (n.d.), the mathematical equation for the direction of Qibla is given as follows:

$$Q = tan^{-1} \frac{sin \ sin \ (L_d - L_m)}{[(cos \ F_d) \times (tan \ tan \ F_m) - [(sin \ sin \ F_d) \times (cos \ cos \ (L_d - L_m))]]}$$

Where: F_d = Latitude of Desired Location
L_d = Longitude of Desired Location
F_m = Latitude of Mecca ($21.4225°$ north)
L_m = Longitude of Mecca ($39.8262°$ east)

For example, the qibla for a position in Parit 13 Sungai Nibong, Sekinchan, Selangor (3.6091° north, 101.0604° east) is as follows:

$$Qibla$$
$$= tan^{-1} \left(\frac{sin \ (101.0604° - 39.8262°))}{(cos \ 3.6091°) \times (tan \ tan \ 21.4225°) - [(sin \ 3.6091°) \times (cos \ (101.0604° - 39.8262°))]} \right)$$
$$= tan^{-1}[0.8766 \div (0.3916 - 0.0303)]$$
$$= 68° \ west \ of \ North \ \text{or} \ 292° \ north$$

The direction of the Qibla is 68 degrees west of North or 292 degrees north of the location as shown in Figure 2.

Figure 2. Direction of Qibla from Sungai Nibong to Mecca

Conclusion

The Quran, serving as the principal religious text of Islam, holds profound significance for Muslims worldwide. Within its verses, numerous references to mathematical elements and concepts are

discernible, including numerical values, arithmetic operations encompassing multiplication, subtraction, and division, ratios, measurements of temporal and spatial dimensions such as days, time, years, and distance, as well as directional bearings involving angles and directions. This research underscores the potential for employing contextual approaches rooted in understanding Quranic content to facilitate the teaching and learning of mathematics. By leveraging the rich mathematical content embedded within the Quran, educators can foster deeper comprehension and engagement among learners, thereby enriching the pedagogical landscape of mathematics education.

For future investigations, it is recommended to delve into additional Quranic verses containing mathematical elements and concepts, such as classifications or sets and logical reasoning. The extraction of mathematical knowledge from the Quran could be systematically categorized into various domains of mathematics, aligning with established educational frameworks such as those outlined in school syllabi. Drawing upon the guidelines set forth by the National Council of Teachers of Mathematics (NCTM, 2000), high school mathematics can typically be segmented into four core domains: (1) number and operation, (2) algebra, (3) geometry and measurement, and (4) data analysis and probability. Qualitative research methodologies, including expert interviews, may offer valuable insights into comprehending mathematical concepts elucidated within the Quran. Moreover, integrating Islamic values into mathematics education can be effectively implemented within school curricula, particularly within Islamic educational streams. Therefore, educators can leverage research findings to develop alternative learning materials, fostering a nuanced understanding of mathematics enriched by insights from the Quran among students.

In conclusion, the Quran is not only a divine guide for life bestowed by Allah but also a reservoir of knowledge that should not be compartmentalized from other academic texts. Indeed, the Quran is a rich source of reference material for exploring mathematical concepts, imbuing the learning process with profound significance. Learners can unravel the intricate beauty of Allah's creation and deepen their understanding of Him by delving into the mathematical insights embedded within its verses. Integrating Quranic teachings into the study of mathematics enhances academic endeavors. It fosters a deeper spiritual connection, enriching the educational experience with a holistic appreciation of mathematical principles and divine wisdom.

Declarations

Author Contribution	:	HM: Conceptualization, Writing - Original Draft, Editing and Visualization; NEI & NLMN: Writing - Review & Editing, Formal analysis, and Methodology Validation and Supervision
Conflict of Interest	:	The authors declare no conflict of interest.

References

Awan, N. M. (2009). Quran and Mathematics-I. *Jihat al-Islam, 3*(01), 39-59.

Britannica Encyclopedia (2020). Qiblah | Definition & Facts. https://www.britannica.com/topic/qiblah

California. State Board of Education. (1992). *Mathematics framework for California public schools: Kindergarten through grade twelve*. Hippocrene Books.

D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics, 5*(1), 44-48.

EduwebTV (2015). Matematik Tingkatan 5 – Bearing. http://eduwebtv.moe.edu.my

HistoryPod (2017). 16th July 622: The Start of Islamic Calendar. https://www.bing.com/videos/search?q=islamic+calendar&&view=detail&mid=CA7532BE197F445C9D60CA7532BE197F445C9D60&&FORM=VRDGAR&ru

Jamali, S. H. (n.d.). Geometric calculation of Qibla direction. https://ftp.unpad.ac.id/orari/library/library-islam/knowledge/qibla_calc.html

JustinTOOLs.com. Convert Lunar Years to Gregorian Years (lunar yrs to GY). https://www.justintools.com/unit-conversion/time.php?k1=lunar-years&k2=gregorian-years

Maidinsah, H., Zubairi, M. N. M., & Zahari, M. (2021) Mathematical Elements in Malay Traditional Game: A Case Study on Gasing Pangkah. *International Journal of Arts and Commerce, 10*(8), 5-15.

Mufti (2017). Taqwim Islam versus Taqwim Kafir? Tamadun Islam. Edisi Oktober 16, 2017. http://mufti.perak.gov.my/images/minda_mufti/2017/oktober/taqwim_syamsiah_qamariyah.pdf

National Council of Teachers of Mathematics (NCTM) (n.d.) https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/Principles,-Standards,-and Expectations/

Ng, S. H., Neo, G. K., & Goh, J. H. (2020). Matematik Tingkatan 5. Pelangi Publication Sdn Bhd. Johor Bahru: Johor, Malaysia.

Reid, A., Petocz, P., Smith, G. H., Wood, L. N., & Dortins, E. (2003). Mathematics students' conceptions of mathematics. *New Zealand journal of mathematics, 32(*Suppl.), 163-172.

Sheikh Husin Jamali (n.d.). Geometric calculation of Qibla direction. https://ftp.unpad.ac.id/orari/library/library-islam/knowledge/qibla_calc.html

Shihabuddin A. (2011). Sirah: Perang Badar Al-Kubra. https://www.ustazusa.com/2011/01/sirah-perang-badar-al-kubra.html

Afiqah, M. T. S. (2019). A study of mathematical thinking in mengkuang weaving. *Unpublished Master Thesis*. *University of Technology MARA Kelantan*, Malaysia.

Wan Bakar, W. N. (2011). Mathematics in the Holy Quran. *Journal of Academic Minds, 5*(1), 53-64.

Yusof A. (2018). Penentuan Arah Kiblat Menggunakan Kaedah Trigonometri. https://www.thepatriots.asia/penentuan-arah-kiblat-menggunakan-kaedah-trigonometri/