

# RAM TP 2023

REPORT



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# INTRODUCTION

Raising A Mathematician Training Program - 2023  
(Event supported by CMI)

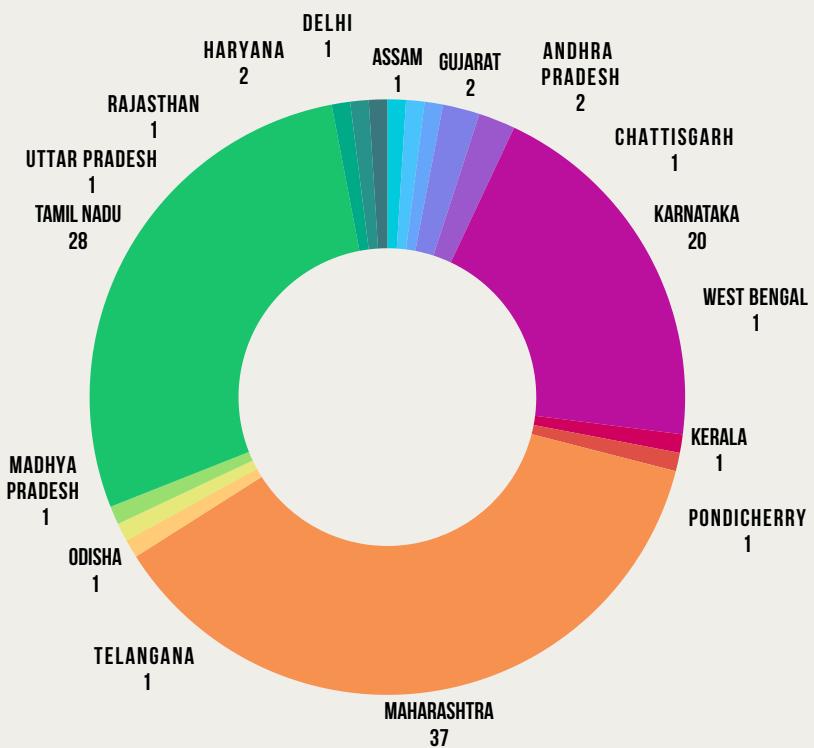
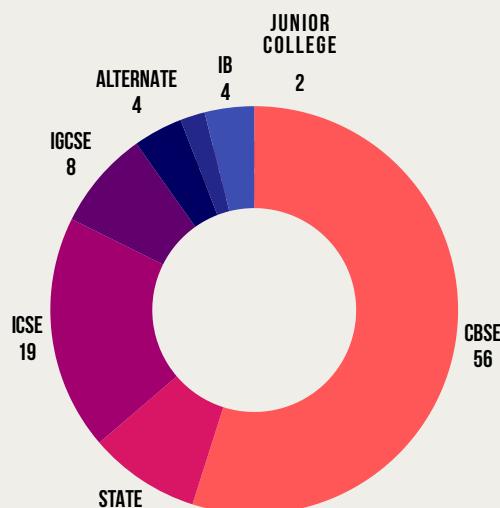
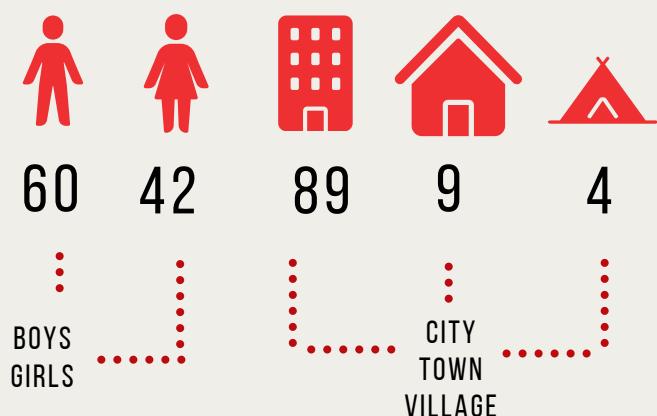
The 10th annual residential summer camp, RAM TP 2023, organized by Raising A Mathematician Foundation in association with Chennai Mathematical Institute (CMI) at CMI was a highly successful event. RAM TP aimed at providing a platform for young enthusiasts to delve into the fascinating world of mathematics and was a resounding success. The camp, held from May 7th to 13th 2023 brought together talented students from all over the country across cities, towns, villages and different states. The camp fostered an environment of learning, collaboration, and intellectual growth, covering a wide range of topics with expert faculty members.



# KEY HIGHLIGHTS

Raising A Mathematician Training Program - 2023  
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## STUDENT DIVERSITY



# DETAILED REPORT

Raising A Mathematician Training Program – 2023  
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## OBJECTIVE OF RAM TP

RAM TP aims to create an immersive learning environment that fosters a deep appreciation and love for mathematics among its participants. By bringing together students from diverse backgrounds and regions, the camp provides a platform to explore challenging mathematical concepts, engage in problem-solving, and collaborate with like-minded peers. RAM TP's objective is to identify and mentor mathematically inclined school students. The primary goal of the camp is to ignite the participants' passion for mathematics and cultivate critical thinking skills. Through mentorship, interactive sessions, and hands-on activities, the camp empowers these young talents, encouraging them to pursue further studies and research in the field of mathematics. Ultimately, RAM TP seeks to inspire and nurture the students, fostering a future generation of leaders and innovators in the realm of mathematical exploration.

## SELECTION PROCEDURE

RAM TP 2023 received an overwhelming response, with applications pouring in from all over India. After a rigorous selection process, 102 participants were invited to attend the residential camp. The selection procedure involved a thorough assessment of the Student's Application Form and Teacher's Recommendation Letter, evaluating each applicant's passion for mathematics and their career aspirations.

# PEDAGOGY AND PROGRAM SCHEDULE



RAM TP 2023 was conducted as a residential camp, held at Chennai Mathematical Institute (CMI). The participants were divided into four batches - A, B, C, and D, with Batch D consisting of returning students. Each day at RAM TP started with a calming meditation session at 7 am, providing an opportunity for students to center themselves and mentally prepare for the day ahead. The camp's pedagogy focused on interactive learning, with hourly sessions conducted by the in-house faculty daily, complemented by sessions from guest speakers covering diverse areas in mathematics. These sessions exposed the participants to a wide range of topics, enriching their knowledge and fostering engagement with various mathematical concepts. Moreover, the program design aimed to foster a passion for mathematics beyond traditional exam-focused approaches. Students were encouraged to explore and derive new formulae igniting their curiosity and excitement for discovery. The camp's emphasis on understanding the underlying concepts rather than rote learning resonated with the participants, empowering them with a deep and lasting appreciation for the subject. Feedback from students who had received additional coaching for competitive exams highlighted the value of RAM TP's approach, which aimed to break away from purely exam-oriented learning. By providing a nurturing environment and encouraging students to explore and comprehend mathematics through active inquiry, RAM TP 2023 successfully ignited a genuine love for the subject among the participants. RAM TP 2023 left a deep-rooted impact on the young minds, inspiring them to continue their mathematical journey with enthusiasm and a research-oriented mindset.

# TOPICS COVERED

For  
Batch A, B, C & D



The topics covered during the residential camp varied for each batch and aimed to provide comprehensive exposure to various branches and applications of mathematics. The topics included:

- Methods of Proofs
- Linear Programming Problems (LPP)
- Intro to Galois Theory
- Intro to Topology
- Responsible AI
- Number Theory
- Cyclic Quadrilaterals
- History of Mathematics from ancient India
- Matrix Coding and Divisibility of a Prime
- Intro to Algorithmic Game Theory

The topics mentioned above were tailored to suit each batch, reflecting the diverse range of mathematical concepts covered during the residential camp. Depth and breadth of each topic varied based on the specific batch.

# SPEAKERS

## LINEUP

### Mr. Yogesh Waikul

#### A Mechanical Engineer with master's degree in Financial Management

empowered students with valuable knowledge in optimization and abstract algebra. By introducing linear programming problem-solving techniques, he equipped students with practical tools to tackle real-world challenges.



### Mr. Aadityan Ganesh

#### Graduate from Chennai Mathematical Institute

incoming PhD student at Princeton University and an alumni of RAM, enlightened students about the revolutionary world of blockchain technology. By explaining the underlying principles, applications, and potential future impact, he equipped students with knowledge of this cutting-edge field, inspiring some to pursue careers in the blockchain and cryptocurrency industry.



### Prof. Kavita Sutar

#### Associate Professor at the School of Computing and Data Science, Sai University

She sparked interest in Two-view geometry and the perception of depth



### Mr. Vinay Nair

#### Co-founder of RAM Foundation

continued to inspire students with a captivating exploration of ancient mathematics, demonstrating its profound connections to modern math. Through rigorous proofs and engaging discussions, he illuminated the beauty of geometric theorems, the elegance of cyclic quadrilaterals, and the ingenuity of ancient Indian mathematical techniques like Kuttaka and Bhavana, fostering a deep appreciation for the historical roots of mathematics.



### Dr. S. Muralidharan

#### Retd. Computer Scientist from TCS, Chief Exam Coordinator for IOQM

provided students with a clear and concise introduction to Galois Theory, unlocking the beauty and significance of this abstract algebraic concept. Through his guidance, students grasped the profound impact of Galois Theory in fields like cryptography, coding theory, and even the study of polynomials, leaving a lasting impression on their mathematical journey.



### Mr. Bhas Bhamre

#### Founder of Bhas Bhamre Academy

shared his expertise in diverse mathematical areas, leaving a lasting impact on the students. His exploration of spherical trigonometry opened up new perspectives for students, especially those interested in astronomy and navigation. Furthermore, his sessions on number theory and cyclic quadrilaterals added depth to their mathematical toolkit, igniting curiosity in the beauty of these mathematical domains.





## Mr. Rajesh Sadagopan

**Founder of Aryabhatta Institute of Mathematical Sciences**

He delivered an enriching experience in matrix coding and the intriguing concept of divisibility of primes.

## Dr. Hitesh Gakhar

**Post doc researcher in University of Oklahoma**

introduced students to the captivating world of topology, unveiling the fascinating study of shapes and their transformations. His engaging sessions aroused curiosity about the abstract and visual aspects of topology, leaving a lasting impact on student's perspectives about the fundamental nature of space.



## Dr. Ramesh Balaji

**Senior Data Scientist, TCS**

instilled a sense of ethical awareness in students regarding the development and use of artificial intelligence. His emphasis on responsible AI practices and the practical implications of AI technologies encouraged students to approach their future endeavors with a strong ethical framework, making them more conscientious AI enthusiasts and future innovators.



## Dr. Badri Seshadri

**B.Tech from IIT Madras and PhD from Cornell University**

co-founded cricinfo.com in 1993, co-founder of Tamil Heritage Trust, co-founder of Synprosoft - an IT services company, co-founder of a Tamil book publishing company called Kizhakku Pathippagam in 2004



## Mrs. Bhuvana Arun

**Founder of The Path Ahead**

gave a broad overview of college admissions within and outside India.



## PRE-CAMP

Before the residential camp students actively prepared themselves by engaging with meticulously crafted preparatory notes provided by the academic team of the camp and completing assignments for approximately one month. This proactive approach of making pre-reading materials and assignments available to participants ahead of the camp ensured that they arrived well-equipped and ready to make the most out of the learning experience.

# CONCLUSION

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Chalkboard content:

$$\begin{aligned} (x_1, y_1) &= (3, 2) & a^2 - Nb^2 &= 1 \\ (x_2, y_2) &= (17, 12) & d - Nd^2 &= 1 \\ (x_3, y_3) &= (99, 70) & (a^2 - Nb^2)(d^2 - Nd^2) &= 1 \\ (x_4, y_4) &= (577, 408) & \sqrt{(a^2 + Nb^2)^2 - N(ad + bd)^2} &= 1 \\ x^2 - 2y^2 &= 1 & (9^2 + 2 \cdot 4)^2 - 2(6^2 + 6)^2 &= 1 \\ x_1^2 - 2y_1^2 &= 1 & 17^2 - 2(12)^2 &= 1 \\ x_2^2 - 2y_2^2 &= 1 & x_3 &= x_1 x_2 + N y_1 y_2 \\ (x_3, y_3) &= (3, 2) & x_4 &= x_2 y_1 + x_1 y_2 \\ (x_4, y_4) &= (3, 2) & 99 \times 6 - 17 &= 577 \\ & & 577 \times 6 - 99 &= 3363 \end{aligned}$$

RAM TP 2023 marked the 10th edition of our flagship program, and it was a momentous occasion as it was a seamless transition to a residential camp after three years of conducting the program online due to the COVID-19 pandemic. The residential format provided a unique opportunity for participants to immerse themselves in a collaborative environment dedicated to mathematical learning and exploration. RAM TP 2023 marked a significant milestone in the journey of the program, reuniting young talents in a residential setting and further cementing their passion for mathematics. Throughout the camp, students were exposed to a diverse array of mathematical topics, challenging problems, and engaging discussions led by our experienced faculty and guest speakers. Workshops and lectures were carefully designed to cater to varying levels of mathematical proficiency, ensuring that each participant was given the opportunity to grow and excel. Beyond the traditional classroom setting, informal discussions and impromptu problem-solving sessions added to the intellectually stimulating atmosphere of the camp, creating a vibrant mathematical community. By the end of the program, the student's mathematical knowledge and skills had noticeably progressed, and their passion for the subject had been further secured. RAM TP 2023 was a resounding success, leaving a lifelong impact on the participants as they returned home with enriched mathematical insights, cherished memories, and a strong bond with fellow math enthusiasts.

# SUPPORTERS OF RAM TP 2023



## Chennai Mathematical Institute (CMI)



This residential camp was held in the campus of CMI, where they graciously sponsored the food and accommodation for students as well as the entire organizing team. Exceptional logistical support provided by CMI ensured an efficient and enjoyable experience for campers. The inviting campus created an ideal environment for a fulfilling and pleasant experience for all participants. Moreover, we were privileged to have faculty members from this prestigious institution contributing their expertise in mathematics, adding to the academic rigor and enjoyment of the participants throughout the camp.

Many parents of the students who attended RAM TP 2023 supported through their generous voluntary donations.

# CONTACT US



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