EDUMATIKA: *Jurnal Riset Pendidikan Matematika* *e-ISSN 2620-8911*
Volume 6, Issue 1, May 2023 *p-ISSN 2620-8903*

The Arithmetic Sequences in Making Traditional Cast Nets in Lombok

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Abstract. Mathematical concepts can be found in the culture of the community, such as in daily activities and handicrafts. One type of handicraft is the *pencar*, a cast net (throw net) fishermen use to catch fish. This research aims to explore the arithmetic sequences involved in making a *pencar*. This research uses qualitative research with ethnography. The study was conducted in Marong Village, West Nusa Tenggara, Indonesia. Data were obtained by direct observation of the pencar and the process of making it, interviews with cast-net handcrafters, and literature studies on arithmetic sequences. The results of this study show that there are three arithmetic sequences in the *pencar*. The first sequence, the number of anak (meshes) between each anakan (widener) in the n-th widener row, is 3, 4, 5, and so on, formulated by $U_n = 3 + (n - 1)$. In the second sequence, the number of anakan (widener) in the n-th widener row is 44, 45, 46, and so on, formulated by $U_n = 44 + (n - 1)$. The third sequence is quadratic; the number of lubang (meshes) in the n-th anakan is 44, 90, 138, 188, and so on, formulated by $U_n = n^2 + 43n$. The arithmetic sequences in *pencar* can be used as a problem context for culture-based learning in the arithmetic sequence topic.

Keywords: Arithmetic Sequence; Ethnomathematics; Lombok Handycraft; Tradisional Cast Nets

Abstrak. Konsep matematika dapat ditemukan dalam budaya masyarakat, seperti dalam aktivitas keseharian maupun kerajinan tangan. Salah satu jenis kerajinan tangan adalah *pencar* atau jala tebar yang digunakan oleh nelayan untuk menangkap ikan. Penelitian ini bertujuan untuk mengeksplorasi barisan aritmatika dalam pembuatan *pencar*. Penelitian ini menggunakan penelitian kualitatif dengan etnografi. Penelitian dilakukan di Desa Marong, Kabupaten Lombok Tengah, Nusa Tenggara Barat, Indonesia. Data diperoleh melalui observasi langsung terhadap *pencar* serta proses pembuatannya, wawancara dengan pengrajin *pencar*, serta studi literatur tentang barisan aritmatika. Hasil penelitian ini menunjukkan bahwa terdapat tiga barisan aritmatika pada *pencar*. Barisan pertama: banyak baris *anak* antara dua baris *anakan* adalah 3, 4, 5, dan seterusnya, yang dirumuskan dengan $U_n = 3 + (n - 1)$. Barisan kedua: banyak *anakan* dalam baris *anakan* ke-n adalah 44, 45, 46, dan seterusnya, yang dirumuskan dengan $U_n = 44 + (n - 1)$. Barisan ketiga adalah barisan aritmatika tingkat dua: banyak lubang pada *anakan* ke-n adalah 44, 90, 138, 188, dan seterusnya yang dirumuskan dengan $U_n = n^2 + 43n$. Barisan aritmatika pada *pencar* dapat digunakan sebagai konteks masalah dalam pembelajaran berbasis budaya pada materi barisan aritmatika.

Kata kunci: Barisan Aritmatika; Etnomatematika; Jala Tebar Tradisional; Kerajinan Tangan Lombok

Available online at journal homepage: https://ejournal.iainkerinci.ac.id/index.php/edumatika
Email: edumatika@iainkerinci.ac.id
DOI: https://doi.org/10.32939/ejrpm.v6i1.2541

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Volume 6, Issue 1, May 2023 *p-ISSN 2620-8903*

INTRODUCTION

Mathematics, within the academic realm, is renowned for its abstraction, making it often perceived as lacking contextual relevance. The challenge further intensifies as mathematics seeks to elucidate concepts beyond sensory experiences (Kou & Deda, 2020). Consequently, there arises a necessity for a conceptual bridge that can seamlessly connect mathematics with real-world applications (Wulandari & Setianingsih, 2022). In response to this need, ethnomathematics emerges as a viable bridge, offering a unique pathway to link mathematical principles with tangible, contextual issues.

Ethnomathematics, as defined by d'Ambrosio (2001) and Rosa & Orey (2011), entails the application of mathematical principles within cultural groups, encompassing the interpretation of mathematical ideas inherent in a given culture. This perspective broadens the understanding of mathematics, transcending conventional academic spaces, and extending its reach into various facets of community life and culture (Orey & Rosa, 2015; Rosa et al., 2016). An intriguing aspect of ethnomathematics lies in its capacity to unveil the often overlooked "hidden mathematics" within a culture, thereby shedding light on forgotten mathematical concepts (Alghar et al., 2023; Rosa & Orey, 2011). This nuanced approach underscores the richness of mathematical thought embedded in diverse cultural contexts.

Given its diverse tribes and cultures, Indonesia presents a wealth of cultural potentials ripe for exploration through the lens of ethnomathematics. Various ethnomathematical objects, serving as representations of community culture, can be discerned in traditional games (Taskiyah & Widyastuti, 2021), traditional house ornaments (Alghar et al., 2022; Delviana & Putra, 2022), calendar calculations (Ami, 2021; Umbara et al., 2021), as well as historical buildings (Alghar & Marhayati, 2023; Sulaiman & Firmasari, 2020; Nurfauziah & Putra, 2022). Furthermore, the geographical spectrum of ethnomathematics studies extends to encompass mountain and coastal communities, such as the coastal community of Lombok in West Nusa Tenggara. This multifaceted exploration emphasizes the expansive scope and richness of ethnomathematics within the context of Indonesia's cultural diversity.

The coastal communities of Lombok heavily rely on maritime activities, engaging in roles such as fishermen, traders of marine products, and manufacturers of fishing equipment (Setyadji & Nugraha, 2015). Traditional fishing methods, including the use of grills, lifts, and cast nets, are prevalent among the local fishermen, as highlighted by Mardhiyah et al. (2022) and Kholis et al. (2021). Particularly noteworthy is the enduring practice of crafting casting nets, a traditional tool deeply ingrained in the culture of Lombok's coastal community, as depicted in Figure 1. This cultural tradition, observed over an extended period, attests to the historical significance of net-making in the daily lives of the coastal inhabitants.

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Figure 1. Lombok Coastal Community Activities in Making *Pencar* Nets

The traditional fishing gear known as cast nets, referred to as *pencar* nets in the Lombok language, is characterized by a net measuring 3 to 5 meters in length, featuring weights on its sides (Indrahti & Maziyah, 2021). Crafted from nylon filament, this tool falls under the category of traditional fishing gear, recognized for its environmentally friendly attributes (Latuconsina, 2010; Rohadi et al., 2020). The methodology involves spreading the net across the water's surface and subsequently allowing it to sink, effectively ensnaring fish within its confines. When pulled by fishermen, the net entraps the caught fish, illustrating the practical and sustainable nature of this traditional fishing technique (Indrahti & Maziyah, 2021).

In contrast, numerous ethnomathematics studies have delved into the realms of waters, fishermen, and fisheries. Muzdalipah & Yulianto (2018), for instance, identified mathematical concepts intertwined with gourami counting techniques, encompassing activities such as buying and selling, as well as gourami breeding. Malalina et al. (2020) uncovered geometric shapes embedded in the tools employed by Musi River fishermen for fish-catching endeavors. Another study by Wulandari & Setianingsih (2022) shed light on the mathematical concepts employed by Tambak Bulak fishermen, encompassing tasks such as determining locations, measuring ponds, designing pond layouts, and calculating the number of fish seeds. These ethnomathematics investigations showcase the diverse and intricate ways mathematical principles are woven into the fabric of traditional fishing practices.

Earlier research in the domain of ethnomathematics within fisheries primarily centered on aspects such as fish cultivation (Wulandari & Setianingsih, 2022), calculations involved in buying and selling fish (Muzdalipah & Yulianto, 2018), and examination of geometric shapes present in fishing gear (Malalina et al., 2020). Notably, there has been a relative scarcity of studies investigating ethnomathematics in the craft of making nets. Consequently, this current study aims to address this gap by specifically focusing on the exploration of arithmetic sequences employed in the intricate process of crafting *pencar* nets within the coastal communities of Lombok. This research endeavors to contribute valuable insights into the mathematical intricacies inherent in the

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traditional skill of net-making, thereby enriching our understanding of ethnomathematics in the broader context of fisheries.

METHOD

This research adopts a qualitative research design employing an ethnographic approach, chosen to effectively elucidate the mathematical concepts inherent in the craft of making *pencar* nets. The ethnographic method involves a detailed examination of the entire process of crafting *pencar* nets, a significant fishing activity within the Lombok community. The research unfolds through a structured series of six stages. *The initial stage* involves preliminary activities where the researcher defines the research theme, object, and location. The overarching theme explored in this study is ethnomathematics within the context of exploration. The research object encompasses the intricate process of fashioning fishing nets, specifically from the penembek phase to the 10th anakan stage, culminating in a net size of 2.5 meters. The research is conducted in Marong Village, West Nusa Tenggara, Indonesia.

Moving on to *the second stage*, the research question phase involves defining the specific problem to be investigated, which in this case is the exploration of the concept of arithmetic sequences in the craft of making *pencar* nets. Subsequently, *the third stage* revolves around data collection. Various techniques are employed, encompassing literature studies, observation, documentation, and interviews. Literature studies involve an extensive review of books, journal articles, and proceedings focusing on ethnomathematics in coastal areas, the net-making process, the concept of arithmetic sequences, and the daily life of fishing villages in Marong Village. Observations are conducted by actively witnessing, recording, and photographing each stage involved in crafting *pencar* nets. The outcomes of these observations are meticulously documented in the form of pictures and field notes. Furthermore, interviews are carried out with two key informants, Mr. Mamiq Nilam and Mr. Lalu Gunasar, both esteemed residents of Marong Village who possess active expertise in the traditional art of making fishing nets.

Advancing to *the fourth stage*, the data analysis phase, the primary dataset encompasses observations, interviews, documentation, and insights derived from literature studies. To ensure the credibility of the data, triangulation techniques are applied for validation. The data is initially described and subsequently subjected to analysis. In *the fifth stage*, designated as the results and discussion phase, the findings from the data analysis are interpreted, presented through descriptions, and summarized in tables. Additionally, the outcomes are contextualized by comparing them with other relevant studies and exploring the mathematical concepts inherent in the crafted *pencar* nets. Finally, *the sixth stage* entails the conclusion phase, wherein the research's

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Volume 6, Issue 1, May 2023 *p-ISSN 2620-8903*

key findings are synthesized to address the initial research question. The sequential flow of these stages is illustrated in Figure 2, providing a comprehensive overview of the research process.

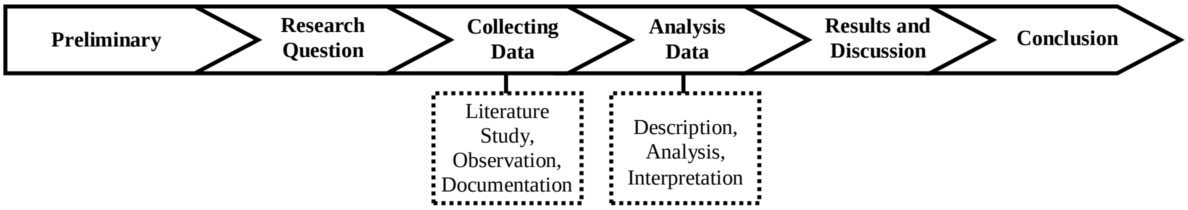

Figure 3. Six Stages of Research

RESULTS AND DISCUSSION

Exploration Results in Making *Pencar* Nets

As per the initial observations, the crafting of throwing nets among the coastal community in Lombok involves the utilization of nylon, *suri* (gage stick), and *suban* (shuttle) as essential tools and materials, as depicted in Figure 3. Nylon thread serves as the primary material for constructing spread nets. *Suri*, crafted from bamboo, functions as a tool to ensure uniformity in the size of the loops within the net. Meanwhile, *suban*, also made from bamboo and shaped like a needle, acts as a connecting hook between individual net loops. This setup illustrates the meticulous use of specific tools and materials in the intricate process of creating throwing nets within the cultural practices of the Lombok coastal community.

(a) (b) (c)

Figure 3.The Tools Used in Making *Pencar* Nets: (a) Nylon Thread, (b) *Suri* (Gage Stick) , (c) *Suban* (Shuttle)

Table 1 outlines local terms, their corresponding English terms, symbols, and descriptions related to the processes and components involved in crafting *pencar* nets in Lombok.

Table 1 Local Terms, Symbols, and Descriptions

Local Terms	**English Terms**	**Symbol**	**Description**
Penembek	Horn	*P*	The *penembek* is a circular area that serving as the starting knot for the *pencar*.
Anakan	Widener Row	*A*	The *anakan* is the area of the mesh bounded by *anak*.
Anak	Widener	*a*	The *anak* is an additional node created at a certain distance to widen the shape of the *pencar*.
Lubang	Meshes	*L*	The *lubang* is the netting hole formed when four strands of twine are knotted or knitted together.

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Based on preliminary observations, it is evident that the people of Lombok engage in the crafting of *pencar* nets through a two-stage process, encompassing the *penembek* and *anakan* stages.

Penembek Process

The *penembek* process, in Lombok terms, begins with creating a *pencar* nets center. This process is done by winding nylon thread on a *suban*. Then, a nylon thread is tied to the center of the *pencar* nets. Next, the nylon thread is broken down and knitted to form a net. Knitting is done with dead knots so that the *pencar* nets do not shift quickly and do not change size. The *penembek* process determines the size of the nets to be made. The more *penembek* processes, the larger the size of the *pencar* nets to be made.

Based on Table 1, *penembek* is a circular area that serves as the starting node for the *pencar* net. The starting knot on the *penembek* acts as the starting point for hooking the nylon threads. Usually, the *penembek* consists of several *lubang*, after which an *anak* is made. *Lubang* is a loop in the net. The *anak* is an additional node made with a certain distance to widen the shape of the net. On the other hand, *anakan* is the area on the net bounded by *anak*.

Based on the results of observations and interviews, the process of making *pencar* nets is in the *penembek* process and *anakan* process. The *penembek* process is the initial process of making *pencar* nets. This process produces a center *pencar* net that looks like a circle. The *penembek* process is often referred to as the prefix. The result of this process is 50 *lubang*. Then the penembek continued by making the first *anakan*. The results of the *penembek* process are shown in Figure 4.

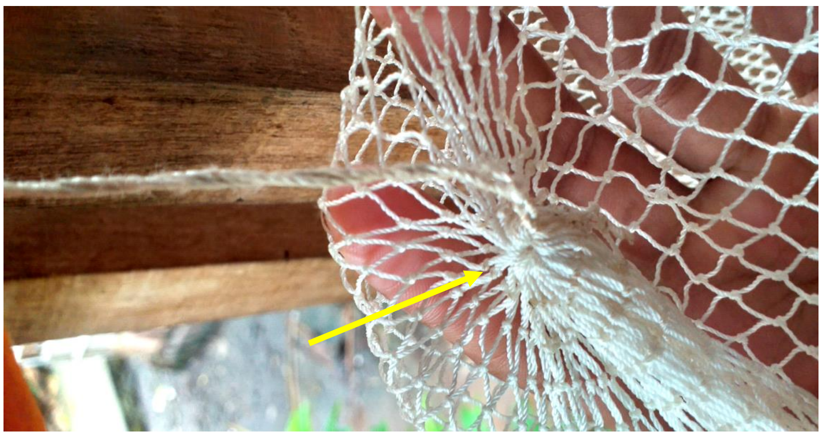

Figure 4. The results of *penembek* process.

Then, the *penembek* process is continued with the *anakan* process. The *anakan* process forms a new *lubang* that will later connect other threads. In other words, the more *anakan*, the larger the net's diameter.

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Anakan Process

When knitting nets, the *anakan* process is carried out. The *anakan* process is the process of adding loops so that the mesh diameter gets more extensive. The number of *anakan* determines the size of the *made pencar nets*. The first *anakan* is done when the nets are knitted four times down. After the first *anakan* area has been determined, a new loop called the *anak* is made, shown in Figure 3. After the first *anak* is made on the first *anakan*, the second *anak* is made with a distance of two loops from the first *anak*. And so on, until the last *anak* in the first *anakan* is two loops from the first *anak*. Figure 5 exemplifies the *anakan* process in manufacturing *pencar* nets.

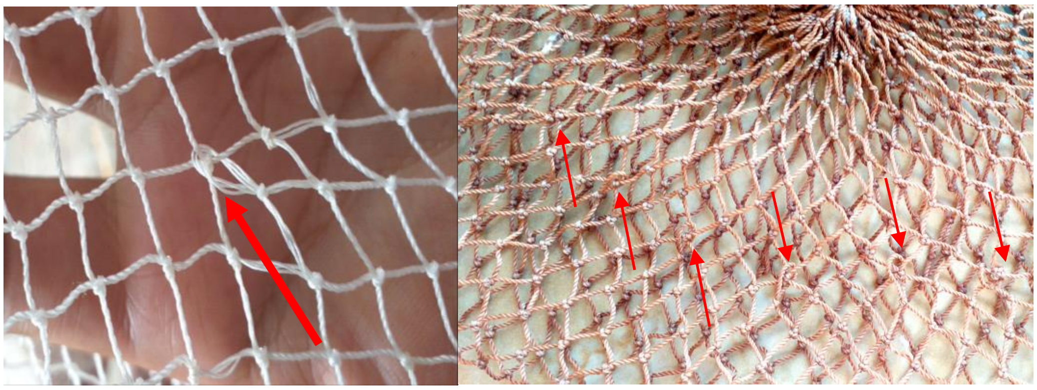

Figure 5. *Anak* (red) in *Anakan*

The second *anakan* is made five loops down from the first *anakan*. Then, the *anak* is given to the second *anakan*, with three loops to the side for each *anak*. The third *anakan* is made six loops down from the second *anakan*. At the same time, the *anak* in the third *anakan* is four loops to the side. And so on, the process of *anakan* and *anak*, until the desired size of the *pencar* net is obtained. The process of determining the *anak* and *anakan* in making *pencar* nets has a particular pattern.

The First Anakan (A_1)

The first *anakan* (A_1) is done when the net *lubang* is knitted four times. There are 44 *anak* and 50 *lubang* in the first *anakan*. The distance of each *anak* in the first *anakan* is two *lubang*. The second *anak* ($a_{1,2}$) is made of two *lubang* to the side of the first *anak* ($a_{1,1}$). The third *anak* ($a_{1,3}$) is made of two *lubang* to the side of the second *anak* ($a_{1,2}$). And so on until the 44th *anak*($a_{1,44}$) in the first *anakan*. The sketch of the first *anakan* is shown in Figure 6.

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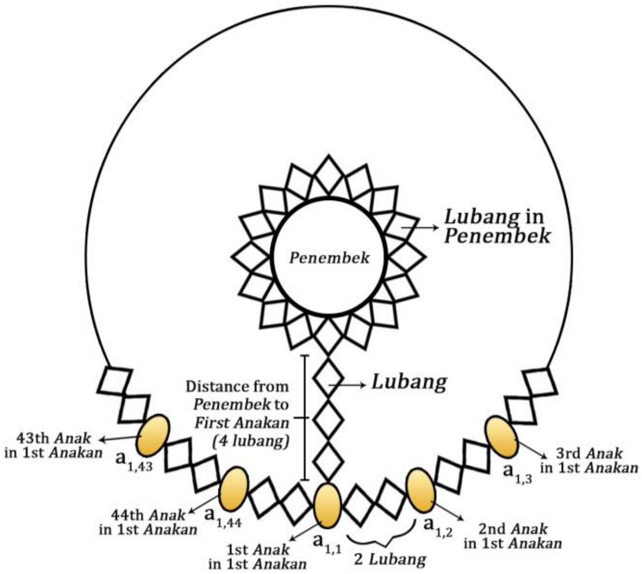

Figure 6. Sketch on the First *Anakan*

The Second Anakan (A_2)

The second *anakan* (A_2) is done when the *lubang* of the net is knitted down five times from the first *anakan* (A_1). There are 45 *anak* and 90 *lubang* in the second *anakan*. The distance of each *anak* in the second *anakan* is three *lubang*. The second *anak* ($a_{2,2}$) is made of three *lubang* to the side of the first *anak*($a_{2,1}$). The third *anak* ($a_{2,3}$) has three *lubang* to the side of the second *anak* ($a_{2,2}$). And so on until the 45th *anak* ($a_{2,45}$) in the second *anakan*. The sketch of the first *anakan* is shown in Figure 7.

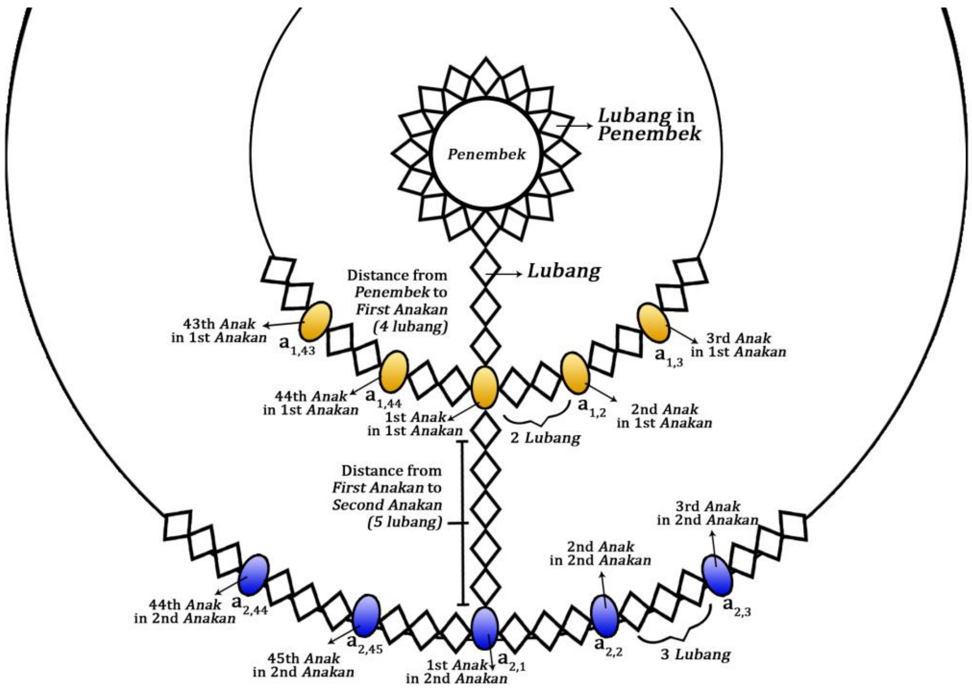

Figure 7. Sketch on the second *anakan*

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The Third Anakan (A_2)

The third *anakan* (A_3) is done when the net *lubang* is knitted down six times from the second *anakan* (A_2). There are 46 *anak* and 138 *lubang* in the third *anakan*. The distance of each *anak* in the third *anakan* is four *lubang*. The second *anak* ($a_{3,2}$) is made of four *lubang* to the side of the first *anak* ($a_{3,1}$). The third *anak* ($a_{3,3}$) has four *lubang* to the side of the second *anak* ($a_{3,2}$). And so on until the 46th *anak* ($a_{3,46}$) in the second *anakan*.

Based on the first, second, third, and fourth *anakan*, the number of *anak* and *lubang* in the next *anakan* can be seen in Table 2.

Table 2. The number of *anak, lubang*, and the *lubang* between *anak* within the *anakan*

***Anakan* Level**	**The number of *anak***	**The number of *lubang* in *anakan***	**The number of *lubang* between *anak***
First *Anakan* (A_1)	44	44	3
Second *Anakan* (A_2)	45	90	4
Third *Anakan* (A_3)	46	138	5
Fourth *Anakan* (A_4)	47	188	6

Based on the exploration results of the number of *lubang*, the number of *anak*, and the distance between *anak* in the process of making *pencar* nets, it was found that there is an arithmetic sequence concept and a quadratic sequence concept in it. The distance of the *lubang* between the *anak* in the *anakan* is patterned 3, 4, 5, and 6. The number of *anak* in each *anakan* is patterned 44, 45, 46, and 47. The number of *lubang* in each *anakan* is patterned 44, 90, 138, 188. The exploration results on the number of *anak* and the distance between *anak* in each *anakan* have a regular difference. This regularity indicates the existence of an arithmetic sequence.

Arithmetic Sequences in *Anakan*

A sequence is a list of numbers from left to right with a certain pattern. An arithmetic sequence is a list of numbers that have consistent differences between each consecutive pair. (Bartle & Sherbert, 2000; Bird, 2020). The difference between the terms determines the order in an arithmetic sequence. The general form of an arithmetic sequence is $U_n = a + (n - 1).b$, where U_n is the nth term, *a* is the first term, *b* is the difference between terms, and *n* is many terms (Rahmani-Andebili, 2021). The results of initial observations on making *pencar* nets indicate a mathematical concept, namely arithmetic sequences.

Based on Table 2, the number of *anak* in the first *anakan* is 44, the number of *anak* in the second *anakan* is 45, and the number of *anak* in the third *anakan* is 46. The number of *anak* in the next *anakan* can be found using an arithmetic sequence. The differences at each *anakan* level are symbolized by *b*, the first term is symbolized by a, and the *anakan* is symbolized by *A*. The pattern is shown in the following chart.

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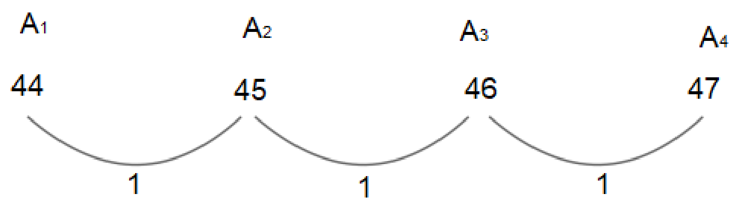

Figure 8. The pattern from First *Anakan* to Fourth *Anakan*

The difference in the number of *anakan* in every *anak* is symbolized by *b*. In addition, A_1 is the number of *anak* in the first *anakan*, which is 44 *anak*. *Anakan* in A_2 is the number of *anak* in A_1 plus the difference (*b*). Then, the number of *anak* in A_3 is the number of *anak* in A_2 plus the difference (*b*). And so on until the number of anak in A_n is represented in Table 3.

Table 3. An arithmetic sequence with the number of *anak* in an *anakan*

***Anakan* Level**	**The Number of *Anak***	**Number Pattern**	**Arithmetic Sequence Formula**
First *Anakan* (A_1)	44	$44 = 44 + (1 – 1) \bullet 1$	$U_1 = a$
Second *Anakan* (A_2)	45	$45 = 44 + 1 = 44 + (2 - 1) \bullet 1$	$U_2 = a + b$
Third *Anakan* (A_3)	46	$46 = 44 + 2 = 44 + (3 - 1) \bullet 1$	$U_3 = a + 2 \bullet b$
Fourth *Anakan* (A_4)	47	$47 = 44 + 3 = 44 + (4 - 1) \bullet 1$	$U_4 = a + 3 \bullet b$
⋮	⋮	⋮	⋮
The-n *Anakan* (A_n)	U_n	$U_n = 44 + (n - 1) \bullet 1$	$U_n = a + (n - 1) \bullet b$

Based on Table 3, the number of *anak* in the n[th] anakan can be seen through the pattern $U_n = 44 + (n – 1) \bullet b$. Where $a = 44$, and $b = 1$. So, by substituting *a* and *b*, we get $U_n = 44 + (n – 1)$. So, the pattern of arithmetic sequences in the number of *anak* in an *anakan* is found as $U_n = 44 + (n – 1)$. Where U_n is the number of *anakan* in the n^{th} *anak* and *n* is the *anakan* level.

Based on initial observations and interviews with Mr. Lalu Gunansar and Mr. Mamiq Nilam, the manufacture of *pencar* nets in different sizes is influenced by the amount of nylon thread and the density of the loops made. For example, if the *pencar* and *sesek* nets are the same size, the *sesek* nets require more nylon. That is because the density of loops in the *sesek* nets is higher than the *pencar* nets. In other words, the arithmetic sequence in *anak* within *anakan* can apply to the *pencar* nets but not to the other nets. That is because the type of net made and the net density affect the number of *anakan*.

On the other hand, the amount of nylon in the *penembek* affects the amount of *anak* and *anakan* in the *pencar* net-making process. The more nylons there are, the more *anak* and *anakan* there are, and the size of the *pencar* net will be more prominent. That means that the more *penembek* there are, the larger the *pencar* net will be. On the other hand, the size of the *pencar* net is influenced by the number of *anak* and *anakan*. Therefore, the *penembek* made by the fishermen in the *pencar* net affects the number of *anak* and *anakan* to be made.

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Arithmetic Sequence on The Number of *Lubang* between *Anak*

Based on Table 2, the distance between the *anak* in the first *anakan* is three *lubang*, the *anak* in the second *anakan* is four *lubang*, and the *anak* in the third *anakan* is five *lubang*. An arithmetic sequence can determine the number of *lubang* as the distance between the anak and the next *anakan*. Differences at each level of *anakan* are symbolized by *b*, while *anakan* are symbolized by *A*. The pattern is shown in the following chart.

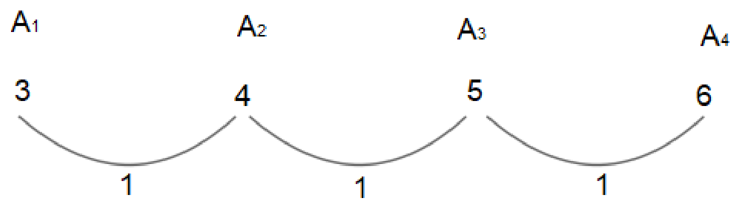

Figure 9. The pattern from First Anakan to Fourth Anakan

The difference in the number of *lubang* between the *anakan* is symbolized by *b*, and the first term of *anakan* is symbolized by *a*. In addition, A_1 is the first *anakan*, namely 44 *anak*. The number of *lubang* between *anak* of A_2 is the number of *lubang* between *anak* of A_1 plus the difference (*b*). Then, the number of *lubang* between *anak* in A_3 is the number of *lubang* between *anak* in A_2 plus the difference (*b*). And so on, until the number of *lubang* between anak in A_n is represented in Table 4.

Table 4. The pattern of an arithmetic sequence has many *lubang* between *anak* within *anakan*

***Anakan* Level**	**The number of *lubang* between *anak***	**Number Pattern**	**Arithmetic Sequence Formula**
First *Anakan* (A_1)	3	3 = 3 + (1 – 1) • 1	$U_1 = a$
Second *Anakan* (A_2)	4	4 = 3 + 1 = 3 + (2 -1) • 1	$U_2 = a + b$
Third *Anakan* (A_3)	5	5 = 3 + 2 = 3 + (3 -1) • 1	$U_3 = a + 2b$
Fourth *Anakan* (A_4)	6	6 = 3 + 3 = 3 + (4 -1) • 1	$U_4 = a + 3b$
⋮	⋮	⋮	⋮
The-n *Anakan* (A_n)	U_n	$U_n = 3 + (n - 1) \cdot 1$	$U_n = a + (n - 1) \cdot b$

Based on Table 4, it can be seen that the number of *lubang* between *anak* and *anakan* in the n^{th} can be known through the pattern $U_n = U_1 + (n - 1) \cdot b$. U_1 is a fixed value of 3, and *b* is a fixed value of 1. So, by substituting U_1 with a value of 3 and *b* with a value of 1, we get $U_n = 3 + (n - 1)$. So, the pattern of arithmetic sequences in the number of *lubang* between *anak* within *anakan* is found as $U_n = 3 + (n - 1)$. Where U_n is the number of *lubang* between *anak* in the n^{th} *anakan* and *n* is the *anakan* level.

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The Quadratic Sequences on The Number of *Lubang* in *Anakan*

Based on Table 2, the holes in the first *anakan* to the fourth *anakan* are 44, 90, 138, and 188. The number of *lubang* in the next *anakan* can be found using an arithmetic quadratic sequence. The first term of the number of *lubang* in the first until the fourth *anakan* is symbolized by A_1, A_2, A_3, and A_4. The difference between the first and fourth terms in the first level is 46, 48, and 50. The difference in the first level forms a pattern of its own, thus allowing the formation of differences in the second level.

Furthermore, the difference between terms in the second level is 2. Differences in the first and second levels indicate that the pattern formed is a quadratic arithmetic sequence. The pattern is shown in Figure 10. Based on Figure 10, it can be seen that the arithmetic sequence formed is a multilevel arithmetic sequence. The formula for a two-level arithmetic sequence is $Un = an^2 + bn + c$, with n as the order of the n^{th} and a, b, c are constants whose values need to be found (Purnawan & Subiono, 2022; Radjak et al., 2022). The values of a, b, and c are known by substituting the value of each term and the difference at each level into the formula shown in Figure 7. The process of finding the values of a, b, and c is shown in the following procedure.

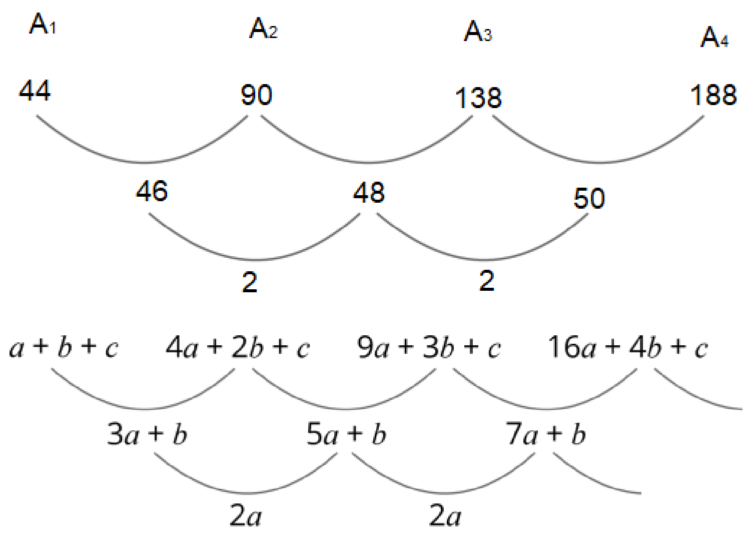

Figure 10. The pattern of The Number of *Lubang* in First *Anakan* to Fourth *Anakan*

The first difference value at the first level is 46, which has the formula $3a + b$, which forms a two-variable linear equation $46 = 3a + b$. The second difference value at the first level is 48, which has the formula 5a + b so that the linear equation of the two variables formed is $48 = 5a + b$. By eliminate these equations, we get the value of a is 1 and b is 43.

To find the value of c, substitute the values $a = 1$ and $b = 43$ in A_1, which is 44 and has the formula $a + b + c$, thus c is 0. Thus, the values of $a = 1$, $b = 46$, and $c = 0$ are obtained. The general form of the graded arithmetic sequence on the number of holes in each *anakan* is shown in Table 5.

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Table 5. The pattern of an arithmetic sequence is the number of *lubang* between *anak* within *anakan*

***Anakan* Level**	**The number of *lubang* between *anak***	**Number Pattern**	**Quadratic Sequence Formula**
First *Anakan* (A_1)	44	$44 = 1 + 43 = 1^2 + (43 \cdot 1)$	$U_1 = 1 \cdot 1^2 + 43 \cdot 1 + 0$
Second *Anakan* (A_2)	90	$90 = 4 + 86 = 2^2 + (43 \cdot 2)$	$U_2 = 1 \cdot 2^2 + 43 \cdot 2 + 0$
Third *Anakan* (A_3)	138	$138 = 9 + 129 = 3^2 + (43 \cdot 3)$	$U_3 = 1 \cdot 3^2 + 43 \cdot 3 + 0$
Fourth *Anakan* (A_4)	188	$188 = 16 + 172 = 4^2 + (43 \cdot 4)$	$U_4 = 1 \cdot 4^2 + 43 \cdot 4 + 0$
⋮	⋮	⋮	⋮
The-n *Anakan* (A_n)	U_n	$U_n = n^2 + (43 \cdot n)$	$U_n = an^2 + bn + c$

Based on Table 5, it can be seen that the number of *lubang* in the n^{th} *anakan* can be known through the pattern $U_n = n^2 + 43n$. With U_n is the number of *lubang* in the n^{th} *anakan* and n is the *anakan* level. The number pattern $U_n = n^2 + 43n$ will be equal to $U_n = an^2 + bn + c$ for $a = 1$, $b = 43$, and $c = 0$.

The patterns in arithmetic sequences are $a + b$, $a + 2b$, ..., $a + (n - 1)b$, with the general formula $U_n = a + (n - 1)b$ where U_n is the n^{th} term, a is the first term, b is different, and n is the term sought (Bartle & Sherbert, 2000). Meanwhile, the quadratic sequence is $a + b + c$, $4a + 2b + c$, $9a + 3b + c$, ..., $an^2 + bn + c$, with the general formula $U_n = an^2 + bn + c$ where Un is the n^{th} term, a is the first term of the first level, b is the first term of the second level, c is the difference, and n is the term sought (Azrida et al., 2015; Purnawan & Subiono, 2022).

The existence of an arithmetic sequence indicates that the creation of a *pencar* net utilizes the concept of linear and quadratic arithmetic sequences to increase the size of the *pencar* net. That follows the interview results of Mr. Mamiq Nilam and Mr. Lalu Gunasar: the more anak you make, the bigger your net. That is also in line with what was explained by Sudirman & Mallawa (2004) and (2022), who said that the net size depends on the place used to catch fish. Furthermore, some net measures also adjust to the types of sea creatures caught, such as fish, shrimp, lobsters, and others (Budiyanti et al., 2018).

The study's results also show that in the handicraft products made, the community also uses the concept of arithmetic sequences in manufacturing. That follows research conducted by Nandang et al. (2021) that fabric brooch artisans use the idea of an arithmetic sequence in their manufacture. Likewise, in the manufacture of wood crafts, the concept of an arithmetic sequence is used to expand the surface of the woven that is made (Nurjamil et al., 2021) and also the ornament of the *gadang* house (Alghar et al., 2022). Resfaty et al. (2019) revealed that arithmetic sequences produce geometric shapes in *mendong* woven crafts.

Besides that, an arithmetic sequence in making *pencar* nets further reinforces that mathematical concepts have been widely used in fishing activities. Not only in the manufacture of *pencar* nets but also in the forms of fishing gear (Malalina et al., 2020), the process of making fish

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ponds (Wulandari & Setianingsih, 2022), the approach of empowering fish seeds (Ubayanti et al., 2016), to the process buying and selling of fish caught in the market (Muzdalipah & Yulianto, 2018). In other words, the results of this study open the gate for further research to reveal more mathematical concepts in fishing activities and the fisheries sector.

On the other hand, the results of this study can be developed to be applied in learning arithmetic sequences in a class. In addition, the concept of multilevel arithmetic sequences in this study can be developed as a contextual problem to be brought into the realm of learning. So that learning sequences and series material in class can lead students to mathematical knowledge and a cultural introduction.

CONCLUSION

Based on the results and discussion, it can be concluded that there are arithmetic sequences and multilevel arithmetic sequences in the process of making *pencar* nets. The arithmetic sequence is shown in the number of *anak* in each *anakan*, namely 44, 45, 46, and 47, which form the arithmetic sequence $U_n = 44 + (n - 1)$. The arithmetic sequence is found in the number of *lubang* between *anak* in each *anakan*, namely 3, 4, 5, and 6, which form an arithmetic sequence $U_n = 3 + (n - 1)$. The quadratic arithmetic is shown in the number of *lubang* in each *anak* that creates the sequence 44, 90, 138, 188. The sequence has a quadratic sequence $U_n = n^2 + 43n$.

The results of this study are still limited to exploring the concept of arithmetic sequences in the activities of the Lombok coastal community in making *pencar* nets. This research can be used as a basis for other researchers to explore different mathematical concepts in fisheries and the concept of arithmetic sequences in other types of cultures. In addition, the results of this study can be used as reference material for educators to develop contextual mathematics learning with a cultural touch.

ACKNOWLEDGEMENT

The author would like to thank Mr. Mamiq Nilam and Mr. Lalu Gunasar as *pencar* net craftsmen who were willing to be interviewed regarding the process of making *pencar* nets.

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