



# RAM (DAV) TTP 2023 REPORT

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Raising A Mathematician Foundation®



**D. A. V. Group of Schools, Chennai**



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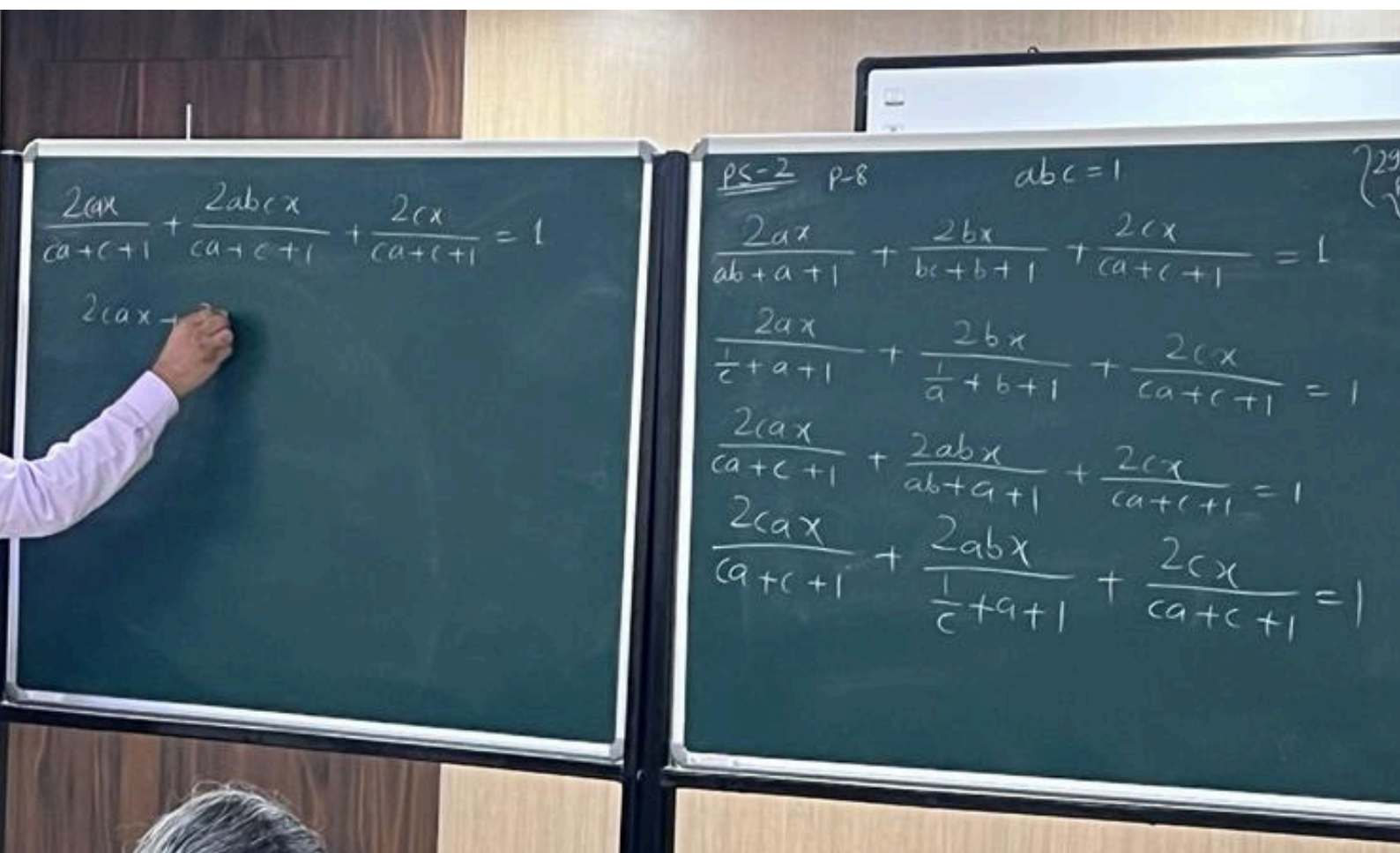


# INTRODUCTION

Raising A Mathematician (RAM) Foundation in collaboration with the DAV group of schools held its first Teachers' Training Program (TTP) from September 28th to October 2nd 2023. The 5-day training program was hosted by DAV group of schools, Chennai at DAV Boys' Senior Secondary School, Gopalapuram. A selection test was held for mathematics teachers across Tamil Nadu and 45 qualified teachers were invited to participate in this exclusive program. Teachers could choose between the residential option or be a day-scholar.

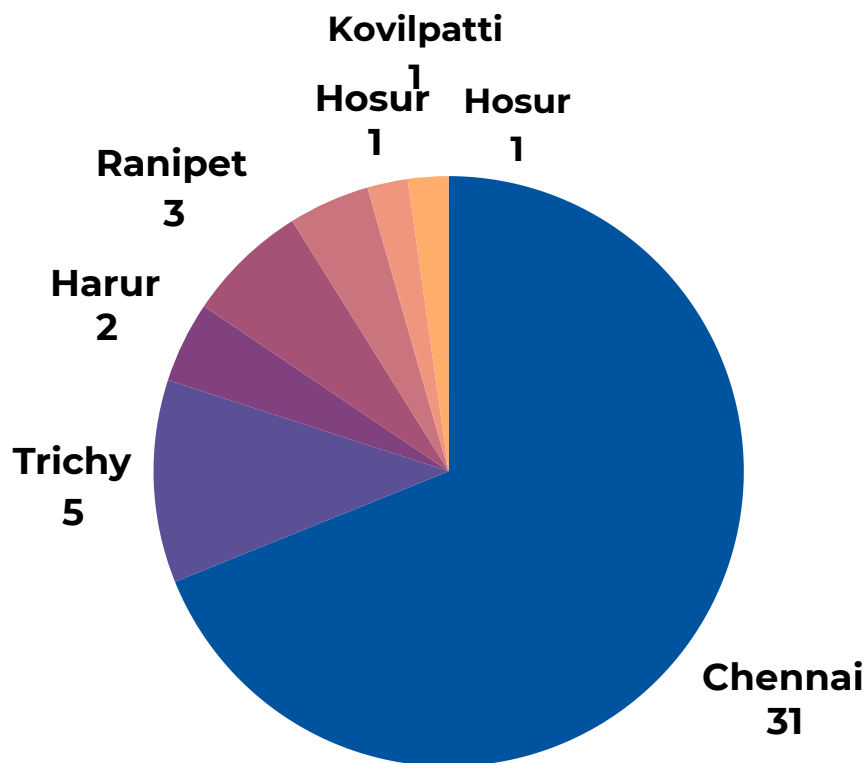
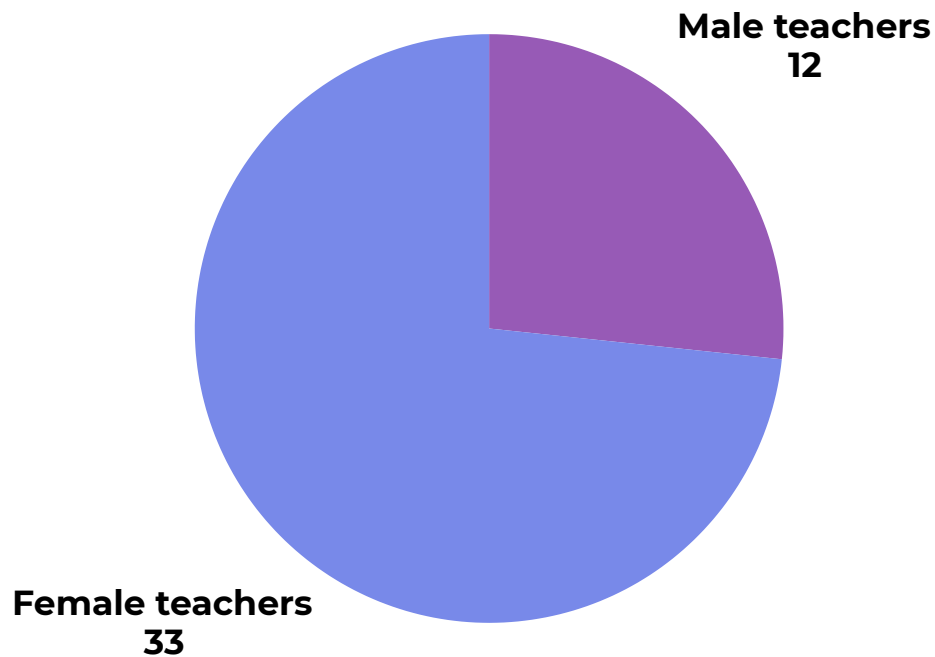
# OBJECTIVE

The camp's objective was enrichment of the teachers' mathematical experience. Often mathematics teachers can get stuck in meeting the twin challenges of covering the syllabus and catering to a heterogenous group of children. The camp hoped to rejuvenate their joy of mathematics and the art of problem solving.





# PARTICIPATION



# KEY HIGHLIGHTS

## **Guest Lectures:**

Guest lectures provided key insights to various dimensions of mathematics and mathematics education.

### **Prof. Swati Sircar and Dr. Sneha Titus**

Prof. Swati Sircar and Dr. Sneha Titus from Azim Premji University demonstrated what are called 'Low floor High Ceiling' (LHFC) tasks for the classrooms. Activities that start out as simple explorations but are easily scalable to cater to the needs of all the children in the classroom. The energy in the classroom was crackling as teachers realized the infinite possibilities for exploration and learning. Teachers also came up with their own LHFC tasks and they got feedback on those tasks. Prof. Sircar also shared with the participants the different 3D shapes she had made and the geometric problems that arose from them.

### **Mr. Rajesh Sadagopan**

Mr. Rajesh Sadagopan introduced different patterns in number sequences and showed the possibility of different patterns in a single sequence and so the  $n$ th number could be different numbers. He also shared the workings of Geogebra and shared some proofs using Geogebra. He also spoke to the teachers about how important it is to introduce the subject in the right manner. He gave examples of assessments which can tell us if the method of instruction is working or not. The master problem generator that he is, he shared a lot of innovative problems with the teachers.



### **Prof. Anup Dixit and Prof. Siddhi Pathak**

Mathematicians Prof. Siddhi Pathak (Chennai Mathematical Institute) and Prof. Anup Dixit (Institute of Mathematical Sciences) generously shared about what mathematicians do through their personal journey, work, life, and passion. Their personal stories of how and why they chose math was very insightful. They also shared about challenges faced in Math instruction, relationship between language and learning Math, working on Math in the 21st century vis a vis the classical age and history of mathematics, a day in their life as Mathematicians - the discussion was very stimulating and rewarding.

### **Ananya Ranade, Aditi Muthukod and Hurudaya N**

The trio walked the audience through the International Mathematical Olympiad exam and the qualifying exams for team selection for IMO. They shared the details on number of students who get selected, timeline, question paper pattern, preparation, the difficulty level in each phase of the exam - basically the whole enchilada. The fun part of the session was when they shared a couple of teaser questions to give the teachers a feel for Olympiad questions. It was a great road map for the teachers on how to guide their students through the Olympiad process.



# TESTIMONIALS

(Participants)



Namaste! I enjoyed each and every session on all three days. I have got lots of takeaways from these 5 days programme. Initially, we teachers grumbled how we were going to sit in the programme from morning to evening. But I feel now, it could be extended more. The time flew away like minutes. Every teacher and volunteer here are so humble and approachable. The sessions were more than expected. Especially hands on sessions by Swati mam and Sneha mama and all guest lectures were amazing. In between, I felt that I am nowhere as a mathematics teacher. But, now at the end, I have a few plans on how to go about teaching i.e delivering context and encouraging students to upskill their math inquisitiveness. I would like to take part in some more camps to update my math problem solving skills and also that of my students.



A great opportunity for all math educators to be engaged from 9:00 am to 6:30 pm by sitting with problems which would not be possible otherwise. Many thanks to the organizers for introducing us to a community of like-minded individuals. I enjoyed the lectures, problem solving sessions and tutorials. Inviting guest speakers to the camp has been the highlight for me. Personally, I would have wanted an extended duration of the program, as instead of 5 days it could be for a week. Grateful for the opportunity given.



When we were told about the 5-day workshop, I was wondering what we were going to do in 5 days. But after attending these sessions I realized that 5 days are not enough; the resource personnel possess an ocean of knowledge. Every day in the camp/workshop was like a festival; each and every moment was a learning experience. Hats off and sincere thanks to all the math geniuses who have paved some seeds in my mind for a change. I am sure that I am going to make classes more enjoyable for my students with the ideas I got from here. At the same time, I too could learn more and get associated with the RAM foundation in the future. Thanks to all the guest lecturers who made the learning atmosphere very interesting. Like what Sneha madam said we should also know about what is happening/ the progress in the field of mathematics and be updated and this is exactly what was happening in this workshop. Thank you for a well organized workshop and opening a new world for us.



# STRUCTURE OF THE CAMP

## Synopsis of the sessions

The teachers were grouped into two batches - Nalanda and Takshashila for more personal interaction with the participants. The guest lectures were combined sessions.

### A diverse group of faculty members discussed the following topics:

**Mr. Shriprasad Tambe** walked the teachers through the definitions, axioms and properties of natural numbers, rational numbers, and real numbers, while also providing the proof for the related properties. He also discussed Catalan numbers, Unit Fractions/ Egyptian Fractions, Continuing Fractions, Greedy Algorithms, Telescopic sums, mapping rational numbers and irrational numbers on the number line.

**Dr. S. Muralidharan** discussed Euler's formula for connected planar graphs and polyhedrons. He introduced the topic by bringing the attention of teachers to the structure of a football - how many hexagons and pentagons does it take to make a football? As an extension, he also discussed the 3-D structures that can be built using different polygons. He introduced the Instant insanity puzzle and its solution using Graph theory. He also introduced Pick's theorem. He shared a few brain teasers and their solutions (calculating the centroid of an irregular quadrilateral and the pond-trees-thief-buried-treasure).

**Mr. Bhas Bhamre** solved numerous problems in number theory, algebra, and geometry with the participants. He asked the teachers to approach the solution as a 7th grader would. The teachers were glued to their books while solving the problems that looked simple only to unravel their depths once they were pursued.

**Mr. Vinay Nair** introduced Aryabhata's method - 'Kuttaka' - for solving linear diophantine equations. He also shared Brahmagupta's algorithm - 'Bhavana' - for solving Quadratic indeterminate equations. He discussed the problem set given for exploration from the pre-reading material - tetrads, observation about Pythagorean triplets, and some applications for Pell's equation. He opened a Pandora's box of various camps and courses that students can pursue in the coming years after Epsilon India. Mr. Vinay also shared a list of games with the participants and encouraged them to come up with the winning strategy for the same.

# FACULTY



## Mr. Shriprasad Tambe

*Shriprasad Tambe did his MSc in Mathematics from IIT Bombay in 1992. He has been in the field of Mathematics education since early years. He teaches students from middle school up to graduation.*

## Mr. Bhas Bhamre

*A founder of Ramanujan Academy in Nasik where he works with middle and high school students to build strong foundations of Mathematics especially in areas pertaining to Olympiads.*



## Dr. S. Muralidharan

*A Mathematician with a Ph.D. from TIFR, he is a retired Computer Scientist having worked with TCS in the corporate sector. He has also contributed as the Chief Exam Coordinator for IOQM.*



## Mr. Vinay Nair

*A co-founder of Raising A Mathematician Foundation, Founder of Vichar Vatika, and Director for Epsilon India. He is currently pursuing PhD from Chinmaya Vishwavidyapeeth.*



# GUEST SPEAKERS

Apart from the regular sessions, participants also got exposed to high level talks by guest speakers.



## Prof. Anup Dixit

*A PhD from University of Toronto and post doc from Queens University, Canada. He is a Number Theorist working as Assistant Professor at Institute of Mathematical Sciences, Chennai.*

## Prof. Siddhi Pathak

*A PhD from Queens University, Canada. She is a Number Theorist working as Assistant Professor at Chennai Mathematical Institute, Chennai.*



## Prof. Swati Sircar

*A faculty at Azim Premji University and is deeply passionate about Mathematics and Art. She completed her college education from Indian Statistical Institute and later from University of Washington.*



## Dr. Sneha Titus

*Associate Editor of the school mathematics resource journal, At Right Angles. Sneha is deeply involved with the development of resources in mathematics and anchored the mathematics textbook writing process of Sikkim SCERT for classes IV and V.*







# DAILY SCHEDULE AND FORMAT OF THE CLASSES

The forenoon sessions started at 9:00 am with three sessions of 90 minutes each - 2 lectures and 1 tutorial - with two breaks totalling 4 hours.



The afternoon session started at 2:00 PM with four sessions - 2 lectures (75 mins each), one 45-minute activity for games and resources and a 30-minute tutorial session.

The day ended at 6:30 PM.



# ACKNOWLEDGEMENT

The entire training program was hosted and financially supported by DAV group of schools, Chennai. The program being kept free of cost made it even more accessible for teachers from diverse backgrounds to come and participate in the program.





