Exploration of Ethnomathematics in Pekanbaru City Traditional Hall Building

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Abstract

Culture plays an important role in the emergence and development of mathematics learning. However, students still do not realize that mathematics is very close to students, especially in its own cultural elements. One of the cultural buildings that can be seen in Pekanbaru City is the Pekanbaru City Traditional Hall, which is a type of traditional house that still exists today. The aim of this research is to explore the mathematical concepts that exist in the Pekanbaru City Traditional Hall building. This research is qualitative research with an ethnographic method where data is collected through literature review and observation. Then data reduction, data presentation and conclusion drawing are carried out. The results show that the mathematical concepts that can be expressed in the Pekanbaru City Traditional Hall building are counting, flat shapes, relationships between angles, congruence, the Pythagorean theorem, and geometric transformations. It is hoped that the results of this research can be used by school teachers as a source of mathematics learning.

***Keywords:** Ethnomathematics, Traditional Houses, Traditional Halls, Geometry*

1. Introduction

Mathematics as a compulsory subject at every level of school should have its own appeal for students. However, in reality, mathematics learning in Indonesia is still focused on abstract mathematics material and directs students to memorize rather than understand (Hamidah et al., 2021). Often, the mathematics learning that is currently developing still tends to be less flexible, less applicable, very theoretical, and less contextual (Utami et al., 2022). As a result, Indonesian students are less able to use mathematical concepts to solve problems related to everyday life (Risdiyanti & Prahmana, 2018; Stacey, 2011). In fact, mathematics should be a human activity and mathematics must be connected to human life (Freudhental, 1991). It is undeniable that mathematics and culture are closely related. Mathematics is recognized as developing along with the development of human civilization, while human civilization always produces culture (Utami et al., 2022). So there should be a transformational effort to realize mathematics that is closer to the reality and culture of students (Prahmana & D'Ambrosio, 2020) so that mathematics learning is closer to students' lives. Based on how mathematics is taught in schools and seeing how mathematics develops, Ethnomathematics can be a solution (Prahmana et al., 2021; Abdullah 2016; D'Ambrosio, 1985).

Ethnomathematics is a study that examines how mathematics develops and is used in various cultural contexts around the world (D'Ambrosio, 2001). Through ethnomathematics we can learn and combine ideas, methods, techniques that have been used and developed by socio-cultures or societies with different cultures (D'Ambrosio, 2016; Rosa & Orey, 2016). Ethnomathematics bridges the integration of local culture or traditions around students with the context of mathematics (Rosa & Shirley, 2016; D'Ambrosio, 2001). Ethnomathematics shows that mathematics is rooted in different

cultures, so it can accommodate various ideas and encourage students to become critical, democratic, and tolerant thinkers towards different cultures (Mattos et al., 2020; D'Ambrosio, 2016). Therefore, ethnomathematics as a pedagogical innovation in mathematics learning (Prahmana et al., 2021) must continue to be explored so that students can love mathematics, be motivated, and be creative in working on mathematics problems.

Indonesia, as a country rich in traditions and cultures, provides an ideal environment for the development of ethnomathematics studies. One culture that has a lot of potential to be studied is the Malay culture in Riau, especially through its traditional buildings. One of the Malay traditional buildings in Riau that can be explored is the traditional hall. The Pekanbaru City Traditional Hall as one of the traditional halls in Riau and an icon of Malay culture in Riau stores mathematical wealth in the form of symbols, patterns, and architecture that reflect mathematical concepts, such as symmetry, fractal patterns, and geometry (Zulkifli, 2018). Traditional Malay buildings such as the Pekanbaru Traditional Hall are often designed with attention to geometric and mathematical aspects that are not only aesthetic but also functional. For example, the symmetrical patterns in the carvings and roof structures that show certain regularities and proportions. These concepts are not just aesthetics, but reflect the worldview and values of the local community, which can be a means of understanding how mathematics is applied in a cultural context (Marta, 2020).

There are several ethnomathematic studies on traditional houses, namely: (1) Sulistyani et al. (2019) who conducted ethnomathematics exploration in the Joglo Tulunagung Traditional House, (2) Supiyati et al. (2019) who explored the architectural style of the Sasak Community, (3) Rosita (2019) who explored the Banyuwangi Osing Traditional House; and 4) Sari et al. (2018) who explored ethnomathematics in the Ogan Komering Ulu Traditional House of South Sumatra. However, there is still limited research that reveals ethnomathematics in the Pekanbaru City Traditional Hall. Therefore, this study will explore ethnomathematics in the Pekanbaru City Traditional Hall building more broadly and explain various mathematical concepts that can be revealed.

This research is important to explore how mathematics is hidden in the culture of the Riau Malay community, especially through an analysis of the Pekanbaru City Traditional Hall building. By understanding the mathematical aspects of this traditional architecture, it is hoped that a new approach can be found in teaching mathematics that is more contextual and relevant to students' daily lives (Sembiring, 2019). In addition, this study has the potential to contribute to the development of curriculum and teaching materials based on local wisdom, so that mathematics education becomes more inclusive and respects cultural diversity. It is hoped that the results of this study can be used as a context in creating a mathematics learning design, so that a mathematics learning design is created that is fun, close to students' daily lives, and contains cultural values that can shape students' character when applied in the classroom.

2. Method

This research is a qualitative research with ethnographic method. Ethnographic method is a method used to study and explain the culture of a society (Spradley, 2016; Sutama, 2019). The selection of this method is in accordance with the purpose of the research, namely ethnomathematics exploration which seeks a combination of mathematical ideas, methods, and techniques practiced and developed by socio-cultural or cultural communities (Bass & Milosevic, 2018; D'Ambrosio, 2016; Rosa & Orey, 2016; Mattos et al., 2020). Ethnomathematics studies will show that mathematics can be found in various cultures so that it can connect and revive students' reasoning and critical thinking and can foster democratic and tolerant characters in students by embracing existing cultural differences and seeing this as an opportunity for mathematics education (Prahmana & D'Ambrosio, 2020; D'Ambrosio, 2016; Rosa & Orey, 2016).

This research was conducted in Pekanbaru City, especially at the Pekanbaru City Traditional Hall as the main object of the study. Data collection was carried out by conducting field studies, namely observing the Pekanbaru City Traditional Hall building and documenting it. The main instrument in this study was the researcher himself, who acted as an observer and data collector. The research procedure adopted an ethnographic approach based on four general questions, namely: (1) Where to start the observation, (2) How to observe it, (3) How to find important things, and (4) How to understand

it (Prahmana & D'Ambrosio, 2020; Utami et al., 2019; Alangui, 2010). This research procedure is used as the framework for this research.

Based on the research framework , the first step is to make detailed observations at the Pekanbaru City Traditional Hall and process the documentation of objects suspected of having potential as research objects. The second step identifies the results of observations in depth associated with the focus of the content under the research. To support the data collection process, researchers used tools such as camera and notebook. All data related to the Pekanbaru City Traditional Hall building was documented and collected. The third step identifies the scope and objects selected based on stage two and confirmed by the literature study. The data was then reduced to filter information that was relevant to the research objectives, namely the ethnomathematics aspect in the architecture of the Traditional Hall. Relevant data was then categorized and presented based on the mathematical concepts that could be found. In addition, a literature study was also conducted by looking for various references related to the Pekanbaru City Traditional Hall and the philosophical values contained in the building. The final step is to connect reciprocally between content and cultural objects to obtain a mathematical representation of the Pekanbaru City Traditional Hall. After the data was categorized, the researcher drew conclusions related to the ethnomathematics concept contained in the Pekanbaru City Traditional Hall building. The results of the exploration were then integrated into mathematics problems so that they could be used as teaching materials in school mathematics subjects.

3. Results and Discussion

The Pekanbaru City Traditional Hall has several important uses for the Riau Malay community, both in social, cultural, and ceremonial aspects. The Pekanbaru City Traditional Hall is a physical symbol of the traditional values maintained by the Lembaga Adat Melayu (LAM) Riau. LAM Riau is an institution that plays an important role in the preservation, development, and implementation of Malay customary values and traditions in Riau Province, Indonesia. This institution is responsible for maintaining and preserving the Malay culture that has existed for a long time, as well as ensuring that customary traditions and laws are applied in the lives of the community. As the guardian of the Malay cultural heritage, LAM Riau utilizes the Traditional Hall to preserve and introduce customary traditions and values to the wider community.

Figure 1. Pekanbaru City Traditional Hall

Some of the philosophical values contained in the Pekanbaru City Traditional Hall are: (1) Symbol of unity and deliberation, (2) Open structure, (3) Relationship with nature, (4) Cultural values and Malay identity, (5) Symbol of justice and balance, and (6) Social status and leadership. The Pekanbaru City Traditional Hall is not only a physical building, but also a symbol of togetherness, openness, justice, and preservation of cultural values inherited from the ancestors of the Riau Malay community (Fauzan, 2019; Nasution, 2017; Wahyuni, 2015; Abdullah, 2012; Riau Cultural Center, 2010).

This study reveals that the Pekanbaru City Traditional Hall building contains many ethnomathematic elements that reflect the Riau Malay community's understanding of mathematical concepts. The research results will be presented according to the research framework used.

3.1 Where to start the observation

Observations began by analyzing parts of the Pekanbaru City Traditional Hall that contained mathematical elements. Based on the results of the initial analysis, there are several parts that will be observed further, namely the shape of the building, roof, doors, pillars, wall decorations, as well as regional motifs attached to each part of the Pekanbaru City Traditional Hall.

3.2 How to observe it

Each part of the building that has been determined in section 3.1 is then observed in more depth to see the mathematical concepts contained therein. A summary of observations for each part of the Pekanbaru City Traditional Hall building is shown in Table 1, Table 2, Table 3, Table 4, and Table 5.

Table 1. Analysis of Mathematical Concepts on the Building Shape of the Pekanbaru City Traditional Hall
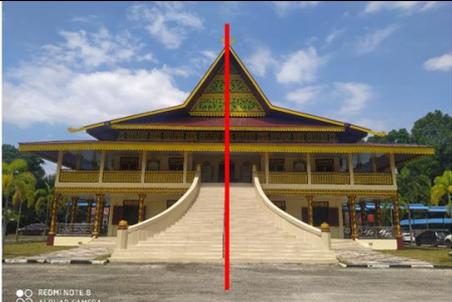
Concept	Photo	Construct	Specific activity
Symmetry	 Figure 1. Shape of the Pekanbaru City Traditional Hall Building	Fold symmetry	Fold symmetry occurs from folds that can divide a shape into two parts of the same size
Sequence	 Figure 2. Pekanbaru City Traditional Hall Stairs	Arithmetic sequence	Arithmetic sequences occur from the difference in lengths of adjacent steps which are always the same
Flat Shapes	 Figure 3. Side View of a Rectangle Building	Rectangle	A rectangle occurs from two pairs of parallel and equal length floor sides

Table 2. Analysis of Mathematical Concepts on the Roof of the Pekanbaru City Traditional Hall

Concept	Photo	Construct	Specific activity

Symmetry	 Figure 4. Selembayung at the roof	Fold symmetry	Fold symmetry occurs from folds that can divide the selembayung shape into two equal parts
Flat Shapes	 (i) (ii) Figure 5. Flat Area at the roof	Rectangle	Rectangles occur from several roof shapes that have two pairs of parallel sides and the same length
		Isosceles triangle	An isosceles triangle occurs from the shape of the front of the roof which has two sides of the same length
		Trapezoid	A trapezoid occurs on a roof that has four sides with two sides parallel but not the same length
Pythagoras Theorem	 Figure 6. Pythagorean theorem on the front of the roof	Isosceles triangle	The Pythagoras Theorem ocurs from the relationship between the sides of a right triangle
Congruence	 Figure 7. Congruence on the front of the roof	Triangle Congruence	Congruence occurs from the objects that have different sizes, but the same shape
Geometric Transformation	 Figure 8. Lebah Bergantung motif in the roof	Translation	Translation occurs from square A to square B with the same shape and size.
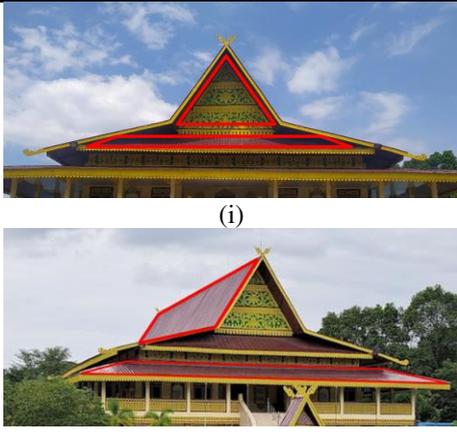
		Dilation	Dilation occurs when a figure's size is changed proportionally from a fixed center point
...			

Figure 9. Dilation concept in roof decoration

Table 3. Analisis Konsep Matematika pada Pintu Balai Adat Kota Pekanbaru

Concept	Photo	Construct	Specific activity
Symmetry		Fold symmetry	Fold symmetry occurs from folds that can divide the shape of an object into two equal parts

Figure 10. The door

Figure 11. The motif of the door

Figure 12. The motif of the door ventilation
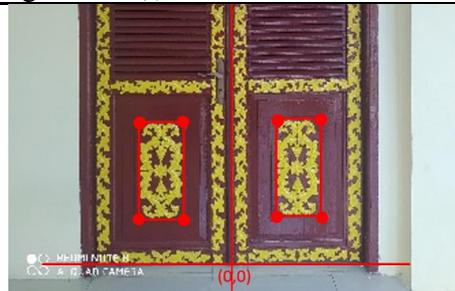
Congruence	(i) (ii) Figure 13. (i) The door and (ii) ventilation	Congruence	Congruence occurs from the objects that have different sizes, but the same shape
Geometric Transformation	(i) (ii) Figure 14. The reflection of motif on (i) the door and (ii) ventilation	Reflection	Reflection occurs when a shape or object is flipped across a line to create a mirror image

Table 4. Analisis Konsep Matematika pada Pintu Balai Adat Kota Pekanbaru

Concept	Photo	Construct	Specific activity
Symmetry	 Figure 15. Motif on the pole	Fold symmetry	Fold symmetry occurs from folds that can divide the shape of an object into two equal parts

Space Shape		Prism	Prism occurs in three-dimensional object with parallel straight sides and a top and bottom base that are the same polygonal shape.
	Figure 16. The prism-shaped part of the pole		
Geometric Transformation		Rotation	Rotation occurs when an object or shape is turned around a fixed point, called the center of rotation, through a given angle and direction
	Figure 17. Rotation Concept in Pole Decoration		

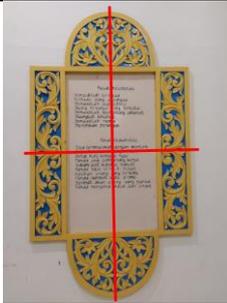Table 5. Analisis Konsep Matematika pada Pintu Balai Adat Kota Pekanbaru

Concept	Photo	Construct	Specific activity
Symmetry		Fold symmetry	Fold symmetry occurs from folds that can divide the shape of an object into two equal parts
	Figure 18. Frame shape		
Flat Shape		Rectangle	A rectangle is a frame shape that has two pairs of parallel sides and the same length
		Semi-circle	Semi-circle occurs when a circle is cut into two equal parts along a diameter line
	Figure 19. Flate shape in the frame		

3.3 How to find important things

Berdasarkan observasi mendalam dan analisis yang telah dilakukan pada setiap bagian Balai Adat Kota Pekanbaru, diperoleh bahwa konsep-konsep matematika yang dapat ditemukan adalah Symmetry, Sequence, Flat Shapes, Pythagoras Theorem, Congruence, Geometric Transformation, and Space Shape.

3.3.1 Simetry
One of the main findings is the application of the concept of symmetry to the overall design of the building. Reflection symmetry (mirror) is clearly visible on the building facade, especially in the

arrangement of doors, windows, and ornaments that adorn the walls. Both sides of the Balai Adat building have similar elements, reflecting balance and harmony, two important values in Riau Malay culture (Sembiring, 2019). Symmetry in architecture is also seen as a symbol of balance between nature and human life, reflecting Malay cosmological philosophy.

3.3.2 Flat Shapes

The Pekanbaru City Traditional Hall is a real example of the application of the concept of flat shapes in traditional Malay architecture. This building not only functions as a center for traditional and cultural activities, but also shows the use of forms and spaces that reflect the application of mathematical concepts, especially flat shapes. The Pekanbaru City Traditional Hall has a basic rectangular shape which is the main characteristic of traditional Malay architecture. This rectangular shape provides stability and sufficient space for various activities. The use of this form can be analyzed from a geometric perspective, where the area and circumference of the flat shape are calculated to determine the appropriate size and proportions (Sembiring, 2019).

3.3.3 Congruence

The concept of triangular congruence in the Pekanbaru City Traditional Hall can be seen in several architectural elements of the building, especially in the roof and ornaments. Congruence in mathematics refers to the relationship between two or more shapes that are similar in angles and proportions even though they are different in size. In the architectural context, congruence is often used to create harmony and harmony in design, as well as maintaining consistent proportions in various building elements (Zulkifli, 2018).

One of the clearest parts of applying the triangle concept to the Traditional Hall is the pyramid-shaped roof. This roof consists of several triangles that form the entire roof structure. Each triangle on the side of the roof has the same angle, although the size of the side of the triangle varies, depending on the height and size of the roof (Fauzan, 2019). In this case, the triangles have the property of being congruent, where the angles in the triangles are equal, and the ratio of the lengths of the sides is comparable. The application of this triangular congruence not only creates visual beauty, but also provides strong structural stability to the building.

3.3.4 Geometry Transformations

The Pekanbaru City Traditional Hall is an example of traditional Malay architecture which is rich in the application of the concept of geometric transformation in ethnomathematics. Geometric transformations, such as translation, reflection, rotation, and dilation, are used to create order, balance, and visual aesthetics. In the context of ethnomathematics, this transformation also has philosophical meaning that reflects Malay traditional and cultural values. The following are several applications of geometric transformation at the Pekanbaru City Traditional Hall.

3.3.4.1 Translation

Translation is the shifting of an object without changing its shape or orientation. At the Pekanbaru City Traditional Hall, translation is applied in repeated carving patterns on the pillars and walls of the building. Geometric ornaments, such as triangles, squares, and floral motifs, are repeated horizontally or vertically along the surface of the building. These translated carving motifs reflect the order and balance that are characteristic of Malay culture. This translation pattern not only functions as an aesthetic decoration, but also expresses continuity and eternity which is part of the cosmology of Malay society (Zulkifli, 2018).

3.3.4.2 Reflection

Reflection is the reflection of an object regarding a certain axis. Reflections are often used in symmetrical designs at the Pekanbaru City Traditional Hall, especially in wall ornaments, doors and windows. For example, triangular carvings or other geometric patterns are repeated symmetrically on both sides of a door or window, creating the impression of perfect mirroring. This reflection not only creates visual harmony, but also contains philosophical meaning related to balance in life, such as balance between the physical and spiritual worlds, which is an important value in Malay tradition. This

reflective symmetry is a form of geometric transformation that is often used in traditional architecture (Marta, 2020). Several things that can be used to reveal the concept of reflection are as follows.

3.3.4.3 Rotation

Rotation is the rotation of an object at a certain point with a certain angle. At the Pekanbaru City Traditional Hall, rotation is applied to ornamental designs that have flower-shaped patterns or other natural shapes arranged in a circle around a central point. This motif is often used on roofs or ceilings, where geometric elements are arranged in a circle with consistent rotation. This rotation creates a recurring, centered pattern, symbolizing cosmic harmony and order. In the context of ethnomathematics, this rotation shows how Malay society connects geometric principles with circular and repetitive concepts of life (D'Ambrosio, 2001). Several things that can be used to reveal the concept of rotation are as follows.

3.3.4.4 Dilation

Dilation is a transformation that changes the size of an object without changing its shape. At the Pekanbaru City Traditional Hall, the concept of dilation is applied in repeating carved motifs that have different sizes but still maintain the same shape. For example, floral or leaf motifs found on pillars or walls are often repeated in various sizes, from small to large, creating a harmonious impression of enlargement or reduction. This dilation not only creates aesthetic variations, but also symbolizes development and growth, which are important themes in the Malay people's philosophy of life (Sembiring, 2019). In the context of ethnomathematics, dilation shows how geometric shapes can change size but still maintain balanced proportions. Several things that can be used to reveal the concept of dilation are as follows.

The results presented in this section show that the Pekanbaru City Traditional Hall building is related to existing mathematical concepts. The application of ethnomathematics concepts in the Pekanbaru City Traditional Hall shows that the Malay community has a deep understanding of the principles of geometry. They have succeeded in integrating these concepts into traditional architecture that is not only functional but also aesthetic and philosophical. This is in accordance with ethnomathematics research conducted on other traditional buildings (Maifa et al., 2022; Safitri & Priscilla, 2022; Wardhani et al., 2022). This ethnomathematics study can be a bridge to link local culture with mathematics learning, which provides a contextual understanding of how mathematics is present in everyday life. By using ethnomathematics as an approach in learning mathematics, students can understand that mathematics is not only an abstract science, but is integrated into everyday life, especially in their cultural heritage (Pratiwi & Aridho, 2022; Marzuqoh, 2019). This kind of study also supports the development of culture-based mathematical literacy (Kehi et al., 2019).

3.3   How to understand it

Hasil analisis dari bagian bangunan Pekanbaru City Traditional Hall yang memuat konsep matematika kemudian dimanfaatkan sebagai konten dalam membuat soal-soal matematika. Adapun contoh soal yang dapat dijadikan dimanfaatkan dalam pembelajaran adalah sebagai berikut.

Example 1 (Simetry)

The picture on the side is the door motif of the Pekanbaru Malay Traditional Hall. Determine the number of fold symmetry and rotational symmetry!

Solution

There are two lines of symmetry and two rotational symmetries according to the vertical and horizontal axes.

Example 2 (Flat Shapes)

The picture on the side is a decoration on the wall of the Pekanbaru City Traditional Hall containing articles in the Gurindam Dua Belas.
With the dimensions listed in the picture, determine the area covered by the yellow and blue Malay carvings!

Solution
There are four areas to be calculated.
Area 1, 2, 3 are rectangular and Area 4 is half-circle.
Area $1 = p \times l = 42 \times 60 = 2520\ cm^2$
Area $2 = p \times l = 15 \times 60 = 900\ cm^2$
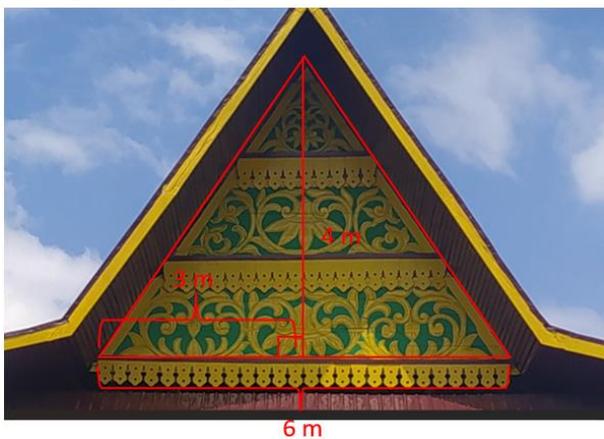Area $3 = p \times l = 15 \times 60 = 900\ cm^2$
Area $4 = \frac{1}{2}\pi r^2 = \frac{1}{2} \times \frac{22}{7} \times 21 \times 21 = 693\ cm^2$
Total of Area $= 2520 + 900 + 900 + 693 = 5013\ cm^2$.
So, the area covered with Malay carvings is $5013\ cm^2$.

Example 3 (Pythagoras Theorem)

Look at the picture on the side.

If the roof motif of the Pekanbaru City Traditional Hall building is in the form of an isosceles triangle with a base of 6 m and a height of 4 m, how long is the wood needed to be the molding at the foot of the triangle?

Solution
Length of hypotenuse $= \sqrt{4^2 + 3^2}$
$= \sqrt{16 + 9}$
$= \sqrt{25}$
$= 5$ m
So, the length of the wooden strip needed for the triangular leg section is $5 + 5 = 10\ m$.

Example 4 (Congruence)

Look at the following image.

If lines AB, EF, and DG are parallel lines, length AB=6 m, AC=5m, CD:DE:CA=1:1:1, then determine the length of the hanging bee motif wood attached along lines AB, EF, and DG!

Solution

Triangle ABC, triangle CEF, and triangle CDG are similar triangles, so $\frac{AB}{AC} = \frac{EF}{CE} = \frac{DG}{CD}$.

Length $CE = \frac{2}{3} \times AC$
$$= \frac{2}{3} \times 5$$
$$= \frac{10}{3} \ m$$

Length $CD = \frac{1}{3} \times AC$
$$= \frac{1}{3} \times 5$$
$$= \frac{5}{3} \ m$$

To determine the length of EF then
$$\frac{AB}{AC} = \frac{EF}{CE}$$
$$\frac{6}{5} = \frac{EF}{\frac{10}{3}}$$
$$EF = \frac{6 \times \frac{10}{3}}{5}$$
$$EF = \frac{60}{15}$$
$$EF = 4 \ m$$

To determine the length of DG then
$$\frac{AB}{AC} = \frac{DG}{CD}$$
$$\frac{6}{5} = \frac{DG}{\frac{5}{3}}$$
$$DG = \frac{6 \times \frac{5}{3}}{5}$$
$$DG = \frac{30}{15}$$
$$DG = 2 \ m$$

So, the length of the hanging bee motif wood attached along lines AB, EF, and DG is $5 + 4 + 2 = 11 \ meter$.

Example 5 (Geometry Transformations: Translation)
Look at the image of the hanging bee motif below.

If a bee carving motif depends on the coordinates $(1,1)$ is translated by $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$. What are the coordinates of the image of the motif?
Solution

The starting point$(1,1)$ is translated by $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$

Then the image formed is $(1 + 1, 1 + 0) = (2,1)$

So the result of translating $(1,1)$ by $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$ is $(2,1)$.

Example 6 (Geometry Transformations: Reflection)
Look at the following image.

Determine the reflection results of points A and B on the wooden door motif via the y axis!
Solution
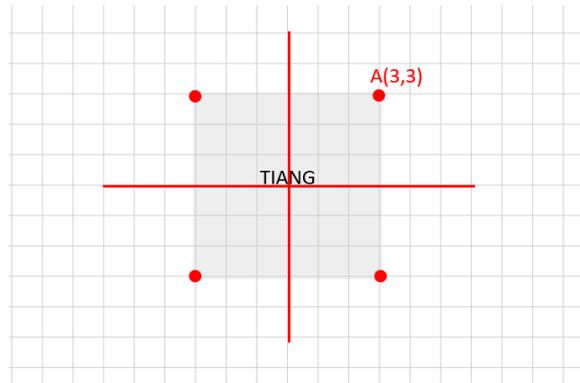The image of point $P(x,y)$ reflected on the y-axis is $P'(-x,y)$.
Then the image of point $A(-2,3)$ on the y-axis is $A'(-(-2), 3) = (2,3)$ and the image of point $B(1,1)$ on the y-axis is $B'(-1,1)$.

Example 7 (Geometry Transformations: Rotation)
Look at the following image.

The motif of the pillars of the Pekanbaru City Traditional Hall building when displayed in Cartesian coordinates is as follows.

If the first motif at point $A(3,3)$ is rotated $90°$ from point $O(0,0)$ and this rotation is done three times, then determine the coordinates of each motif!

Solution

The image of point $A(3,3)$ is rotated by $90°$ about point $O(0,0)$ is $A'(-3,3)$.
The image of point $A'(-3,3)$ is rotated by $90°$ about point $O(0,0)$ is $A''(-3,-3)$.
The image of point $A''(-3,-3)$ is rotated by $90°$ about point $O(0,0)$ is $A'''(3,-3)$.

Example 8 (Geometry Transformations: Dilation)
Look at the following image.

The hanging bee decoration motif in the image has been dilated. If the length of the smallest motif is 2 m and 4 m respectively. Determine the dilation scale used!

Solution

Scale of dilation $= \dfrac{Image\ length}{Object\ length}$

$$= \frac{4}{2}$$

$= 2$

So, the dilation scale used is 2.

4 Conclusion

Pekanbaru City Traditional Hall Building as one form of traditional house is part of Riau Malay culture. In the Pekanbaru City Traditional Hall Building, terdapat bagian bangunan yang memiliki keterkaitan dengan konsep matematika seperti bentuk bangunan secara umum, atap, pintu, tiang, hiasan dinding, serta motif-motif daerah yang melekat pada setiap bagiannya. Hasil analisis menunjukkan bahwa materi-materi matematika yang dapat diungkap pada bagian-bagian ini adalah Symmetry, Sequence, Flat Shapes, Pythagoras Theorem, Congruence, Geometric Transformation, Space Shape. The results of this study are expected to be examples and learning resources that can be used by teachers in school mathematics learning.

Thank You

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