INDONESIAN JOURNAL OF SCIENCE AND MATHEMATICS EDUCATION
06 (2) (2023) 152-164
https://ejournal.radenintan.ac.id/index.php/IJSME/index
ISSN: 2615-8639
DOI: 10.24042/ijsme.v5i1.17179
July 2023

# ETHNOMATHEMATICS EXPLORATION OF THE GREAT MOSQUE OF AL-BARKAH, BEKASI CITY, THROUGH THE LEARNING OF GEOMETRY AND TRANSFORMATIONAL GEOMETRY

**Joko Soebagyo[1*], Fadhilah Izzul Luthfiyyah[2]**
[1,2]Department of Mathematics Education, Faculty of Teacher Training and Education, Universitas Muhammadiyah Prof. Dr. Hamka, Jakarta, Indonesia

**Corresponding author:* joko_soebagyo@uhamka.ac.id

## Article Info

***Article history:***

Received: June 06, 2023
Accepted: July 13, 2023
Published: July 20, 2023

***Keywords:***

Ethnomathematics
Geometry
Great mosque of Al-Barkah
Transformational geometry

## ABSTRACT

Ethnomathematics is an understanding that makes culture a concrete form in constructing mathematical concepts. Ethnomathematics learning can help students improve their understanding of mathematical concepts and preserve Indonesian culture through an introduction to that culture. This research aims to investigate the symbolic meaning and ethnomathematics elements found in the Great Mosque of Al-Barkah. This research is qualitative research with a realist ethnographic approach. Data collection techniques were interviews, observation, documentation, and literature study. The study results prove that the Great Mosque of Al-Barkah has geometric elements (rhombuses and cuboids) and geometric transformations (reflections, rotations, and translations). Also, there are symbolic meanings in parts of the mosque. Thus, ethnomathematical elements were found in the mosque. The results of this discovery can be used as learning media and sample questions for learning mathematics at all levels of education (elementary, junior high school, and senior high school).

# EKSPLORASI ETNOMATEMATIKA PADA MASJID AGUNG AL-BARKAH KOTA BEKASI MELALUI PEMBELAJARAN GEOMETRI DAN TRANSFORMASI GEOMETRI

***Kata Kunci:***

Etnomatematika
Geometri
Masjid agung Al-Barkah
Transformasi geometri

## ABSTRAK

Etnomatematika adalah pemahaman yang menjadikan budaya sebagai wujud nyata dalam mengkonstruksi konsep-konsep matematika. Pembelajaran etnomatematika dapat membantu siswa meningkatkan pemahaman konsep matematika, serta melestarikan kebudayaan Indonesia melalui pengenalan tentang kebudayaan tersebut. Tujuan dari penelitian ini untuk menyelidiki makna simbolik dan unsur etnomatematika yang ditemukan di Masjid Agung Al-Barkah. Penelitian ini merupakan penelitian kualitatif dengan pendekatan etnografi realis. Teknik pengumpulan data berupa wawancara, observasi, dokumentasi, dan studi pustaka. Hasil penelitian membuktikan bahwa pada Masjid Agung Al-Barkah terdapat unsur geometri (Belah ketupat dan balok) dan geometri transformasi (refleksi, rotasi, dan translasi), serta ditemukannya makna simbolik pada bagian Masjid. Dengan demikian, ditemukan unsur entomatematika pada Masjid tersebut. Hasil penemuan ini dapat dijadikan sebagai media pembelajaran dan contoh soal untuk pembelajaran matematika di semua jenjang pendidikan (SD, SMP. dan SMA).



## 1. INTRODUCTION

Many geometric shapes are around us [1]-[3]. Therefore, geometry is one of the fields of mathematics that is needed in everyday life. The monument in the grave of heroes in the Kualuh Hilir Village contains geometric shapes [4]. Other research shows geometric shapes and geometric transformations in the Great Mosque of Demak [5] and a geometric concept of transformation in Yogyakarta batik [6].

Geometry is very important to learn because learning geometry can help students understand other mathematical concepts, improve students' problem-solving abilities, and educate them to communicate more effectively through inquiry, discussion, speculation, and research activities [7]. Students' geometric problem-solving skills still lack [8]. This problem arises because students cannot understand abstract geometric concepts. Ideally, learning geometry involves familiar and available geometric shapes. Thus, these abstract geometric shapes can be identified and used as alternative media for learning geometry. Therefore, an approach is needed that can help students improve their understanding of geometry [9].

In 1976, D'Ambrosio introduced ethnomathematics at the International Congress on Mathematical Education (ICME3) in Germany [10]. D'Ambrosio introduced ethnomathematics as an understanding that makes culture a real form of constructing mathematical concepts [11], [12]. Ethnomathematics can be used as a cultural object that contains mathematical concepts from certain communities as learning material [13]. Teachers can use ethnomathematics learning to explain mathematical concepts more easily by introducing Indonesian culture [14]-[16].

Several studies related to ethnomathematics on geometry material by reviewing West Javanese culture have been conducted, such as ethnomathematics on the concepts of geometry and algebra at the Great Mosques of Cimahi [17], ethnomathematics on the Cangkuang Leles temple in West Java [18], ethnomathematics exploration on the ornaments of the Bandung Great Mosque [19], the history of the Al-Barokah mosque in Bekasi [20] and ethnomathematics research on the Jami' Al-baitul Amien mosque in Jember [21]. Of the many ethnomathematics studies on culture in West Java, no research has discussed the relationship between mathematics and the Great Mosque of Al-Barkah.

This study aims to raise important historical and cultural meanings for students by conducting ethnomathematics research at the Great Mosque of Al-Barkah, Bekasi City. Also, it aims at exploring geometric shapes in the building of the Great Mosque of Al-Barkah, Bekasi City. By doing this research, it is hoped that it can provide cultural insight, especially regarding mosques, and at the same time, mathematical concepts to help students understand mathematical concepts, improve problem-solving skills, and increase student motivation in learning mathematics.

## 2. METHOD

This study uses qualitative research methods with a realist ethnographic approach. Realist ethnography is a traditional approach to directly observing the culture you want to study [22]. The location of this research was the Great Mosque of Al-Barkah which is located on Jl. Veteran No.46, Bekasi City, West Java.

The steps needed to conduct research with an ethnographic approach are: (1) determining whether the problem is appropriate to be investigated using an ethnographic approach; (2) identifying and finding groups of various cultures to study; (3) selecting cultural themes or issues to be used as research; (4) study cultural concepts, determine the type of ethnography to be used; (5) gather information, either by observation, interviews, and so on; and (6) develop a set of work patterns as the final product of the analysis [23].

Primary and secondary data collection techniques were used in data collection [24]. The three data collection methods used for the primary data sources of this research were in-depth interviews, observation, and documentation [25], [26]. The secondary data sources are literature studies. The sources for this research were the secretaries of the Great Mosque of Al-Barkah and the Ri'ayah Staff of the Great Mosque of Al-Barkah. Figure 2 shows the flow of ethnomathematics exploration research at the Great Mosque of Al-Barkah of Bekasi City through learning geometry and transformation geometry.

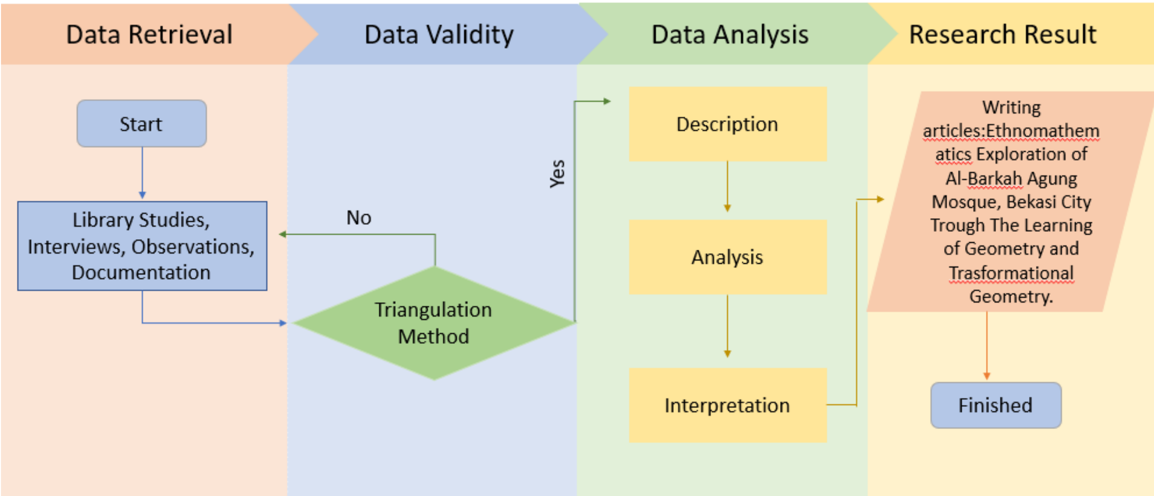


**Figure 1.** Flowchart of Ethnomathematics Exploration Research at the Great Mosque of Al-Barkah

The data collection technique in Figure 1 was carried out through in-depth interviews with informants, namely the secretaries of the Great Mosque of Al-Barkah and the staff of the Ri'ayah Great Mosque of Al-Barkah. Observations were made using observation, measurement, and temporary hypotheses from parts of the mosque with a geometric concept. Meanwhile, documentation is done by taking photos of the mosque building in whole or in part and sketches of the mosque. Meanwhile, secondary data sources come from literature studies.

Checking the validity of the data in Figure 1 is carried out to check the validity of the data using the triangulation method, namely ensuring the comparison of data from various sources and collecting data using various methods [27], [28]. Wolcott's ethnographic method of description, analysis, and interpretation was used for data analysis in this study [29].

## 3. RESULTS AND DISCUSSION

Mosques are one of the protected and preserved Indonesian cultures. The mosque functions as a place of worship for Muslims, but it also functions as a cultural object which can be used as the theme for developing the 2013 curriculum [21]. One area that still maintains its culture is Bekasi City. Bekasi City is one of the areas in West Java and is one of the busiest cities in West Java [30]. Even so, people's lives are still closely related to culture. One of the cultures that has become the icon of Bekasi City is the Great Mosque of Al-Barkah, Bekasi City. The Great Mosque of Al-Barkah is the oldest in Bekasi City, located on Jalan Veteran, right next to the Bekasi City square.

The Great Mosque of Al-Barkah is one of the places that witnessed the struggle for the independence movement. In the past, this mosque was used as a headquarters for fighters discussing politics. The great Mosque of Al-Barkah was founded in 1890 on *waqf* land belonging to the late Mr. Bachroem and was in the form of a *surau*. Then in 1969, the late MS Subandi, a Regent at the time, completely renovated it and turned it into a mosque. The next renovation was carried out by the Regent of Bekasi, Abdul Fatah, in 1985. The last renovation was carried out by the mayor, H Achmad Zurfaih, in 2004-2008, and it became a known mosque today.

**Figure 2.** The Mosque Before Renovation

**Figure 3.** The Current Mosque

There are geometric shapes and geometric transformations at the Great Mosque of Al-Barkah. The geometric shapes used as a concept in the Great Mosque of Al-Barkah are the minarets in cuboids and the mosque ornaments in rhombuses. Furthermore, the shape of the transformation geometry used as a concept in the Great Mosque of Al-Barkah is the main door of the mosque which has an element of reflection; the ornament of the mosque, which has an element of rotation; and the mosque's railing which has an element of translation.

The Great Mosque of Al-Barkah is the oldest in Bekasi City. Compared to other mosques, the Great Mosque of Al-Barkah has its uniqueness. From the results of observations, the courtyard of the mosque has date palms that thrive. Given Indonesia's climate, which is unsuitable for planting dates, we can be sure that these date palms are well cared for. Based on the results of interviews with informants, it was revealed that, apart from being used as a place for prayer, the Great Mosque of Al-Barkah is a place that has historical values and the struggle for independence movements.

### *3.1 The Value of the Minaret*

The Great Mosque of Al-Barkah has four minarets on the mosque's roof. The minarets are located on the sides of the mosque's roof, and if you pay close attention, they will look like they are surrounding the mosque's dome. The construction of the four towers means the four pillars of knowledge, namely sharia, Arabic, history, and philosophy. The following are the four pillars of the Great Mosque of Al-Barkah which are right behind the *saung*:

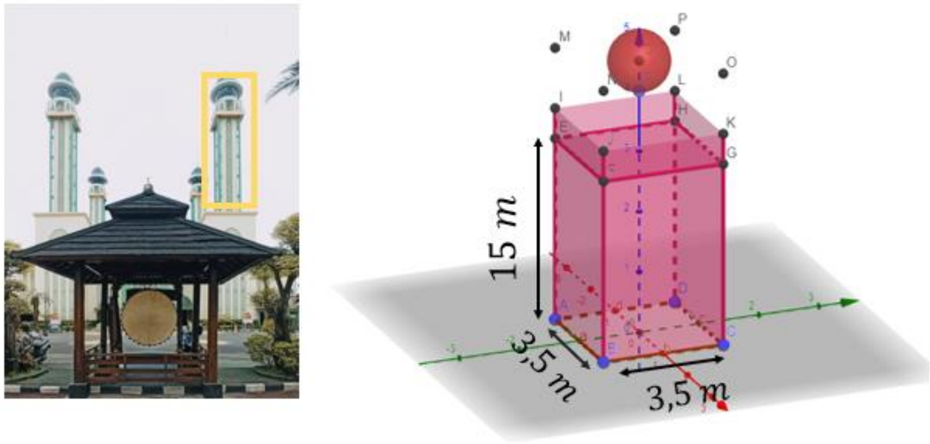


**Figure 4.** The Cuboid Minaret of the Mosque

The tower of the Great Mosque of Al-Barkah in Bekasi City in Figure 4 has a square base with dimensions of $3{,}5\ m \times 3{,}5\ m$ and a height of $15\ m$. After studying the geometry, it can be seen that the minarets of the mosque are in the form of cuboids. A cuboid is a geometric shape having six sides (planes) with congruent, opposite sides and having square and rectangular shapes [31], [32].

Research on five ninth-grade students of SMPN 1 Naringgul showed that students' mistakes in solving problems regarding two-dimensional-sided shapes were caused by students' difficulties in determining formulas and making models. Difficulties can occur because students are still not able to distinguish the surface area of the cuboid from the volume of the cuboid. From the results of Figure 3, it can be used as an example to help students improve their understanding of geometric material on two-dimensional side shapes [33]. Concerning geometric modeling, the following shape is obtained:

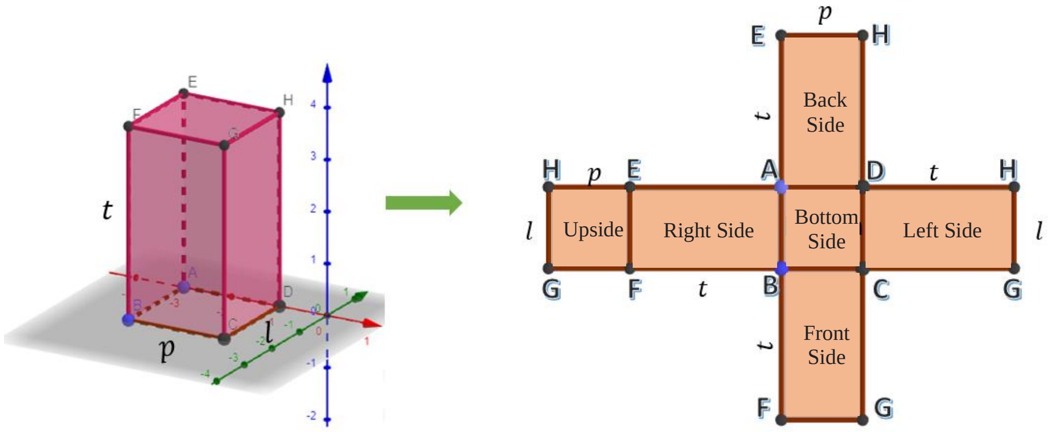


**Figure 5.** Geometry Modelling of Cuboid

In Figure 5, it can be seen that from the cuboid nets, there are congruent planes. Congruence in these planes will produce a surface area so that the volume of the cuboid will be obtained later. The following are congruent fields:
Field ABCD ≅ Field EFGH produces $p \times l$
Field AEFB ≅ Field DHGC produces $l \times t$
Field ADHE ≅ Field BCGF produces $p \times t$

From the equation of the cuboid, equation (1) can be made, which is the formula for the surface area of the cuboid. The following is the form of the equation:

$$\text{Block surface area} = 2(pl + lt + pt) \qquad (1)$$

From the modeling results, it can be seen that the cuboid consists of length, width, and height. The results of this modeling can be made into equation (2), the formula for a cuboid's volume. The following is the form of the equation:

$$\text{Block volume} = p \times l \times t \qquad (2)$$

### *3.2 The Number of Mosque Doors*

The construction of the structure of the Great Mosque of Al-Barkah was made not only to show beauty and comfort while getting closer to Allah but the construction of the structure of the Great Mosque of Al-Barkah also considered the messages to be conveyed. Based on interviews with informants conducted on October 25, 2022, eight doors are on each side of the Great Mosque of Al-Barkah. The installation of these doors is one of the messages to convey that there are many ways to enter His heaven; therefore, never stop getting His grace.

After observing through the cartesian plane, at the main door of the Great Mosque of Al-Barkah, Bekasi City, there is a reflection element that intersects on the y-axis. The following is a modeling of the transformation geometry on the cartesian plane.

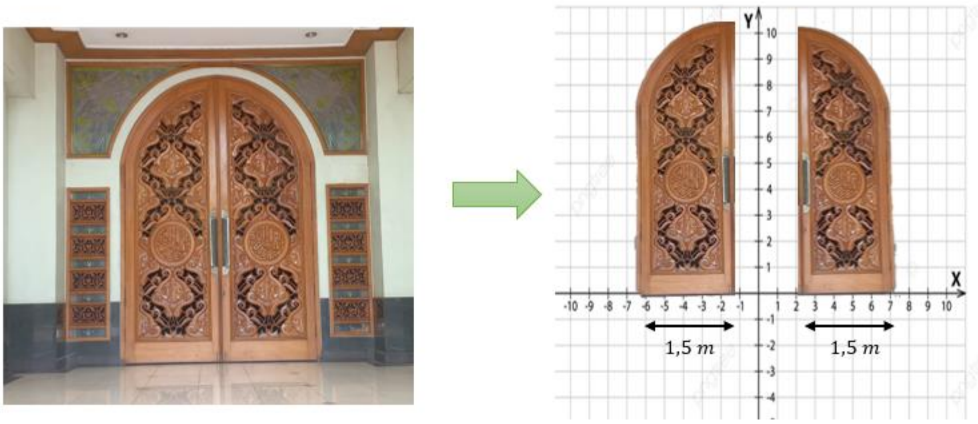


**Figure 6.** The Reflection Shape Intersects on the y-axis at the Main Door

In Figure 6, it can be seen that the main door of the Great Mosque of Al-Barkah has an intersection on the y-axis. Based on the data analysis, the intersection of the main door of the mosque that occurs in the y-axis makes (1) Each side of the door facing each other, (2) The width of each side of the door is 1.5, and (3) The carving and shape of each side of the door have similarities. Therefore, the results of the data analysis show that the intersection of the mosque's main door with respect to the y-axis produces a geometric transformation element, namely reflection [34]. The results of the reflection of the mosque's door on the y-axis can be made as a matrix. Equation (3) is the matrix form obtained from the reflection of the y-axis.

$$M_y : A(x, y) \rightarrow A'(-x, y)$$

$$\begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -x \\ y \end{pmatrix} \qquad (3)$$

Research on 35 students in class XI Mia 2 of SMA N 1 Purbolinggo by testing ethnomathematics-based mathematics teaching materials on transformation geometry found that 86% of students could increase their mathematics scores above the KKM [35]. In addition, the results of research also show that class XI students at SMA Negri 1 Purwoharjo can observe, classify, and conclude geometric forms of transformation at Pura Luhur Giri Salaka [36]. Based on the results of this study, it can be said that ethnomathematics-based learning can also be a real form of applying transformation geometry to grade 9 students.

### *3.3 Ornaments on the Railing.*

The Great Mosque of Al-Barkah, Bekasi City, has beautiful ornaments in its interior. These ornaments can be found on stairs, 2nd-floor railings, and fences, as shown in Figure 6. Various shapes are played on these ornaments, such as isosceles, triangles, squares, stars, and hexagons.

**Figure 7.** Railing

The geometric analysis in Figure 7 reveals that the ornaments on the stair railings of the mosque have a rhombus shape. A rhombus is a two-dimensional shape with perpendicular diagonals and four sides of the same length [37]. By dividing a rhombus into two triangles, the formula for the area of a rhombus can be found as follows:

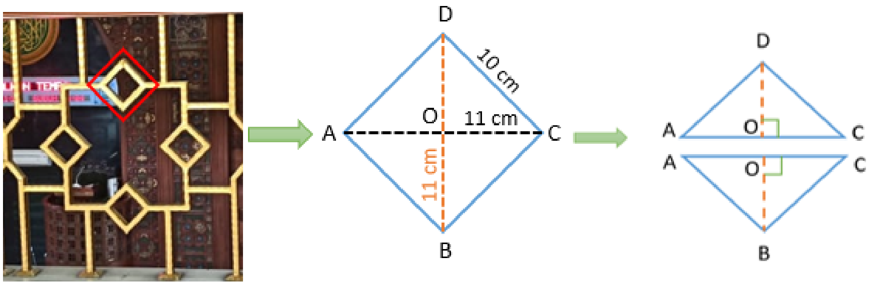


**Figure 8.** Rhombus Shape on the Railing

The part of the railing in Figure 8 marked in red can be illustrated as a rhombus and then transformed into two congruent triangles. The triangle formed can be used to determine the area of a rhombus. Equation (4) is how to determine the area of a rhombus using the formula for two equal triangles:

$$
\begin{aligned}
L.ABCD &= L.ADC + L.ABC \\
&= \frac{1}{2} \times AC \times OD + \frac{1}{2} \times AC \times OB \\
&= \frac{1}{2} \times AC \times (OD + OB) \\
L.ABCD &= \frac{1}{2} \times AC \times BD \qquad (4)
\end{aligned}
$$

Using the sum of the lengths of the sides of a rhombus, you will find the perimeter. Equation (5) is the formula for the circumference of a rhombus by adding up each side:

$$K.ABCD = AD + DC + CB + AB \qquad (5)$$

The increase in student learning outcomes was in line with the teacher's delivery (information phase) to students [38]. Making ornaments at the Great Mosque of Al-Barkah as learning media can help grade IV students learn rhombus. Ethnomathematics-based learning in ma'belle, ma'ggurecceng, and ma'cciccu games could help students learn mathematics more easily [39].

The ornament on the railing in Figure 9, visualized using a Cartesian diagram, shows a two-dimensional geometric shape with a geometric transformation element, rotation. Rotation is moving points by rotating these points as far as α to a certain point [40]. From Figure 9 (note the coordinates of the circled image), the railing ornament rotates three times with the initial turning point at A (5.20) and the center point O (0.0). A point (x,y) that is rotated about $\alpha$ the center point (0,0) will produce a point image.

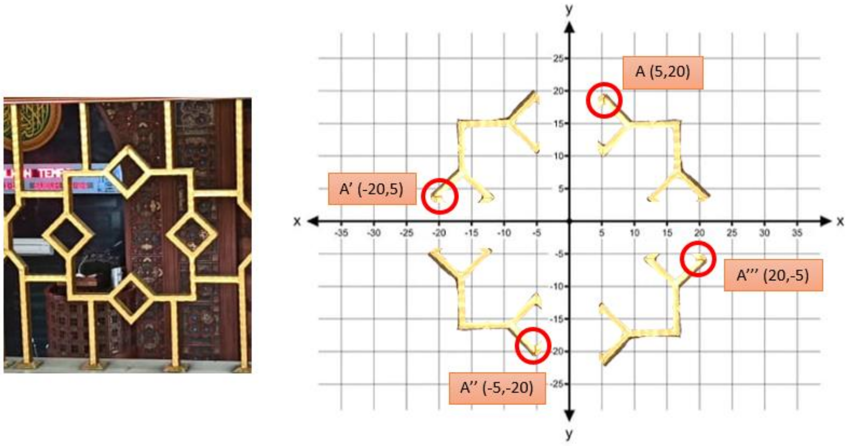


**Figure 9.** Rotation on the Railings Ornament

$$A(x,y) \rightarrow A'(x,y)$$
$$\begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} \qquad (6)$$

Equation (6) is a matrix form with a center point (0,0). Concerning equation (6), the results of data analysis in Figure 8 have been rotated three times with the initial rotation point at A (5.20), and the center point O (0.0) will produce:

$A(5,20) \overset{R[O(0,0),90°]}{\rightarrow} A'(-20,5)$ so it can be written $A(x,y) \overset{R[O(0,0),90°]}{\rightarrow} A'(-y,x)$

$A(5,20) \overset{R[O(0,0),180°]}{\rightarrow} A''(-5,-20)$ so it can be written $A(x,y) \overset{R[O(0,0),180°]}{\rightarrow} A'(-x,-y)$

$A(5,20) \overset{R[O(0,0),270°]}{\rightarrow} A'(20,-5)$ so it can be written $A(x,y) \overset{R[O(0,0),270°]}{\rightarrow} A'(y,-x)$

Based on research, class IX students at State Vocational Schools in Cimahi City still experience mistakes in solving transformation geometry problems, especially calculating shadows after being rotated [41]. Ethnomathematics studies can be used as learning media to increase students' understanding of transformation geometry learning [42], [43]. The data analysis results on the Great Mosque of Al-Barkah ornaments can be used as learning media for students to understand the concept of calculating payments after rotation.

As seen through the Cartesian plane, the railing on the second floor of the Great Mosque of Al-Barkah in Bekasi City has moved twice on the x-axis. The following is the result of shifting the railing on the Cartesian plane.

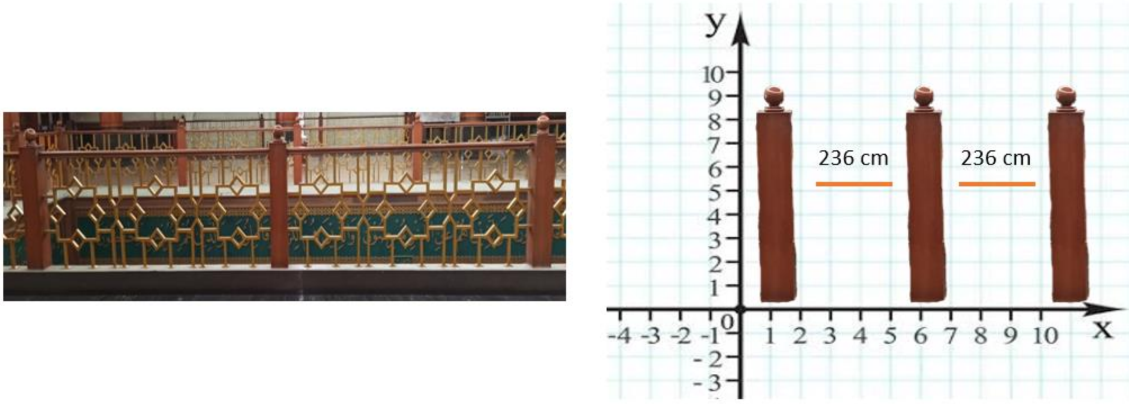


**Figure 10.** Railing Shift

Figure 10 shows that the railing has shifted twice on the x-axis as far as 236 cm. Translation is a change in the position of each point or plane with the same distance and direction [44]. Based on the analysis results, in addition to the discovery of two-dimensional geometric shapes, the railing also found elements of transformation geometry, namely translation.

The Lampung tapis cloth with the rembung shoots motif can be used as a learning medium on the topic of transformation geometry, namely translation. In addition, the design of the shoots motif can also be used as an example of questions for class IX junior high school transformation geometry material [45]. Research on the development of Jepara woodcarving ethnomathematics-based mathematics teaching materials on geometry transformation material for class IX SMP/MTs obtained a feasibility test result of 94.16%, a readability test of 92%, and a student response test of 86.67%. These results indicate that the ethnomathematics teaching materials for Jepara woodcarving are feasible and easy to understand in class IX SMP/MTs transformation geometry learning [46]. In addition to helping students overcome their problems, ethnomathematics can also increase student motivation in transforming geometry material and introduce the diversity of Indonesian culture [47], [48].

## 4. CONCLUSION

From the results of this study, it can be concluded that the building structure of the Great Mosque of Al-Barkah, Bekasi City, has geometric shapes and geometric transformations which can be alternative learning media to help students understand abstract geometric concepts, improve problem-solving skills, and increase student learning motivation. First, the minaret of the Great Mosque of Al-Barkah contains elements of religion and the mathematical concept of geometry, namely cuboids. Second, the door of the Great Mosque of Al-Barkah contains elements of religion and the mathematical concept of transformation geometry, namely reflection. Third, the Great Mosque of Al-Barkah ornaments contains cultural elements in the rhombus, rotation, and translation concepts.

This research is expected to help further research to make the results of ethnomathematics exploration at the Great Mosque of Al-Barkah as a learning medium and see whether the ethnomathematics approach can improve students' understanding of learning geometry and transformation geometry.

## ACKNOWLEDGMENT

In particular, I would like to express my deepest gratitude to the parties who have participated fairly in this research. Firstly, to the parties from Muhammadiyah University, Prof. Dr. Hamka has provided the opportunity to conduct research. Secondly, the Great Mosque of Al-Barkah, Bekasi City, has helped by becoming a source of information for this research. Lastly, family and friends always support and help during the research process.

## REFERENCES

[1] S. Supiyati, F. Hanum, and Jailani, "Ethnomathematics in sasaknese architecture," *J. Math. Educ.*, vol. 10, no. 1, pp. 47–57, 2019.

[2] L. M. Fauzi, F. Hanum, J. Jailani, and J. Jatmiko, "Ethnomathematics: Mathematical ideas and educational values on the architecture of Sasak traditional residence," *Int. J. Eval. Res. Educ.*, vol. 11, no. 1, pp. 250–259, 2022.

[3] J. Soebagyo and A. Noer, "Eksplorasi etnomatematika pada bangunan gapura pramuka," *Euclid*, vol. 10, no. 2, pp. 268-280, 2023.

[4] S. Sugi and J. Soebagyo, "Ethnomathematics Exploration of Cemetery of Heroes in City Kampung Mesjid Labuhanbatu Utara," *J. Anal.*, vol. 8, no. 2, pp. 142–151, 2022.

[5] Radiusman, S. Novitasari, I. Nurmawanti, A. Fauzi, and M. Simanjuntak, "Ethnomathematics: Mathematical values in Masjid Agung Demak," *AIP Conf. Proc.*, vol. MMCCCXXXI, no.1, pp. 1-8, 2021.

[6] R. C. I. Prahmana and U. D'Ambrosio, "Learning geometry and values from patterns: Ethnomathematics on the batik patterns of yogyakarta, indonesia," *J. Math. Educ.*, vol. 11, no. 3, pp. 439–456, 2020.

[7] M. T. Budiarto and R. Artiono, "Geometri dan Permasalahan Dalam Pembelajaran (Suatu Penelitian Meta Analisis)," *JUMADIKA J. Magister Pendidik. Mat.*, vol. 1, no. 1, pp. 9–18, 2019.

[8] I. Fauzi and A. Arisetyawan, "Analisis Kesulitan Belajar Siswa pada Materi Geometri Di Sekolah Dasar," *Kreano, J. Mat. Kreat.*, vol. 11, no. 1, pp. 27–35, 2020.

[9] I. M. Surat, "Peranan Model Pembelajaran Berbasis Etnomatematika sebagai Inovasi Pembelajaran dalam Meningkatkan Literasi Matematika," *Emasains J. Edukasi Mat. dan Sains*, vol. 7, no. 2, pp. 143–154, 2018.

[10] R. Y. Tyaningsih, N. H. Salsabila, Samijo, and Jatmiko, "Pengembangan MUPEL (multimedia peluang) berbasis etnomatematika dalam permainan tradisional anak (Dakon)," *J. Math Educ. Nusant.*, vol. 6, no. 1, pp. 39–53, 2020.

[11] M. Rosa, U. D'Ambrosio *et al.*, *Current and Future Perspectives of Ethnomathematics as a Program*. New York : Springer Nature, 2016.

[12] R. Richardo, "Pembelajaran Matematika Melalui Konteks Islam Nusantara: Sebuah Kajian Etnomatematika di Indonesia," *J. Pendidik. Mat.*, vol. 3, no. 1, pp. 73-86, 2020.

[13] S. Hardiarti, "Etnomatematika: Aplikasi Bangun Datar Segiempat pada Candi Muaro Jambi," *Aksioma*, vol. 8, no. 2, pp. 99-110, 2017.

[14] J. Soebagyo, R. Andriono, M. Razfy, and M. Arjun, "Analisis Peran Etnomatematika dalam Pembelajaran Matematika," *ANARGYA J. Ilm. Pendidik. Mat.*, vol. 4, no. 2, pp. 184-190,2021.

[15] H. Pathuddin, K. Kamariah, and M. Ichsan Nawawi, "Buginese ethnomathematics: Barongko cake explorations as mathematics learning resources," *J. Math. Educ.*,

vol. 12, no. 2, pp. 295–312, 2021.

[16] A. S. Nur, S. B. Waluya, R. Rochmad, and W. Wardono, “Contextual learning with Ethnomathematics in enhancing the problem solving based on thinking levels,” *JRAMathEdu (Journal Res. Adv. Math. Educ.*, vol. 5, no. 3, pp. 331–344, 2020.

[17] T. Purniati, Turmudi, and D. Suhaedi, “Ethnomathematics: Exploration of a mosque building and its ornaments,” *J. Phys. Conf. Ser.*, vol. MDXXI, no. 3, pp. 1-7, 2020.

[18] F. Nursyeli and N. Puspitasari, “Studi Etnomatematika pada Candi Cangkuang Leles Garut Jawa Barat,” *Plusminus J. Pendidik. Mat.*, vol. 2, no. 1, pp. 327–338, 2021.

[19] T. Purniati, Turmudi, D. Juandi, and D. Suhaedi, “Ethnomathematics Exploration of The Masjid Raya Bandung Ornaments in Transformation Geometry Materials,” *J. Medives J. Math. Educ. IKIP Veteran Semarang*, vol. 5, no. 2, pp. 235–243, 2021.

[20] Y. Bachtiar, “Mengungkap Sejarah Masjid Agung Al-Barkah, yang Berdiri di Alun-alun Bekasi,” *TribunJakarta.com*, 2018. Accessed: May 18, 2023. [Online]. Available: https://jakarta.tribunnews.com/2018/05/23/mengungkap-sejarah-masjid-agung-al-barkah-yang-berdiri-di-alun-alun-bekasi

[21] E. Yudianto, R. A. Febriyanti, S. Sunardi, T. Sugiarti, and M. Mutrofin, “Eksplorasi etnomatematika pada Masjid Jami’ Al-Baitul Amien Jember,” *Ethnomathematics J.*, vol. 2, no. 1, pp. 11–20, 2021.

[22] G. Gobo and L. T. Marciniak, "Qualitative Research," *SAGE*, 2011. [Online]. Available: https://books.google.co.id/books?hl=en&lr=&id=9FALDAAAQBAJ&oi=fnd&pg=PA103&dq=gobo+ethnography&ots=9ocDgz3zbI&sig=Y5D6IBr4_XJ8hfRhYYd-KmgYtJU&redir_esc=y#v=onepage&q=gobo ethnography&f=false.

[23] J. W. Creswell, *Qualitative Inquiry & Research Design Choosing Among Five Approaches, 3rd ed*. Lincoln: SAGE Publications, Inc., 2013.

[24] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan RD*. Bandung : Alfabeta, 2013.

[25] A. Setyawati, J. F. Sunni, and J. Soebagyo, “Ethnomathematics exploration in the Galasin traditional games in Jakarta on mathematical concepts,” *Union J. Ilm. Pendidik. Mat.*, vol. 11, no. 1, pp. 58–65, 2023.

[26] S. A. Salsabila and J. Soebagyo, “Eksplorasi Etnomatematika Pada Masjid Cut Meutia Ethnomathematics,” *Math Didact. J. Pendidik. Mat.*, vol. 9, no. 2, pp. 293–307, 2023.

[27] P. S. Rahmat, "Penelitian Kualitatif," *EQUILIBRIUM*, vol. 5 No. 9, pp. 1-8, 2009.

[28] H. Wijaya, *Analisis Data Kualitatif Ilmu Pendidikan Teologi*. Makassar : STTJ, 2018.

[29] H. F. Wolcott, *Transforming Qualitative Data: Description, Analysis, and Interpretation*. London : SAGE Publications, 1929.

[30] S. D. Marzellina, “Jadi Kota Teramai di Jawa Barat! Ternyata Ini 5 Kecamatan dengan Penduduk Terbanyak di Kota Bekasi: Tahu Gak?,” *Jatim Network*, 2023. [Online]. Available: https://www.jatimnetwork.com/ragam/439056968/jadi-kota-teramai-di-jawa-barat-ternyata-ini-5-kecamatan-dengan-penduduk-terbanyak-di-kota-bekasi-tahu-gak

[31] M. Amien, R. Oktriana, and R. F. Nurjanah, *solusi master bank soal matematika smp 7-8-9, 1st ed*. Solo: Genta Smart Publisher, 2015.

[32] D. T. Wahyuningtyas, *Modul Bangun Datar dan Bangun Ruang*. Malang : Unikama, 2013.
[33] Sarwoedi, D. O. Marinka, P. Febriani, and I. N. Wirne, "Efektifitas Etnomatematika dalam Meningkatkan Kemampuan Pemahaman Matematika Siswa," *J. Pendidik. Mat. Raflesia*, vol. 3, no. 2, pp. 171–176, 2018.
[34] D. Novrika, R. Ilma, I. Putri, and D. Y. Hartono, "Desain Pembelajaran materi Refleksi menggunakan motif kain batik untuk siswa kelas VII," *Pros. Semin. Mat. dan Pendidik. Mat.*, vol. I, no. 1, pp. 607-626, 2016.
[35] E. Suprana and N. Farida, "Pengembangan Bahan Ajar Matematika Berbasis Etnomatematika pada Materi Geometri Transformasi," *Limacon J. Math. Educ.*, vol. 1, no. 1, pp. 1–7, 2019.
[36] B. W. Pangestika, Susanto, L. N. Safrida, D. Trapsilasiwi, and L. A. Monalisa, "Analisis Keterampilan Geometri Siswa dalam Menyelesaikan Masalah Transformasi Geometri yang Berkaitan dengan Etnomatematika di Taman Nasional Alas Purwo," *EDUKATIF J. ILMU Pendidik.*, vol. 4, no. 4, pp. 5804–5817, 2022.
[37] E. Unaenah *et al.*, "Teori Bunner pada Konsep Bangun Datar Sekolah Dasar," *J. Pendidik. dan Ilmu Sos.*, vol. 2, no. 2, pp. 327–349, 2020.
[38] F. P. Umami, T. Sugiarti, and F. S. Hutama, "Penerapan Teori Belajar Van Hiele untuk Meningkatkan Aktivitas dan Hasil Belajar Siswa Pokok Bahasan Luas Persegi, Persegi Panjang, dan Segitiga," *Widyagogik*, vol. 7, no. 2,pp. 128-138, 2020.
[39] I. Irmayanti and D. Danial, "Eksplorasi Etnomatematika Permainan pada Siswa Sekolah Dasar di Sinjai Selatan," *AULADUNA J. Pendidik. Dasar Islam*, vol. 6, no. 1, pp. 90-104, 2019.
[40] Istiqomah, *Modul Pembelajaran SMA Matematika Umum*. Mataram : Kemendikbud, 2020.
[41] F. I. Maulani and W. Setiawan, "Analisis Kekeliruan Siswa SMK Negeri di Kota Cimahi dalam Menyelesaikan Soal Geometri Transformasi," *J. Pembelajaran Mat. Inov.*, vol. 4, no. 3, pp. 729–738, 2021.
[42] S. Sutarto, I. D. Hastuti, and S. Supiyati, "Etnomatematika: Eksplorasi Transformasi Geometri Tenun Suku Sasak Sukarara," *J. Elem.*, vol. 7, no. 2, pp. 324–335, 2021.
[43] Haryanto, N. Toto, Subanji, and Abadyo, "Ethnomathematics in Arfak (West Papua Indonesia): Hidden Mathematics on knot of Rumah Kaki Seribu," *Educ. Res. Rev.*, vol. 11, no. 7, pp. 420–425, 2016.
[44] N. Yuniarti and N. Karnita, *bank soal superlengkap matematika sma kelas 1,2,&3*. Jakarta Selatan : Cmedia, 2014.
[45] L. T. Avelia, F. A. Nugraheni, and D. I. Palma, "Etnomatematika pada Kain Tapis Lampung Motif Pucuk Rebung," *ProSANDIKA UNIKAL (Prosiding Semin. Nas. Pendidik. Mat. Univ. Pekalongan)*, vol. I, no. 1, pp. 373–382, 2020.
[46] F. M. Putri, "Pengembangan Bahan Ajar Berbasis Etnomatematika Ukir Kayu Jepara Pada Materi Transformasi Geometri Kelas Ix Smp/Mts," *Jurnal Pembelajaran dan Pengembangan Matematika*, vol. 2, no. 1, pp. 21–37, 2022.
[47] A. A. Abdullah, "Etnomatematika; Eksplorasi Transformasi Geometri Pada Ragam Hias Cagar Budaya Khas Yogyakarta," *J. Ilm. Soulmath J. Edukasi Pendidik. Mat.*, vol. 8, no. 2, pp. 131–138, 2020.

[48] G. Sunzuma, N. Zezekwa, I. Gwizangwe, and G. Zinyeka, "A Comparison of the Effectiveness of Ethnomathematics and Traditional Lecture Approaches in Teaching Consumer Arithmetic: Learners' Achievement and Teachers' Views," *Pedagog. Res.*, vol. 6, no. 4, pp. 1-8, 2021.