Polba Mahavidyalaya

A report on

One-day Seminar on

"The Game of Numbers"

organized by the

Department of Mathematics

in collaboration with

IQAC

Polba Mahavidyalaya, Hooghly-712148

Date: 25.03.2023

To,
The Teacher-in-Charge,
Polba Mahavidyalaya,
Polba, Hooghly,
Pin- 712148.

Date: 17.03.2023

Sub: Seeking permission to organize a one-day Departmental Seminar on "THE GAME OF NUMBERS"

Respected Sir,

With due respect, I, on behalf of the Department of Mathematics in collaboration with IQAC, Polba Mahavidyalaya, would like to request your kind permission to organize a one-day Departmental Seminar on "THE GAME OF NUMBERS" in the college premises. The proposed date of the said seminar is tentative on 25.03.2023. The date would be finalized according to the convenience of the Resource Person.

- Proposed Resource Person: Dr. Kshitish Ch. Mistri, Dept. of Mathematics, Ramakrishna Mission Vivekananda Centenary College, Rahara, Kolkata- 700118.
- Proposed Budget:

Purpose	Expected Budget
Refreshment and Miscellaneous	Rs. 1000

Hope you would be kind enough to provide your administrative and financial permission for the forthcoming Seminar.

Thanks and Regards,

Amrita Das 17/03/2023

Dr. Amrita Das,
Assistant Professor of Mathematics,
Polba Mahavidyalaya,
Hooghly-712148.

Allowed
17/3/2023.

Amrita Das 27/03/23

Telephone: (03213) 225128, 225133
Fax : (03213) 225128

web site: polbamahavidyalaya.com
e-mail: officepolbamahavidyalaya@gmail.com

POLBA MAHAVIDYALAYA

Post Office - Polba, District – Hooghly, West Bengal, Pin - 712148

AFFILIATED TO THE UNIVERSITY OF BURDWAN
Recognized under Sections 2(f) & 12(B) of the UGC Act. 1956
NAAC Accredited

Ref. No. _____ Date: 17.03.2023

Notice

All Teaching, Non-Teaching Staff and Students of Polba Mahavidyalaya are hereby informed that the Department of Mathematics in collaboration with IQAC is going to organize a Departmental Seminar on "The Game of Numbers" on 25.03.2023 at the College premises.

All are requested to be present on this occasion positively.

D. D. 17/03/2023.

Coordinator
IQAC

17/03/2023.

Teacher-in-Charge
Teacher in Charge
Polba Mahavidyalaya
Polba, Hooghly, West Bengal

Amrita Day 27/03/23

POLBA MAHAVIDYALAYA Estd-2005 Dist.-Hooghly

Amrita Day 27/03/23

POLBA MAHAVIDYALAYA

(AFFILIATED TO THE UNIVERSITY OF BURDWAN)

Polba, Hooghly, Pin-712148

To
Dr. Kshitish Ch. Mistri,
Dept. of Mathematics,
Ramakrishna Mission Vivekananda Centenary College,
Rahara, Kolkata-700118.

Sub: Invitation to deliver a speech as a Resource Person in a One-day Departmental Seminar on "THE GAME OF MATHEMATICS."

Sir,

We feel happy to announce that the Department of Mathematics in collaboration with IQAC, Polba Mahavidyalaya is going to organize a "One-Day Departmental Seminar on **"THE GAME OF MATHEMATICS"** on 25.03.2023 at the College Premises.

On this occasion, on behalf of our Institute, I cordially invite you to deliver a one-hour lecture as a very distinguished Resource Person.

Intimation from your end as confirmation would be highly appreciated.

Thanking you,

With Regards,

15/3/2023

Narugopal Kaibarty
Teacher-in-Charge
Polba Mahavidyalaya
Polba, Hooghly, West Bengal

Teacher-in-Charge
Polba Mahavidyalaya
Polba, Hooghly
Pin- 712148

POLBA MAHAVIDYALAYA Estd-2005 Dist.-Hooghly

27/03/23

Objectives of the seminar

Seminar Objectives on "The Game of Numbers" are:

- To explore the fundamental concepts and principles of numbers in mathematics.
- To understand the significance of numbers in various fields such as science, technology, and everyday life.
- To analyze the role of numbers in problem-solving and decision-making processes.
- To discuss the history and evolution of number systems across different cultures and civilizations.
- To examine the applications of numbers in areas like cryptography, statistics, and finance.
- To enhance participants' critical thinking and analytical skills through engaging activities and discussions related to numbers.
- To foster a deeper appreciation for the beauty and complexity of numbers as a universal language in the world of mathematics.
- To inspire curiosity and creativity in exploring the mysteries and patterns hidden within the realm of numbers.
- To encourage collaboration and knowledge sharing among participants to deepen their understanding of numerical concepts.
- To empower attendees with practical tools and strategies for leveraging numbers effectively in their personal and professional endeavours.

27/03/23

Program Schedule

Program	Time
Registration	10:30AM-11:00AM
Welcome Note	11:00AM-11:05AM
Felicitation to Dignitaries • Mr. Narugopal Kaibarta, Teacher-In-Charge • Dr. Kshitish Ch. Mistri, Guest Speaker • Dr. Kaliprasad Mishra, Teacher Council Secretary	11:05AM-11:10AM
Lighting of the Lamp by the Dignitaries	11:10AM-11:15AM
Address by Mr. Narugopal Kaibarta, Teacher-In-Charge	11:15AM-11:30AM
Special Address by Dr. Kaliprasad Mishra, Teacher Council Secretary	11:30AM-11:35AM
Introduction to the Topic of the Seminar	11:35AM-11:40AM
Introducing the Speaker	11:40AM-11:45AM
Lecture Delivery by the Speaker	11:45AM-01:45PM
Discussion	01:45PM-02:00PM
Lunch Break	02:00PM-02:30PM
Technical Session 1 by Mr. Palash Sadhu	02:30PM-03:30PM
Technical Session 2 by Dr. Amrita Das	03:30PM-04:30PM
Valedictory Session	04:30PM-04:45PM

Amrita Das 27/03/23

Short report of the seminar

Inauguration

The audience was greeted with a warm welcome by Dr. Amrita Das, Assistant Professor of Mathematics, Polba Mahavidyalaya, Hooghly, followed by felicitating the dignitaries.

The dignitaries of the seminar, Mr. Narugopal Kaibarta (teacher-in-charge), Dr. Kshitish Ch. Mistri (guest speaker) and Dr. Kaliprasad Mishra (Teacher's Council Secretary) were felicitated by students; followed by the lighting of the lamp by the dignitaries.

The gathering was then addressed by Mr. Narugopal Kaibarta, and Dr. Kaliprasad Mishra. Their words were inspiring and truly enriched us.

Next, the topic was introduced by Dr. Amrita Das as follows:

"In this academic exploration, we delve into the fascinating intersection of mathematics and mindfulness through the lens of "The Game of Numbers – Buddhiyoga." Buddhi, derived from the Sanskrit root "budh," means intellect, wisdom, and the power of the mind to understand, analyze, discriminate, and decide.

At the heart of "The Game of Numbers – Buddhiyoga," lies the belief that mathematics is not merely about solving equations or calculating formulas; rather, it's a tool for self-discovery and personal growth.

By integrating yogic principles such as meditation, breath control (pranayama), and body postures (asanas) within the context of mathematical problems, students learn how to maintain clarity of thought while navigating complex challenges.

This pedagogical framework offers several benefits beyond the conventional classroom setting."

Proceeding further, Mr. Palash Sadhu, SACT, Dept of Mathematics, Polba Mahavidyalaya, introduced the speaker of the seminar, Dr. Kshitish Ch. Mistri, Assistant Professor in the Department of Mathematics, Ramakrishna Mission Vivekananda Centenary College, Rahara, and invited him for his deliberation.

Keynote Speech by Dr. Kshitish Ch. Mistri

The Game of Numbers-Buddhiyoga

The speaker presented a topic that is both fascinating and essential in our modern world - "The Game of Numbers: Buddhiyoga."

He explained that, in the realm of mathematics, numbers are not merely symbols; they are the building blocks of our universe. Buddhiyoga, a term derived from Sanskrit, encompasses the concept of intellectual or cognitive skills. When we combine numbers with the power of our intellect, we engage in a profound game - a game that challenges us, inspires us, and ultimately enriches our lives.

He explained the concept using beautiful examples. One example of this connection is the integration of Yoga Pranayama and Vedic Mathematics (VM). Yoga Pranayama focuses on breath control and mental clarity, which can enhance concentration during mathematical problem-solving. VM offers alternative methods for solving mathematical problems, emphasizing visualization and memorization techniques. Both Yoga Pranayama and VM contribute to mindfulness, emotional regulation, and reduced aggression among students, leading to improved academic performance.

Amrita Das 27/03/23

Buddhiyoga- Images of the game app **The game of numbers "Buddhiyoga"**

Explanation to the game: The game 'Buddhiyoga' is particularly the game of 'Snakes and ladders' originated as part of a family of Indian dice board games that included gyan chauper and pachisi (known in English as Ludo and Parcheesi). It made its way to England and was sold as "Snakes and Ladders" then the basic concept was introduced in the United States as Chutes and Ladders.

In olden times, people would play with pieces of jewellery or other objects that they shared a personal connection with. It was believed that only when a player became one with the pieces of the game, that she would truly begin to learn from it.

Broadly speaking, any Buddhiyoga aims to lead its player from the lowest to the highest plane of existence. The squares – between 72 and 124 in number – are symbolic of the journey of life. Each square represents a positive or negative choice or its consequence. Being bitten repeatedly by a certain snake, vice, for example, should encourage a player to introspect on his own weaknesses in life. Conversely, an easy passage to Vaikuntha (Vishnu's abode) or Allah's throne, as the case may be, would highlight the importance of morality in life.

Overall, Dr. Mistri gave explanations to each row followed by each square of the game. The significance of each square was explained through relevant examples of our daily deeds. The speaker ended by connecting the applications of the game to mathematics.

Each square was explained by the speaker. One may get the text explaining each square of the game from the Buddhi Yoga app.

History: The game was popular in ancient India by the name Moksha Patam. It was also associated with traditional Hindu philosophy contrasting karma and kama, or destiny and desire. It emphasized destiny, as opposed to games such as pachisi, which focused on life as a mixture of skill (free will) and luck. The underlying ideals of the game inspired a version introduced in Victorian England in 1892. The game has also been interpreted and used as a tool for teaching the effects of good deeds versus bad. The board

Anushri Das 27/03/23

was covered with symbolic images used in ancient India, the top featuring gods, angels, and majestic beings, while the rest of the board was covered with pictures of animals, flowers and people. The ladders represented virtues such as generosity, faith, and humility, while the snakes represented vices such as lust, anger, murder, and theft. The morality lesson of the game was that a person can attain liberation (Moksha) through doing good, whereas by doing evil one will be reborn as a lower forms of life. The number of ladders was fewer than the number of snakes as a reminder that a path of good is much more difficult to tread than a path of sins. Presumably, reaching the last square (number 100) represented the attainment of Moksha (spiritual liberation).

Buddhiyoga or Gyan Chaupar (game of wisdom), the version associated with the Jain philosophy, encompassed the concepts like karma and Moksha. A version popular in the Muslim world is known as shatranj al-'urafa and exists in various versions in India, Iran, and Turkey. In this version, based on sufi philosophy, the game represents the dervish's quest to leave behind the trappings of worldly life and achieve union with God.

When the game was brought to England, the Indian virtues and vices were replaced by English ones in hopes of better reflecting Victorian doctrines of morality. Squares of Fulfilment, Grace and Success were accessible by ladders of Thrift, Penitence and Industry and snakes of Indulgence, Disobedience and Indolence caused one to end up in Illness, Disgrace and Poverty. While the Indian version of the game had snakes outnumbering ladders, the English counterpart was more forgiving as it contained equal numbers of each.

Gyan chauper or Buddhiyoga began with the returning of colonial families from India during the British Raj. The décor and art of the early English boards of the 20th century reflect this relationship. By the 1940s very few pictorial references to Indian culture remained, due to the economic demands of the war and the collapse of British rule in India. Although the game's sense of morality has lasted through the game's generations, the physical allusions to religious and philosophical thought in the game as presented in Indian models appear to have all but faded. There has even been evidence of a possible Buddhist version of the game existing in India during the Pala-Sena period.

Relating the game to mathematics: Any version of Snakes and ladders can be represented exactly as an absorbing Markov chain, since from any square the odds of moving to any other square are fixed and independent of any previous game history. The Milton Bradley version of Chutes and Ladders has 100 squares, with 19 chutes and ladders. A player will need an average of 39.2 spins to move from the starting point, which is off the board, to square 100. A two-player game is expected to end in 47.76 moves with a 50.9% chance of winning for the first player. These calculations are based on a variant where throwing a six does not lead to an additional roll, and where the player must roll the exact number to reach square 100 and if they overshoot it their counter does not move.

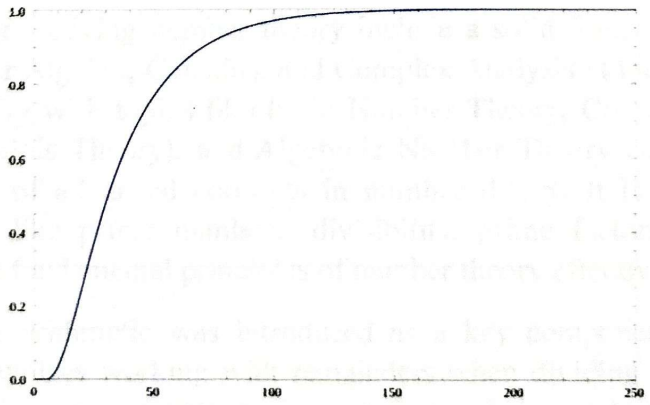


Fig. The cumulative probability of finishing a game of snakes and ladders

Amrita Das 27/03/23

Conclusion: So let us embrace the game of numbers with enthusiasm and determination. Let us cultivate our intellect through the study of mathematics and unlock the infinite potential that lies within each numerical puzzle. Together, let us embark on this journey of discovery and growth, guided by the wisdom of Buddhiyoga.

The speaker ended with a vote of thanks to the audience.

Summary of the Technical Session I by Dr. Amrita Das

Topic: Foundations of Number Theory: An Introductory Overview

In the lecture on "Introduction to Number Theory," the fundamental concepts of number theory were explored. Number theory is a branch of mathematics that deals with the properties and relationships of numbers, particularly integers. The lecture began by defining prime numbers as numbers greater than 1 that have no divisors other than 1 and themselves. It highlighted the significance of prime factorization, which involves expressing a composite number as a product of prime numbers.

The main topics covered in the lecture on "Introduction to Number Theory" include:

- Factors and Multiples
- Even and Odd Numbers
- Prime Numbers
- Common Factors and Multiples
- Prime Factorization
- Divisibility
- Euclidean Algorithm
- Modular Arithmetic

These topics form the foundational concepts of number theory, providing a basis for understanding the properties and relationships of integers, prime numbers, divisibility, and modular arithmetic. Additionally, the lecture discussed the fundamental theorem of arithmetic, which states that every composite number has a unique prime factorization, as well as common factors and multiples between numbers like the greatest common factor (GCF) and least common multiple (LCM).

Some prerequisites for studying number theory include a solid foundation in mathematical subjects such as Linear Algebra, Calculus, and Complex Analysis at the undergraduate level. Additionally, familiarity with topics like basic Number Theory, Commutative Rings, Field Theory (especially Galois Theory), and Algebraic Number Theory can be beneficial for a deeper understanding of advanced concepts in number theory. It is also helpful to have knowledge of topics like prime numbers, divisibility, prime factorization, and modular arithmetic to grasp the fundamental principles of number theory effectively.

Furthermore, modular arithmetic was introduced as a key component of number theory. Modular arithmetic involves working with remainders when dividing by a specific number (modulus). It has applications in cryptography, computer science, and various other fields due to its properties and computational efficiency.

Amrita Das 27/03/23

Some career paths for someone with a degree in number theory include:

- Academia: Pursuing a career in academia as a math researcher or professor, focusing on pure mathematics and conducting research in number theory.
- Data Science: Opportunities in data science, where individuals with strong mathematical skills can work as data scientists, analyzing and interpreting data sets to derive insights and make informed decisions.
- Engineering: Applying mathematical principles in engineering roles, such as civil engineering, where a strong understanding of numbers and analysis is essential for designing infrastructure and analyzing long-term needs.
- Computer Programming: Careers in technology like computer programming, software development, or data science, leveraging advanced mathematical skills to work on complex algorithms and models.
- Financial Analysis: Roles in finance as actuaries, where individuals analyze financial costs of risk and uncertainty using math, statistics, and financial theory to help businesses minimize risks and make informed decisions.
- Statistics: Opportunities as statisticians working across various fields like business, engineering, and sciences to apply mathematical theories and techniques to solve problems through data analysis and interpretation.
- Data Analysis: Careers in data analysis, where professionals design and build data processes for modeling, mining, and production, utilizing mathematical concepts to develop algorithms and predictive models.

These career paths showcase the diverse opportunities available for individuals with a background in number theory, ranging from academia to data science, engineering, finance, statistics, and more.

Overall, the lecture provided a foundational understanding of number theory, highlighting key concepts such as prime numbers, divisibility, prime factorization, the Euclidean algorithm, and modular arithmetic. These concepts form the basis for further exploration in number theory and its applications across various disciplines.

Summary of the Technical Session II by Mr. Palash Sadhu

Topic: The Role of Numbers in Mathematics and Beyond

Numbers play a fundamental role in mathematics and extend their significance beyond the realm of pure mathematics into various aspects of our daily lives. In the lecture on "The Role of Numbers in Mathematics and Beyond," it was emphasized how numbers serve as the building blocks of mathematics, enabling us to quantify, measure, and solve problems. From natural numbers to complex numbers, each type has unique properties that mathematicians have explored and utilized in diverse fields.

The lecture delved into how numbers are not just abstract entities but have practical applications in fields like physics, engineering, economics, and even art. Through examples and explanations, it was highlighted how numbers are used to describe the physical world, model financial systems, design structures, and create aesthetically pleasing compositions.

Numbers are extensively used in everyday life, impacting various aspects of our routines. Here are some examples of how numbers are integrated into daily activities:

Amrita Das 27/03/23

- Managing Money: Understanding math is crucial for managing finances, balancing check books, comparing prices, and making informed financial decisions.
- Cooking: Math is essential in cooking, involving measurements, proportions, conversions, and adjusting recipes.
- Shopping: Math skills come into play when comparing prices, calculating discounts, and making cost-effective purchasing decisions.
- Home Decorating and Remodelling: Calculating areas, estimating project costs, and understanding measurements are vital for home improvement projects.
- Recreational Sports: Geometry and trigonometry can enhance sports skills by helping in techniques like hitting a ball or making a basket.
- Travel: Math is used for estimating fuel needs, planning trips based on distance and speed, calculating fuel usage, and handling currency exchange when traveling abroad.
- These examples illustrate how numbers are not just theoretical concepts but practical tools that we rely on daily for various tasks and decision-making processes.

Moreover, the lecture touched upon the historical development of numbers, from ancient civilizations to modern mathematics, showcasing the evolution of numerical systems and their impact on human progress. It was underscored that understanding the role of numbers is crucial not only for mathematicians but for anyone seeking to comprehend the underlying order and structure of the universe.

In conclusion, the lecture shed light on the pervasive influence of numbers in mathematics and beyond, illustrating their indispensable role in shaping our understanding of the world and driving innovation across various disciplines.

Valedictory Session

Vote of thanks by Mr. Palash Sadhu

"I think we are at the end of our first session.

On behalf of the Department of Mathematics, Polba Mahavidyalaya, I extend my heartfelt gratitude to each one of you for gracing us with your presence today at this enlightening seminar.

A special thanks to our honourable guest speaker Dr. Kshitish Ch. Mistri for providing us with such an enriching experience. By exploring this intriguing fusion of mathematics and mindfulness, we hope to inspire our future generations of thinkers who will continue to push the boundaries of what's possible both inside and outside the classroom. Your words are truly motivating for us.

I would like to thank our teacher-in-charge, Mr. Narugopal Kaibarta, our Teacher's Council Secretary, Dr. Kaliprasad Mishra, the IQAC coordinator, Dr. Santanu Sengupta, the Seminar Committee Convenor, Dr. Sohini Ghosh, and of course, Dr. Sanjoy Kumar Ghosh, for believing in us and allowing us to organize such an enriching event. Thanks to them for their administrative and financial support.

Thanks to the head of the Department of Mathematics, Dr. Amrita Das, for helping us in every possible way to organize the seminar.

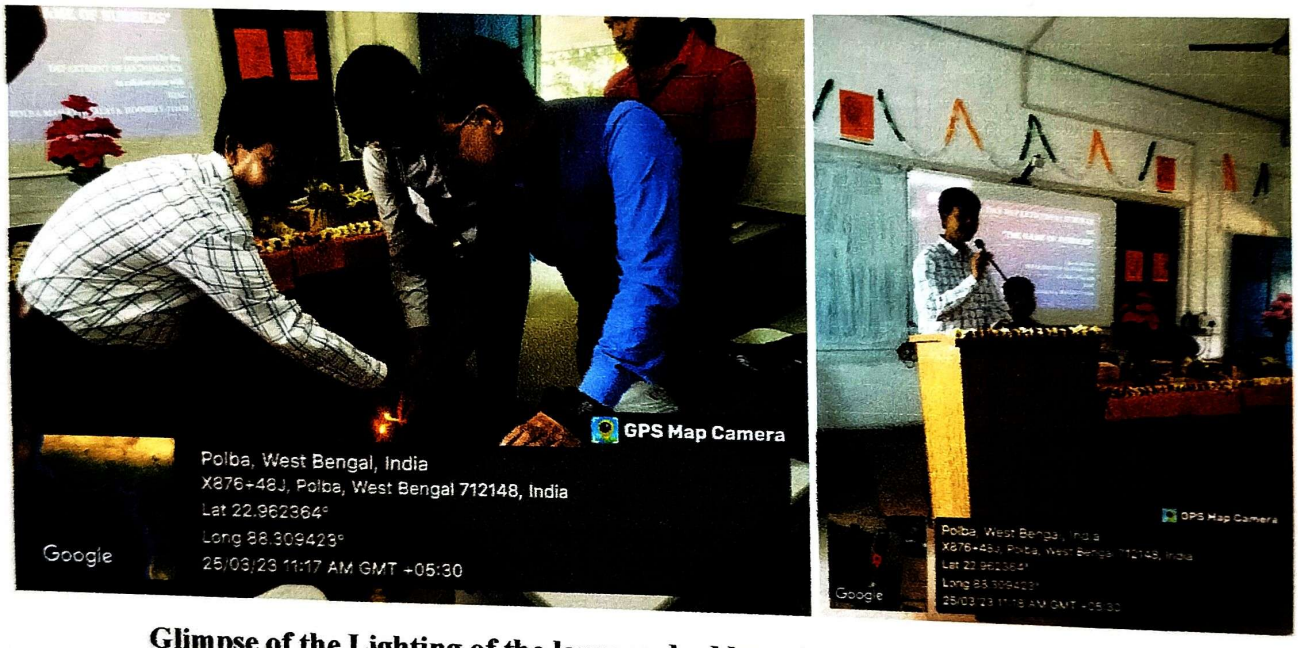
Thanks to all the teaching and non-teaching staff of Polba Mahavidyalaya for their enormous help and support.

Last but not least, I would like to thank each and everyone present here for being here and making this session a wonderful and memorable one. Thank you once again. Thank you all."

Amrita Das 27/03/23

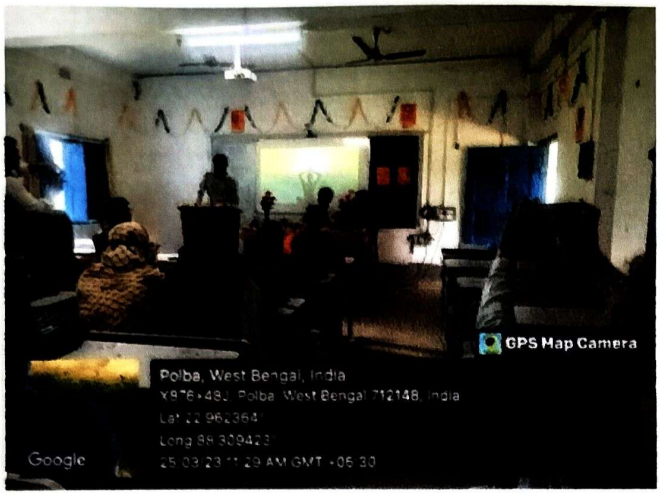
Some Glimpse of the Seminar

A glimpse of the Welcome note by Dr. Amrita Das and Mr. Palash Sadhu

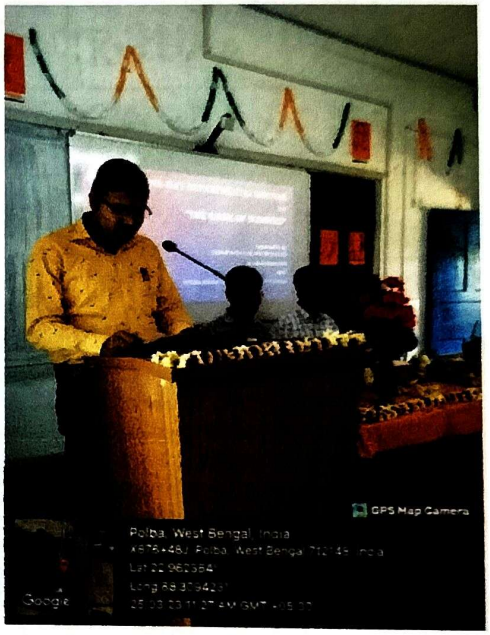


Glimpse of the Lighting of the lamp and address by the teacher-in-charge

Amrita Das
27/03/23



Glimpse of the Lecture delivered by the Honourable Speaker Dr. Kshitish Ch. Mistri



Glimpse of the discussion session and vote of thanks by Mr. Palash Sadhu

Amita Das
27/03/23

POLBA MAHAVIDYALAYA
POLBA, HOOGHLY, PIN-712148
Department of Mathematics
One-day departmental seminar on "The Game of Numbers"
25/03/2023

Sl. No.	Name	Sem	Roll no.	Subject	Signature
1.	Isha Das	4th	851	B.Sc (G)	Isha Das
2.	Pranjit Dutta	2nd	801	B.Sc (G)	Pranjit Dutta
3.	Bamita Ganguly	4th	201	English (H)	Bamita Ganguly.
4.	Swsmita Maity	4th	202	English(H)	Swsmita Maity
5.	Debasish Mondal	4th	208	English(H)	Debasish Mondal
6.	Rittika Nandi	4th	206	English (H)	Rittika Nandi
7.	Shraboni Ghosh	4th	203	English (H)	Shraboni Ghosh
8.	Tithi Ghosh	4th	209	English(H)	Tithi Ghosh
9.	Eman sen.	4th	104	Education (H)	Eman Sen.
10.	Anusree Santra.	4th	103	Education (H)	Anusree Santra.
11.	Parthib Chakraborty	4th	601	Pol. Sc (H)	Parthib Chakraborty
12.	Manish K. Ghosh	4th	110	Pol. Sc (H)	Manish K. Ghosh
13.	Keya Das	4th	852	BSC(G)	Keya Das

Amrita Das 25/03/2023

Telephone: (03213) 225128, 225133
Fax : (03213) 225128
web site: polbamahavidyalaya.com
e-mail: officepolbamahavidyalaya@gmail.com

POLBA MAHAVIDYALAYA

Post Office - Polba, District – Hooghly, West Bengal, Pin - 712148

AFFILIATED TO THE UNIVERSITY OF BURDWAN
Recognized under Sections 2(f) & 12(B) of the UGC Act. 1956
NAAC Accredited

Ref. No._____

Date: 25-03-2023

To whom it may concern

This is to certify that Dr. Kshitish Ch. Mistri, Assistant Professor, Department of Mathematics, Ramakrishna Mission Vivekananda Centenary College, Rahara, PIN-700118 delivered a seminar lecture on *"The Game of Numbers"* as the resource person on 25.03.2023 at Polba Mahavidyalaya, in a one day seminar organized by the Department of Mathematics in collaboration with IQAC.

We appreciate his adept articulation and profound knowledge, which not only enriched the young minds of those present but also left a profound and lasting impression. We are grateful for his painstaking efforts in enhancing the standard of education at our institution.

25/3/2023.

(Narugopal Kaibarta)

Teacher in Charge
Polba Mahavidyalaya
Polba, Hooghly, West Bengal

Received in original
K Mistri
25.03.23

Estd- 2005
Dist.-Hooghly

27/03/23