

ETHNOMATHEMATICS OF JAVANESE WEDDING CULTURAL WISDOM

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ABSTRAK

Etnomatematika merupakan suatu kajian budaya yang kita miliki terhadap matematika. Penelitian ini bertujuan untuk mendeskripsikan tradisi dan mengidentifikasi aktivitas-aktivitas etnomatematika yang ada pada upacara adat pernikahan suku Jawa dari mulai pengenalan calon pasangan, tata cara melamar, persiapan pernikahan, sampai dengan penyelenggaraan acara pernikahan. Metode penelitian yang digunakan dalam penelitian ini adalah metode kualitatif dengan teknik pengumpulan data yang bersifat kepustakaan atau studi pustaka (library research) dan wawancara kepada narasumber berkaitan dengan etnomatematika kearifan budaya pernikahan jawa. Objek pada penelitian ini sudah menyeluruh dan memiliki ruang lingkup yang lebih luas dari jurnal sebelumnya yang tertuju pada satu objek saja. Dalam penelitian ini dijelaskan rangkaian pernikahan adat jawa dari awal hingga akhir. Penelitian ini membantu mengidentifikasi aktivitas etnomatematika yang terkait dengan upacara adat pernikahan suku Jawa, seperti aktivitas menghitung dalam ritual penentuan hari baik pernikahan, kajian geometri, dan kajian transformasi geometri. Selain itu, penelitian ini juga membantu menggali konsep-konsep matematika yang terkandung dalam kearifan budaya pernikahan Jawa, seperti konsep pembagian dan penjumlahan bilangan.

Kata kunci : Etnomatematika, Matematika, Perhitungan, Pernikahan

ABSTRACT

Ethnomathematics is a study of the culture we have towards mathematics. This research aims to describe the traditions and identify the ethno-mathematical activities that occur in traditional Javanese wedding ceremonies, starting from introducing the prospective partner, procedures for proposing, wedding preparations, to holding the wedding ceremony. This research uses qualitative research with data collection techniques in the nature of literature or library research and interviews with sources related to the ethnomathematics of Javanese wedding cultural wisdom. The object of this research is comprehensive and has a wider scope than previous journals which focused on just one

object. In this research, the series of traditional Javanese weddings from beginning to end is explained. This research helps identify ethnomathematics activities related to traditional Javanese wedding ceremonies, such as counting activities in the ritual of determining a good wedding day, geometry studies, and geometric transformation studies. Apart from that, this research also helps explore mathematical concepts contained in Javanese wedding cultural wisdom, such as the concept of dividing and adding numbers

Keywords: *Calculation, Ethnomathematics, Marriage, Mathematic*

INTRODUCTION

Culture is one of the identities of a region that shows the characteristics of that region. Especially Central Java, which still strongly adheres to its traditional culture, one of which is Javanese traditional marriage. Barouwn believes that culture is a set of attitudes, values, beliefs and behavior shared by a group of people which are communicated from one generation to the next through language or some other means of communication (David, 2008). Marriage is a very important event in human life. The basics of marriage are formed by the natural elements of human life itself which include biological needs and functions, giving birth to offspring, the need for love and brotherhood, nurturing these children to become perfect members of society. Marriage itself has an important meaning in human life, because it contains elements of the rights and obligations of each party, regarding matters of family life that must be fulfilled, both the rights and obligations of husband and wife as well as the existence of marital status, children, wealth, inheritance. and population factors in the order of social life (Fahmi, 2014).

In Central Javanese culture there are customs that must be carried out when a man and woman are united in a marriage bond which is called the adat procession. Weddings carried out by the people of Central Java are a procession that is considered important and is full of meaning in all its procedures (Koentjaraningrat, 2000). The essence of marriage, apart from being something sacred, complicated, unique and fun, is ideally done with a happy heart, full of love and affection, a set of knowledge about the rules and procedures for building a happy household, and of sufficient age (Safrudin, 2017).

A person's knowledge and understanding will lead him to have the awareness and tolerance to live with his partner and save himself from various

temptations. Meanwhile, being old enough makes a person able to think and act maturely in making decisions. Considering the high level of philosophical values in traditional Javanese wedding traditions and rituals, this article is directed at revealing the values in Javanese traditional wedding sakinah family traditions and rituals. Therefore, people who want to carry out these rituals and traditions cannot only carry them out without understanding the spirit and philosophical values contained in them (Safrudin, 2017).

Meanwhile, the aim and benefit of this research is that the author wants to know how Javanese traditional wedding ceremonies work, from introducing the prospective partner, procedures for proposing, wedding preparations, to holding the wedding event. Javanese traditional wedding ceremonies which contain religious values are expected to be beneficial for the bride and groom in navigating the household ship (Fahmi 2014).

The object of this research is comprehensive and has a wider scope than previous journals which focused on just one object. In this research, the series of traditional Javanese weddings from beginning to end is explained. This research helps identify ethnomathematics activities related to traditional Javanese wedding ceremonies, such as counting activities in the ritual of determining a good wedding day, geometry studies, and geometric transformation studies. Apart from that, this research also helps explore mathematical concepts contained in Javanese wedding cultural wisdom, such as the concept of dividing and adding numbers. Thus, research on ethnomathematics of Javanese wedding cultural wisdom contributes to enriching our understanding of the relationship between mathematics and Javanese culture.

This research method uses a type of qualitative research with data collection techniques that are literature or library studies (library research) and interviews with sources related to the topic of this journal. Data collection techniques were carried out by conducting interviews with sources related to Javanese traditional calculations and weddings as well as library research and digital information searches with the target of literature study objectives. In the analysis process, the data obtained is described in the discussion. Synthesis is carried out by using cross links between the collected data and relevant theories and concepts. Then the main

point can be taken which is then processed into several conclusions. The conclusions are strengthened with related suggestions and recommendations.

DISCUSSION

Ethnomathematics is the mathematics used by groups from different cultures, for example: Farmers, teachers, children from certain groups, lower classes, professional classes and others. Mathematics has an abstract power that is able to abstract various problems both in mathematics itself and problems that often arise in everyday life, because mathematics can solve problems quickly and besides that mathematics is a definite science (Ubiratan d'Ambrosio, 1985). In a group or group of people must have an identity that makes the group different from other groups. This difference then gave rise to ethnomathematics. Ethnomathematics focuses on the discussion of mathematics related to the culture around us.

The Javanese tribe has a very diverse hereditary culture, one of which is Javanese marriage customs. Marriage is a decisive first step in the process of building a happy and harmonious family (Kamal Fahmi, 2014). Javanese traditional marriage has many processions that make this marriage something sacred and beautiful at the same time. The wedding procession in Javanese customs has the following stages (Cakraningrat Harya K.P, 1994):

1. Determining the match or not (good or bad) the results of calculations for marriage on the day and market:

To calculate the match or not of the bride and groom by determining the calculation of weton, market, and the day of birth of the bride and groom. The values contained in the name of the day and market are called neptu.

Table 1. Days and neptions

Sunday	5
Monday	4
Tuesday	3
Wednesday	7
Thursday	8
Friday	6
Saturday	9

Table 2. Markets and opportunities

Kliwon	8
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Sweet	5
Pain	9
Pound	7
Wage	4

a. Marriage calculation using modulo 5 and its meaning

Using the days and markets for the prospective bride and groom with the initials A (Saturday Kliwon) and K (Monday Wage), as follows:

Table 3. Calculations using the modulo 5 formula

Saturday	Kliwon	Amount
9	8	17
Monday	Wage	Amount
4	4	8
Amount		25
25 mod 5 = 0, in this calculation, 0 is implied 1		

Table 4. Meaning of the remaining modulo results above

Reast	Meaning	Meaning
1	Sri	Congratulations, you always (alternately) get good luck
2	Dana	Rich
3	Lara	Difficulty
4	Pati	Miserable, often death
5	Lungguh	Rank

b. Marriage calculation using modulo 7 and its meaning

Using the days and markets of the prospective bride and groom with the initials A (Saturday Kliwon) and K (Monday Wage), as follows:

Table 5. Calculations using the modulo 7 formula

Saturday	Kliwon	Amount
9	8	17
Monday	Wage	Amount
4	4	8
Amount		25
25 mod 7 = 4		

Table 6. Meaning of the remaining modulo results above

Reast	Meaning	Meaning
1	Wasesa Segara	Willing to forgive, kind, (great personality), dignified, open-minded.
2	Tunggak Semi	Lots of Fortune.
3	Satriya Wibawa	He obtained glory and nobility
4	Sumur Sinaba	As a source of knowledge or a place to ask questions.
5	Sumur Wirang	Bearing hardship, (affected by death) shame, the antidote is blood: slaughtering animals.
6	Bumi Kapetak	He has a troubled heart, works hard, endures suffering, always maintains cleanliness, his repellent is planting soil.
7	Lebu Katiup Angin	His wishes were not granted, he often moved houses, he was miserable, his rejection spread the ground.

c. Marriage calculation using modulo 9 and its meaning

Using the days and markets for the prospective bride and groom with the initials A (Saturday Kliwon) and K (Monday Wage), as follows:

Table 7. Calculations using the modulo 9 formula

Saturday	Kliwon	Amount
9	8	17
Monday	Wage	Amount
4	4	8
Amount		25
$25 \text{ mod } 9 = 7$		

Table 8. Meaning of the remaining modulo results above

Remainder	Meaning	Meaning
1,4,7	Guardian	Not good
2,5,8	Chief	Currently
3,6,9	Bride	Good

The stage of calculating whether you are a soul mate or not (good or bad) in traditional Javanese marriages contains mathematical elements, the concept of dividing the remainder or modulo. This stage aims to avoid bad incidents during the wedding procession and while living married life. For example, if

an unfavorable result is found, a strategy will be given by carrying out certain conditions either before, during or after the wedding procession. Like the results of our interview with a man with the initials S (Javanese marriage calculator) who said that even though there are 3 ways to calculate using modulo 5, 7, and 9, it will produce the same meaning, depending on the confidence of the calculator who is entrusted with calculating the soul mate or not and good day by the families of the bride and groom.

2. Installation of Tarub

Less than a few days before the bride and groom meet, according to the calculation of days that are considered good, the tarub is placed. Tarup Gepete consisting of: woven coconut leaves, wulung bamboo poles (pucang), yellow coconut leaves, sweet cengkir and ivory cengkir, banana fruit (bundan), sugar cane, rice, otek, installed around the ward/pendapa of the house, around the gamelan, door outside gate, and put two coconuts still in skin and tied one to the other into a well or bathtub. Before placing the tarub, just like during the wedding ceremony, namely choosing or calculating good days, as follows:

Table 9. Placement of Tarub and Ijab according to date and week:

Date	Hour				
	06.00-08.23	08.24-10.47	10.48-13.11	13.12-15.35	15.36-17.59
1,6,11,16,21,26	Ahmad	Jibril	Ibrahim	Yusuf	Israil
2,7,12,17,22,27	Jibril	Ibrahim	Yusuf	Israil	Ahmad
3,8,13,18,23,28	Ibrahim	Yusuf	Israil	Ahmad	Jibril
4,9,14,19,24,29	Yusuf	Israil	Ahmad	Jibril	Ibrahim
5,10,15,20,25,30	Israil	Ahmad	Jibril	Ibrahim	Yusuf
Sweet	Pitutor	Rejeki	Slamet	Pangkalan	Pacakwesi
Pain	Rejeki	Slamet	Pangkalan	Pacakwesi	Pitutor
Pound	Slamet	Pangkalan	Pacakwesi	Pitutor	Rejeki
Wage	Pangkalan	Pacakwesi	Pitutor	Rejeki	Slamet
Kliwon	Pacakwesi	Pitutor	Rejeki	Slamet	Pangkalan

When installing tarub there is an element, namely the concept of multiples of numbers. The day for installing tarub is chosen from the three calculations in Table 9, but in choosing the time it must fall on: slamet, good or good luck, sufficient. The concept of multiple numbers in the installation of tarub is intended so that the bride and groom while sailing the household ship can get safety, goodness and be provided with sustenance.

3. Traditional Javanese wedding ceremony dishes At traditional Javanese wedding ceremonies, the dishes served have certain symbols that are intended for good during the wedding ceremony procession.

Table 11. Various dishes for the bridal celebration ceremony and their meanings

No	Kinds of dishes	Meaning
1.	Apem, Kolak, Sticky Rice, Natural rice (white rice, kuluban, boiled egg) without any salt taste.	Ancestors, please rest assured
2.	Nasi golong lulut (white rice in a ball, layered and covered with an omelet).	Please unite humans with the Creator/God
3.	Gebuli rice with side dishes: boiled egg, fried, whole shallots fried with asren (babad, iso, ati) and brewed coffee.	Seh Abdulkadir Jaelani
4.	Salak sticky rice	Kanjeng Panembahan Senopati
5.	Grilled beef liver and opium	The one who protects Gilang
6.	Salak sticky rice, chicken egg pindang	Kanjeng Sultan Agung
7.	Kolak Kencana (whole mas banana with skin)	Kanjeng Ratu Kidul
8.	The punar sticky rice (yellow sticky rice) is lightly layered and covered with an omelet.	Kanjeng Panembahan Bodo
9.	Dawet	Sang Hyang Antaboga
10.	Rujak Degan (young coconut salad)	Please be in good health
11.	Mancawarna sticky rice (sticky rice in 5 colors: Red, green, yellow, white and blue)	Metal type: gold, iron diamond
12.	Arang-arang kembang (dry and then fried rice put in brown sugar sauce with coconut milk), opak angin, kueh jipang.	Wind
13.	Padamara vegetables (kale, meat with spices, shallots, bay white, laos, coriander, cumin, sugar, sem, shrimp paste, salt). Jongkong (rice flour anointed with lime water and brown sugar, wrapped with banana leaves filled with banana pieces and then steamed) and intil (made from sticky rice), which is ground and steamed and not wrapped/filled with bananas	Please be harmonious/peaceful forever
14.	Tumpeng robyong (a mountain of white rice topped with boiled eggs, grilled shrimp paste, shallots and chilies and skewered with a blade/bamboo where the chilies are placed at the top). On the slopes of the tumpeng are placed various vegetables (kuluban) so that there are mountains of white rice stewed with vegetables (kuluban). Filled with tumpeng robyon, tumpeng bald: white rice without side dishes.	Ask for eternal safety
15.	Nasi walimah (nasi punar = yellow rice)	This celebration ceremony falls on the wedding ceremony
16.	Pliringan porridge (red porridge) is side by side with white porridge. Palang porridge (red covered with white crosswise) clear porridge (sungsum porridge = made from rice flour and coconut milk).	

Dishes in the implementation of traditional Javanese weddings are very diverse, most of the traditional Javanese wedding dishes contain elements of spatial geometry and flat geometry. The selection of dishes in Javanese weddings also considers the meaning contained in the dishes, as listed in table 11.

4. Terms and Sajen Mantu

The requirements and sajen mantu are in the form of :

- a. Sajen patanen (kobongan) in the sentong/middle room, in the form of: empluk containing keluwih leaves, dadap srep, any weeds, kara, gepak jendul candlenut seeds, kluwak, objects, lattice, mirror, comb, suri, telon oil (made from jasmine, kenanga, kantil), new mat, kendi, damar, cuplak, market snacks, sundulangit oil, coconut sugar one tangkep, 1 catty of rice, banana ayu, betel nut ayu, gambier, jambe with its stalk, boreh flower, frankincense, sugar cane, red and white porridge, baro-baro porridge, roasted jadah, live chicken, pindang antep, buffalo head (can be replaced by part of the buffalo head), and kalak, which is : grilled fish skewered without seasoning, and a quarter or 19 ½ cents rong wang.
- b. Pedaringan offerings. The offerings are the same as above, only without pindang antep and kalak.
- c. Must plant empluk containing green beans, candlenut seeds that are gepak jendul, bottle oil mixed with fish water/gereh petek, soybeans, raw chicken eggs, gantal, bottles. The purpose: so as not to be affected by teluh/gunaguna, tenung, which is planted in front of the patanen (kobongan) in front of the big door, in front of the kitchen and the intersection (crossroads).
- d. Discard: Empuk containing gereh / petek fish, soybeans, green beans, candlenuts, chicken eggs, gantal, a mixture of water and oil in each bottle, boreh flowers, porridge: red and white, baro-baro, raw gecok, all of which are placed in a takir and each takir is given 2 cents. After that, it is put on the : patanen (kobongan), gandok, east/west side of the building (house) all

corner doors, bathroom wells, toilets, trash cans, street intersections, courtyard doors, and gamelan places.

- e. Special requirements: Taking sand from Sitinggil ward, reciprocal banyan leaves from ringin kurung (sengkeran) trees in the east and west, namely: Kanjeng Kyai Jayandaru and Dewandaru, take garbage from Pasar Gede to cook rice, water from the estuary/battle put in a jug or klemuk for offerings.

From the offerings used in traditional Javanese weddings contain elements of geometry of space and flat planes (Lestari F. D. A., Lystia S.N., Prasetyo D. A. B., 2020). In addition, it also contains elements of mathematics Number concepts (ordinary and mixed fractions).

The selection of these special offerings and conditions considers the good for the bride and groom.

5. Paningset (Proposal)

Peningset / Sasrahan / proposal made by the male party is usually accompanied by : Buffalo serakit (2 heads) given a cinde necklace, the horns are plated with silver (if the situation is urgent, it is enough to be whitewashed instead of silver). A pair of geese, a chicken carried in a cinde or sindur cloth. If one of the prospective in-laws is pregnant, the hen must be a broody one. Likewise, if one of the prospective in-laws has died, a gong/bende is used when proposing. The meeting of the two prospective brides must be locked up using lawe wenang segelondong. Six palanquins each containing:

- a. First palanquin: chili stalks, eggplant stalks, parijata/ranti stalks, sugar cane, 2 pieces each. only the sugar cane stalks are not put into the palanquin, just carried by the person.
- b. Second palanquin: Rice, coconut one basket (a bunch). Coconuts can also not be put into the palanquin, but carried. Usually one pikul contains approximately 25 pieces.
- c. Third palanquin: Dandang, kendil, kettle, kenceng, siwur/gayung, made of copper. Plus iyan and ilir.
- d. Fourth palanquin: Gawangan, pendulum, wok, canting, mori/lawon/white cloth, and dakon.
- e. Fifth joli: Anggi-anggi (Jamu gallan) placed in a pon-jen with a cinde lid with 25 red rupiahs, which are put into a bag. (25, red rupiah = f. 20.84).

f. Sixth joli: Rice, meat, side dishes, snacks/snacks.

The march of the sasrahan/lamaran is arranged in such a way as : A serakit buffalo, a pair of geese and chickens carried in a cinde/sindur cloth, a pair of arjuna cane held, then each palanquin from the first to the sixth. At the woman's place, they are welcomed with the nalaganjur gamelan. The men sit on the front porch/pendapa, while the women go straight to the back.

In this proposal procession there are mathematical elements of calculation and geometry, namely in the calculation of money given to pay for needs related to marriage and in the food submitted by the bride.

6. Siraman of the bride to be

Before the midodareni night, the bride-to-be is bathed, shampooed, with setaman flower water (water sprinkled with 2 kinds of flowers). The whole body is rubbed with mancawarna rice flour (7 kinds) mixed with mangir, pandanwangi and kemuning leaves. Older relatives are bathed. The bride-to-be sits on a bench covered with a new mat with various leaves: apa-apa, kluwih, kara, dadapsrep, weeds. And cloth: letrek, Jingga, banguntulak, sindur, sembagi, selendang lurik puluh watu, yuyusekandang and mori/white cloth. If it is clean, it is then wuloni (ablution/washed with water placed in a clink/small pot), after which the clink is broken by the eldest of those bathing by exclaiming: "The pamor has been broken!" The offerings are placed close to the bathing place of the two mempelal candidates. Types of offerings: tumpeng robyong, tumpeng gundul, red and white porridge, market snacks/snacks bought at the market, flowers and live chickens.

The procession of siraman contains the mathematical element of the container to put water in the procession of siraman which is in the form of a tube. This shows that in the procession of this siraman contains elements of mathematical concepts of space geometry.

7. Midadaren Night

The groom comes to the bride's parents' place, called nyantri. Dressed in kesatriyan (pakatan like a king's son, gusti pangeran, bendara pangeran): cloth

and takwa shirt (sorjan) of silk, Jebahan headband, karset necklace, with safety pin, keris (Yogyakarta princely style). This Nyantri dress code may also apply to Surakarta, as this knightly attire is the basic attire for the bride and groom.

At approximately 7pm the groom arrives accompanied by relatives, friends, and is presented to the parents of the bride by one of the elders. After being accepted, they are then placed in the room that has been provided. This night, called midodarent night, who come as guests are from both sides of acquaintances, relatives of the bride and groom. In the banquet, the dishes are prioritized for the women (widodari). This is related to the story of Jaka Tarub who got the goddess Nawangwulan. The dishes are kuluban, hasi, eggs. Then added savory rice, chicken ingkung (chicken that has been cooked but still intact), bean sprouts, basil leaves, cabbage leaves, petals, jengkol, sambal pecel, sambal pencok.

There is also a tayub performance on the night of the midodareni, although this is only found in the Surakarta area. There are changes in accordance with the times, but the basic midodaren custom still continues.

This midadaren procession contains elements of number patterns in the difference between each event, namely with a difference of 30 minutes and the concept of measurement. So, if the first event starts at 19.00 and then the second event starts at 19.30. midadaren event is held at 19.00 so as not to disturb the worship time of Muslims.

8. Sanggan Pengantin (ransom)

At the time of the marriage contract, the groom must bring sanggan / ransom in the form of bananas ayu (ripe plantains and the fruit must be complete) as much as 2 sişir, betel nut ayu, flowers / bang telón, lattice, kapok cotton, rice (just a little), lawewenang, segelondong, mirror, comb, suri, incense $\frac{1}{4}$ catty, sundul langit oil in cupu, asam kunyit (2 pieces), coconut buds 2 seeds, selawat as much as rong wang telung duit ($19 \frac{1}{4}$ cents). All of these are given to the mother of the bride-to-be.

This procession contains mathematical elements of the concept of rational numbers. One of the members of rational numbers is the fraction number which in this procession is used to calculate the sanggan (ransom) that is brought during the marriage contract.

9. Akad Nikah

The groom is dressed in kampuh, kuluk, without jewelry and cloth with live animal motifs; he may also wear a cap and headband; the main condition is that he may not wear cloth with live animal motifs, nor may he wear gold jewelry. The dagger may be in suasa, silver or metal, as long as it is not gold. The front part of the hair may not be clipped. Sitting opposite the naib/penghulu. The naib faces east, north). The assistant of the penghulu/witness. sits in the south facing the bride-to-be facing west and the wali facing southwest (sits northeast.). Relatives of the bride and groom sit around the bride and groom. The dowry is white silver weighing one tail, and later replaced with rong semat (2 ringgit made of silver). After the marriage contract, sembah bekti to the parents of both parties. The blessings offered to the ancestors include nasi asah (ambengan), fried buffalo meat, brains, eyes, asren (liver, iso, babad, scrub), and red and white pindang.

The marriage ceremony is the most sacred part of any wedding process, Javanese or otherwise. The marriage ceremony contains the mathematical element of weight measurement used in measuring the weight of white silver used as a wedding dowry.

10. Groom's Makeup/Paes

On the same mat as when he was bathed, he sits down; the front part of his rembut is scraped. He wears kampuh ukup renda, cinde gubeg pants, blue kuluk matak, nyamat cengkih, bergelung keling, sişir mentul, gombyok kerls, and buntal, flowered handkerchief, ngumbar kunca, kelatbau, susun necklace, sumping, without clothes and dilulur/boreh.

The groom wears a kuluk matak shaped like a tube, a rectangular lace ukup kampuh, and the motif on the cinde gudeg pants which has a rhombus-shaped motif proves that in this procession, mathematical elements are not left out. This procession contains mathematical elements of plane geometry and space geometry.

11. Bride's Makeup/Paes

The night before, it has been scraped and then boiled which is made of wax recovered from dandanggula leaves. Makeup like jambangan, as many as 5 pieces where the center one is large and the left and right are small and smaller which are connected with godeg. At the end of the makeup, it is decorated with centung, because the shape is "nylekentung" standing (turning upwards) as many as 2 pieces on the right and left sides that are installed obliquely. The color of the powder is yellow, in the middle of the makeup is given the shape of a perching fly made of prada, eyebrows made like deer horns ranggah. The hairband is in the form of a prone box with finely sliced pan- and fragrant leaves with a jasmine flower base 2 inches long and the size of a bundle and is set in the center. On top of the hair coil, there are 5 or 7 combs and mentuls of which the center one is higher than the others. The subang is ronyok diamond, round sumping made of papaya leaves painted with prada, wearing bracelets, kelatbau, stacking necklaces. kampuh imitates the daughters of the palace, wearing cinde seredan cloth (like the cloth of the empress / king's daughter during the Grebeg celebration), a flowered cinde belt, wearing buntal and placed under the sanggapocong. What is meant by sanggapocong is baglan'kampuh which is rolled up and falls behind the top of the pocong (pantan). The ends of the buntal, dangle I on the left and right faces of the flowered handkerchief.

The bride has many accessories and makeup used during the Javanese traditional wedding process. Makeup on the bride contains elements of mathematics that many of us know is the shape of a triangular flat shape on the paesnya. Accessories that are used also contain elements of geometry, namely kesebangunan and kekongruenan.

12. Panggih Bride and Groom

Panggih means temu, kepangguh means to meet. So the panggih ceremony is a meeting ceremony between the groom and the bride. It is the culminating ceremony in a Javanese traditional marriage. In the panggih ceremony the groom and the bride sit side by side witnessed by the families of both sides of the bride and groom, and invited guests. The complete panggih ceremony consists of 16 stages and each stage contains philosophical meanings that are closely related to one another. The sixteen stages include:

a. Balangan Sirih (Sadak) Ceremony

The balangan sirih ceremony or balangan sadak (throwing betel) is a betel leaf (Java Suruh) rolled up with a thread inside filled with soft lime (Java injet) and Jambe tied together with white thread. After the groom and bride face each other with a distance of two meters stop. That's when the groom and bride compete to throw the betel nut. How to throw not together but race to throw it.

b. Wiji Dadi Ceremony

The wiji dadi ceremony is a request to God Almighty and the hope of the family, elders and pinisepuh that the bride and groom will succeed in fulfilling their biological duties to raise offspring.

c. Sindur Binayang

After the wiji dadi ceremony is complete, the Sindur Binayang ceremony continues, where the bride and groom stand in a row with the groom on the right and the bride on the left.

d. Nimbang Ceremony

After completing the sindur binayang ceremony, the Nimbang / weighing ceremony continues. When the father of the bride arrives in front of the aisle, the father sits in a position in the middle of the aisle. After that the father holds the bridal couple with the position of the groom on the right

and the bride on the left. After the bridal couple was on the father's lap, the mother asked her husband with the words "Abot endi Pak?" which was then answered by the father "on abote". In Indonesian "which weight sir?" answered by the father "the same - the same weight". The nimbang or weighing ceremony has a quite deep meaning, namely that the son-in-law has become his own child just like the bride who is her own child. Thus this ceremony is intended for the bride's parents to treat their son-in-law just like their own biological child.

e. Nandur Ceremony

After the nimbang ceremony is over, the nandur ceremony continues. In this ceremony the father stands opposite the bride and groom in front of the aisle seat. The father holds the groom's right shoulder and the bride's left shoulder. The meaning of this ceremony is to plant the bride and groom accompanied by a prayer to ask God so that the bride and groom who are planted can thrive in building a new household based on fertilizer of love.

f. Kacar-Kacur Ceremony

This ceremony symbolizes the giving of livelihood or the results of work or salary from the husband to his beloved wife. In this ceremony, it is symbolized by crops, such as rice, kitchen spices, soybeans, green beans, peanuts, and others of the same kind. The results of labor in the form of livelihood are handed over to the wife for the welfare of the family.

g. Kembul Dhahar Ceremony

This ceremony is also called the dulungan ceremony, where the groom and the bride bribe each other. The results obtained together need to be enjoyed together as well. Nowadays the wife works and gets a salary / income that is arranged together for mutual welfare.

h. Rujak Degan Ceremony

Degan is a young coconut and tastes fresh. Rujak degan means that the father and mother of the bride and groom are relieved or satisfied because they have carried out the hajad of marrying their daughter.

i. Mertui Ceremony

Other terms for mertui are "Tilik Pitik" and "Jemput Besan". In a traditional Javanese marriage, during the process of traditional ceremonies from No. 1 to 8, the father and mother of the groom are not allowed to attend. In this ceremony, the parents of the bride pick up the besan, namely the parents of the groom, which is then continued with the Sungkeman ceremony.

j. Sungkeman Ceremony

The Sungkeman Ceremony is also known as the Ngabekti Ceremony, which is a sign of respect and devotion physically and mentally from children to parents and to besan. If the grandparents (eyang kakung and eyang putri) are still alive, the bride and groom also receive sungkem.

k. Kalpika Exchange Ceremony

Tukar Kalpika (ring) is an infinitely rounded love ring that symbolizes the eternity of marriage, meaning that the hope is that those who have been united by God cannot be divorced by anyone

l. Welcome Ceremony

The welcome speech is actually the best opportunity for the stakeholder to convey a sense of joy and gratitude to God Almighty that his request has been granted, namely marrying his daughter. In addition, the stakeholder can directly express his gratitude to all those who have provided all kinds of assistance and apologize directly if there are things that are less pleasing to the invited guests and all parties involved in the implementation of the celebration.

m. Blessing Ceremony

The ceremony of giving prayers and blessings from the guests is a public testimony by the whole community that the bride and groom have officially become husband and wife. The point of this ceremony is for all invited guests to give prayers and blessings so that the newlywed couple will get happiness in building a new household.

n. Bridal Kirab Ceremony

Kirab is the procession of the bride and groom along with the entourage consisting of the parents of the bride and groom, their escorts and companions to leave the panggih room to the bridal chamber to change clothes. The purpose of the bridal procession ceremony is to provide an opportunity for all invited guests including committee members and helpers who work for the celebration to get a close look at the face of the newlyweds.

o. Banquet

If the reception is held at home then while the bride and groom are parading the guests have a meal together. If the reception is held at home, while the bride and groom are parading, the guests receive a meal. If the reception is held at a building, a meal is served while the guests give their blessings to the bride and groom and congratulate the parents of the bride and groom.

p. Dismissal Ceremony

As with the communal meal, the dispersal ceremony when the reception is held at home. The sign of the bubar ceremony is marked by the sounding of Gendhing - gendhing ayak - ayak Pamungkas. At that time the bride and groom accompanied by the parents of the bride and groom and several families stand in front of the terrace to receive the blessing of the guests, and after that the guests immediately go home. Unlike the bubar ceremony in the meeting hall, the bubar ceremony is only limited by the

time stated in the invitation letter, for example the reception is held at 19.00 - 22.00 in the evening and 13.00 - 15.00 if it is held during the day.

In the bridal procession there are mathematical elements of absolute value, geometry of dimensions one, two, and transformation, division, multiples and finally weight and size.

Basically, mathematics is a form of culture that integrates into all aspects of life (Safitri J. D., Rinaldi. A., Suherman, 2021). In the Javanese wedding procession, mathematical elements are found. There are several mathematical activities in traditional Javanese weddings including geometry concepts, number concepts, and measurement concepts.

Table 10. Mathematical concepts in Javanese traditional wedding calculations and processions

No	Description	Subject matter
1.	This type of dish, namely circular apem, has geometric elements..	Two-dimentional figure
2.	This type of dish, namely nasi golong wrapped in banana leaves, has geometric elements in the form of pyramids and corners.	Build Spaces and Corners
3.	The types of dishes, namely salak sticky rice, are circular and rectangular in shape and have geometric elements such as sharp, right and obtuse angles.	Build Planes, Spaces, and Corners
4.	A type of tumpeng robyong dish, namely a mountain of rice wrapped in banana leaves, has	

	geometric elements in the shape of a cone, as well as sharp, right and obtuse angles.	Build Spaces and Corners
5.	Sajen mantu patanen (uang rong wang seperempat or $19\frac{1}{2}$, water and oil $\frac{1}{2}$, botol kemenyan $\frac{1}{4}$ kati, serta pada tebusan selawat rong wang telung duit $19\frac{1}{2}$ sen)	Concept of numbers (ordinary and mixed fractions)
6.	Determining the date and time for tarub installation	The number pattern on the clock has a difference of 2 hours 23 minutes, while the date has a difference of 5. Open in Google Translate • Feedback
7.	The accessories used during the groom's make-up include a tube-shaped kuluk matak, a rectangular lace hem and a rhombus motif on the cinde gudeg pants.	Build flat, build space.
8.	The bride's make-up accessories on the head numbering 5 or 7 contain the concept of odd numbers, the bride's paes have a triangular shape, the stacked necklaces worn have 3 identical shapes but different sizes containing the concept of congruence, the shoulder straps worn on both arms have the same shape containing the concept congruent,	The concept of odd numbers, the geometry of similarity and congruence, and the geometry of flat shapes.
9.	In the marriage ceremony procession using a dowry, one tail of white silver contains the	Weight measurement concept.

	concept of measurement, namely one tail of silver is equal to 37.8 grams of silver.	
10.	Midodareni night At 19.00 the groom arrives with relatives. At 19.30 arriving to place guests with dishes at 20.00.	Number Pattern with 30 minute increments
11.	Bride and Groom Shower The water used for sprinkling is placed in a small klenting/crock. Then there are several types of offerings such as tumpeng robyong, tumpeng bald, red and white porridge, and market snacks. Klenting and several types of offerings demonstrate mathematical concepts in geometry.	Spatial Geometry
12.	<p>Balangan Betel Ceremony (Sadak)</p> <p>a. In the balangan betel ceremony, the absolute value is seen in the way the bride and groom face each other at a distance of two meters before throwing the betel</p> <p>b. In the balangan betel ceremony, first-dimensional geometry is seen in the form of betel inside with soft chalk and jambe tied with white thread, while second-dimensional geometry is seen in the form of the groom and bride facing each other two meters apart.</p> <p>c. In the balangan betel ceremony, the transformation is seen in the way the bride and groom compete to throw the betel inside with soft lime and tied jambe with white thread.</p>	Absolute Value, Geometry, and Transformations

13.	In the context of the wiji dadi ceremony, related ethnomathematics activities can include mathematical concepts such as division and multiples in traditional wedding ceremonies. Apart from that, absolute values can also be reflected in the family's hopes for the bridal couple to have children.	Absolute Value
14.	In the context of the Sindur Binayang ceremony, the connection with ethnomathematics can include mathematical concepts such as division and multiples in the layout of the bride and groom standing in a row. In addition, absolute value can also be reflected in the relative position of the groom and bride. The concept of geometry, both one dimension and two dimensions, can also be seen in the layout of the bride and groom standing side by side.	Geometry and Absolute Value
15.	In the context of the Sindur Binayang ceremony, the connection with ethnomathematics can include mathematical concepts such as division and multiples in the layout of the bride and groom standing in a row. In addition, absolute value can also be reflected in the relative position of the groom and bride. The concept of geometry, both one dimension and two dimensions, can also be seen in the layout of the bride and groom standing side by side.	Distribution. Multiples, Absolute Value
16.	In the context of the Nimbang ceremony, the connection with ethnomathematics can include mathematical concepts such as division and	Multiples, Weight, and Size

	<p>multiples in the layout of the bridal couple held on the lap by the bride's father. In addition, mathematical concepts such as weight and measure can be reflected in the question "which weight, sir?" and the answer "equally heavy".</p>	
17.	<p>The connection with ethnomathematics can include mathematical concepts such as division and multiples in the layout of agricultural products handed over to the wife. In addition, mathematical concepts such as weight and measure can also be reflected in the produce submitted. Other mathematical concepts such as measurement and calculation may also be involved in the Kacar-Kucur ceremony</p>	Division and Multiples
18.	<p>In the context of the Kembang Dhahar ceremony, the connection with ethnomathematics can include mathematical concepts such as division and multiples in the layout of the results that are fed together. Although not directly visible, mathematical concepts such as division and multiples can be reflected in the division of the results obtained together.</p>	Division and Multiples
19.	<p>At the Kalpika exchange ceremony, the connection with ethnomathematics is in the concept of geometry, namely the circle shape of the ring which symbolizes the eternity of marriage.</p>	Geometry
20.	<p>Although not directly related to mathematics, this ceremony can involve mathematical concepts such as division and grouping to ensure that all</p>	Distribution

	invited guests can enjoy the meal fairly and equally.	
21.	<p>Submission (Application)</p> <p>Arto : Almost all traditional weddings in Indonesia always have this component. Of course the names vary depending on the culture. In Javanese tradition, this first component is usually also called asok tukon orbayar tukon. The amount is relative, depending on capabilities, customs, and most importantly the agreement of both parties.</p> <p>Clothing: One of the basic human needs is clothing or clothing. This component is a symbol of the groom's ability to meet his wife's clothing needs. Usually the types are: party clothes with bags and shoes, work/everyday clothes with bags and shoes, toiletries and body care, facial care and make-up. Food: Food is also one of the basic needs besides clothing. The type of food chosen is usually keletan (sticky food such as sticky rice, wajik, jadah, etc.), fruit, regional specialties, usually also added with wet cakes and pastries..</p>	Calculation and Geometry

CONCLUSION

Based on the results of the description above, it can be concluded that the concept of ethnomathematics in Javanese wedding culture is very varied and interesting. In Central Java culture, there are customs that must be carried out when a man and woman are united in a marriage bond called a traditional procession.

Marriage carried out by the people of Central Java is a procession that is considered important which is full of meaning from all the procedures. In the customs of the Javanese tribe there are various things or cultures that have been passed down from our great-grandmothers and great-grandfathers. In the Javanese custom of marriage there are various processions in which there are unique elements contained in mathematics. In this journal there is a series of marriage ceremonies from the introduction of prospective spouses, procedures for proposing, wedding preparations, to organising wedding events. In some areas of Java, there are several traditional ceremonies that have been abandoned, but the cultural wisdom in Java is very diverse compared to other regions, so we can conclude that for the follow-up of this journal we will expand the scope of customs, not only in Java but outside Java as well. Javanese traditional marriage is one of the Indonesian cultures that must be preserved so that in the future it does not fade away with time.

It is hoped that further research can discuss more specifically on each Javanese traditional marriage procession.

REFERENCES

- Aditya, D. Y. 2017. *Eksplorasi Unsur Matematika Dalam Kebudayaan Masyarakat Jawa*. Jurnal Formatif.
- Aryanto Aris. 2023. *Etnomatematika Pada Penentuan Hari Baik Dalam Tradisi Membangun Rumah Jawa*, Sutasoma: Jurnal Sastra Jawa.
- Aziz Safrudin. 2017. *Tradisi Pernikahan Tradisi Pernikahan Adat Jawa Keraton Membentuk Keluarga Sakinah*, Institut Agama Islam Negeri (IAIN) Purwokerto
- Bratawijaya, Thomas Wiyasa. 2006. *Upacara Perkawinan Adat Jawa*. Jakarta: Pustaka Sinar Harapan.
- Hardjo, Soedjarwo S. 2000. *Tata Upacara Hajatan*. Jakarta. Sanggar Busana dan Budaya
- Kamal Fahmi.2014. *Perkawinan Adat Jawa Dalam Kebudayaan Indonesia*, Manajemen Administrasi ASM Bina Sarana Informatika.
- Lestari, F. D. A., Lystia, S. N., Prasetyo D. A. B. 2020. *Etnomatematika Pada Tradisi Pernikahan Masyarakat Desa Giring Kecamatan Paliyan*. Seminar Nasional Matematika dan Pendidikan Matematika (Sendika).
- Marsigit, dkk. 2016. *Pengembangan Pembelajaran Matematika Berbasis Etnomatematika*. Prosiding Seminar Nasional Etnomatematika UST. Yogyakarta.
- Mukaromah Lailatul. 2022. *Etnomatematika Pada Upacara Adat Pernikahan Suku Jawa Di Desa Tanjung Mulya Kabupaten Muko Muko Provinsi Bengkulu*, Pendidikan dalam Ilmu Matematika.

- Negoro. 2001. *Tata Cara Pernikahan Adat Jawa Tengah*. Yogyakarta : Pustaka Belajar
- Octaviana Frisca. 2014. *Implementasi Makna Simbolik Prosesi Pernikahan Adat Jawa Tengah Pada Pasangan Suami Istri*, Naskah Publikasi.
- Prasetyo, D. A. B., Utomo, B. & Putra, Dpw. 2021. *Etnomatematika Pada Tradisi Pernikahan Di Desa Giring Paliyan Gunung Kidul Dengan Analisa Bilangan Dan Pelabelan Modulo Graf*. Prosiding Sendika.
- Safitri Julia Dwi, 2020. *Eksplorasi Etnomatematika Pada Upacara Adat Pernikahan Suku Lampung, Jawa, Dan Bali*, Jurusan: Pendidikan Matematika
- Safitri Julia Dwi, Achi Rinaldi, Suherman. 2021. *Eksplorasi Etnomatematika Pada Upacara Adat Pernikahan Suku Lampung, Jawa, Dan Bali*, Pendidikan Matematika, Universitas Islam Negeri Raden Intan Lampung, Jalan Endro Suratmin, Sukarame, Bandar Lampung
- Suraida, Supandi, Prasetyowati, D. 2019. *Etnomatematika Pada Perhitungan Weton Dalam Tradisi Pernikahan Jawa*. Imajiner: Jurnal Matematika Dan Pendidikan Matematika 1.

