Epsilon INDIA

2025 Report

Raising A Mathematician Foundation®

April 29 to May 12, 2025

www.epsilonindia.org

TABLE OF CONTENTS

Raising A Mathematician Foundation®

Introduction

Raising A Mathematician (RAM) Foundation was enthusiastic about organizing Epsilon India in May 2025, following its success since 2021. Epsilon India stands as the sole summer camp in the country catering to exceptionally talented Math students aged 9 to 13. The camp was hosted by Krea University in Sri City. Students were selected through a demanding evaluation procedure, which included an Exploratory test and an Algebra test.

Objective

The camp's objective is to offer an early introduction and advanced experience in Mathematics for students who excel and aren't sufficiently challenged in their regular school settings. The curriculum and teaching methods are tailored for these exceptional individuals. Additionally, the camp facilitates interaction among participants, creating an environment that fosters not just academic development but also social and emotional growth for these exceptional young minds.

Daily Schedule of the Camp

The sessions started post breakfast at 8:30 am with three sessions of 90 minutes each and required breaks for assignments. There were sufficient breaks during the day which included outdoor game time when students played various outdoor sports like football, basketball and volleyball. The day went until 7:45 pm when the participants would retire for dinner and engage in post dinner informal discussions for more than an hour. It was lights off at 10 pm and most students would voluntarily wake up as early as 4 am to work on some math problems that intrigued them.

Key Highlights

The Epsilon India Camp 2025 proved to be an appropriate environment for participants to hone their mathematical skills, develop critical thinking, and forge meaningful connections with peers and mentors. By offering a holistic approach to education that encompasses academic, social, and emotional growth., the camp has left a lasting positive impact on the young mathematical minds it nurtured.

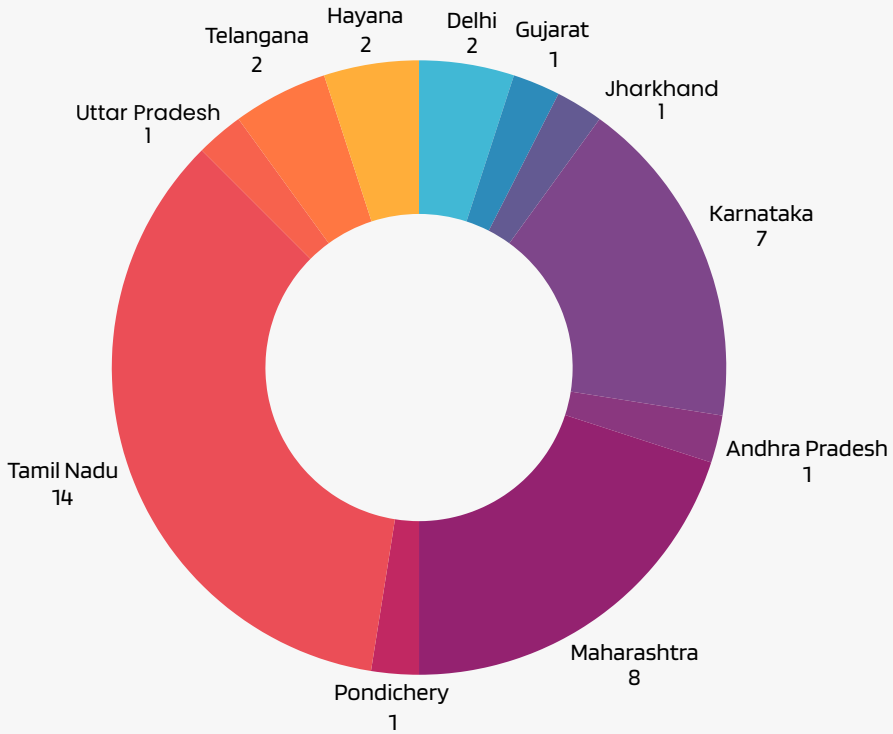
Male
31

Female
09

City
38

Town
2

State wise diversity



Structure of the camp

Brahmagupta Batch Summary

Prof. Soumya Dey: Relations and Partial Orders.

Prof. Dey's course introduced sets, relations, functions, and strengthened students' proof-writing skills. The class then explored equivalence relations, partitions, partial orders, and lattices. The course concluded with fundamental ideas such as the density of rational numbers, supported by highly interactive and approachable teaching.

Prof. Rishi Vyas: Error Correcting Codes

Prof. Rishi Vyas offered an engaging course on Error Correcting Codes by developing fundamental ideas through a practical problem. The course connected number tricks to real-world decryption systems and built the algebra and geometry behind error-correcting techniques. Students concluded the course by creating and experimenting with their own number tricks.

Prof. Gangotryi Sorcar: Hyperbolic Geometry

Prof. Sorcar delivered a thought-provoking introduction to geometry beyond Euclid's fifth postulate through a historical and conceptual narrative. The course moved from neutral geometry to hyperbolic geometry, building comfort with proof-writing in unfamiliar settings. Story-based instruction helped students appreciate both the content and the evolution of these geometric ideas.

Prof. Kavita Sutar-Deshpande: Wallpaper Groups

Prof. Sutar-Deshpande introduced group theory through the study of natural symmetries in objects. Students explored how symmetry sets form groups, leading to one-dimensional symmetry groups and wallpaper groups. The course concluded with the classification of such groups and methods for identifying common symmetries in daily life.

Prof. Ajit Bhand: Iterated Functions and Dynamical Systems

The course guided students toward the research frontier in dynamical systems, focused on the seminal result of Li and Yorke. Concepts such as iterating functions and key examples like the tent map were developed to build the necessary foundation. The course concluded with Li–Yorke chaos and an introduction to Sarkovskii's theorem, offering an accessible entry into active research.

Dr. George R. Thomas: Miscellaneous Complementary Topics

Dr. Thomas conducted two additional classes for the Brahmagupta batch, offering a miscellany of advanced topics. One session complemented Prof. Dey's course by introducing Dedekind cuts and their formalization, while another extended Prof. Gangotryi's geometry course through a discussion on area in hyperbolic space. The enthusiastic and energetic delivery further deepened student engagement with the material.

Madhava Batch Summary

Dr. George Thomas: Methods of Proof

Dr. George Thomas introduced Aristotle's laws of thought and major proof techniques—direct proof, contraposition, and contradiction—through clear geometric examples that strengthened foundational reasoning. His discussion of the Axiom of Choice and the equivalence of the well-ordering principle with induction prompted students to reflect deeply and develop their own formal proofs.

Dr. Soumya Dey: Set Theory

Dr. Soumya Dey introduced sets, basic operations, and region-graphing in $\mathbb{R}^2$, followed by functions and bijections to motivate cardinality. The course concluded with a proof that the integers are countable and an exploration of the Schröder–Bernstein theorem.

Dr. Harold Reiter: Exotic Arithmetic

Dr. Harold Reiter's "Exotic Arithmetic" course presented puzzles involving divisibility techniques, the Euclidean algorithm, and number systems in negative and fractional bases. Student presentations and discussions highlighted the central theme that arithmetic is driven by insightful strategies rather than mere computation.

Dr. Priyavrat Deshpande: Plausible Reasoning

Dr. Priyavrat Deshpande traced the evolution of mathematical thinking from experimentation to formal proof through Buffon's needle experiment, Toeplitz's inscribed-square problem and the Collatz conjecture. The course concluded with Catalan numbers, illustrating how intuition and exploration guide discovery before formalization.

Sridhara Batch Summary

Dr. Ashwin Guha: Symmetry of Platonic Solids

Dr. Ashwin Guha led the Sridhara batch through a week-long exploration of all Platonic solids, beginning with their definitions and culminating in an understanding of their group-theoretic properties. The sessions, enriched with origami-based construction, helped students appreciate the beauty of these solids and deeply enjoy the learning process.

Dr. George Thomas

Dr. George Thomas introduced Aristotle's laws of thought and key proof techniques through clear geometric examples that highlighted their logical power. The session concluded with reflections on the Axiom of Choice and the equivalence between the well-ordering principle and mathematical induction.

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Faculty and Guest speakers

DR. GEORGE R. THOMAS

Mathematician, Independent researcher from Canada and founder of summer camps like Epsilon Camp, MathPath and MathCamp in USA for students showing high promise in mathematics.

PROF. HAROLD REITER

Prof. Harold Reiter is a distinguished mathematician from the University of North Carolina at Charlotte, specializing in combinatorics and graph theory. He has presented at major institutions like Harvard, Stanford, and the AMS.

DR. ASHWIN GUHA

Dr. Ashwin Guha holds a PhD in Computer Science from IISc Bengaluru. A two-time CENTA Olympiad topper, he also authored the award-winning children's book The Homework and writes the blog Rong but Reasonable.

PROF. AJIT BHAND

Assistant professor at mathematics department of IISER Bhopal. Involved with the Maths Circle of India initiative of ICTS-TIFR. Co-organiser of the IISER Bhopal Maths Circle.

PROF. KAVITA DESHPANDE

Prof. Kavita Deshpande is a mathematician with expertise in scientific computing and computer vision. She earned her PhD from Northeastern University in 2012 and has taught at Sai University and the Chennai Mathematical Institute.

PROF. PRIYAVRAT DESHPANDE

Prof. Priyavrat Deshpande, Associate Professor at the Chennai Mathematical Institute, earned his PhD from the University of Western Ontario in 2011. He also coordinates placements and the Madhava Mathematics Competition at CMI.

PROF. GANGOTRYI SORCAR

Prof. Gangotryi Sorcar holds a PhD in Mathematics from Binghamton University. She is dedicated to fostering curiosity, confidence, and a love for learning in her students.

PROF. SOUMYA DEY

Prof. Soumya Dey is a geometer and topologist with a PhD from IISER Mohali and postdoctoral work at IISER Bhopal, IMSc, and CMI. His research centers on braid groups, mapping class groups, and infinite groups, along with active involvement in outreach and collaborative learning.

PROF. RISHI VYAS

Prof. Rishi Vyas is an algebraist specializing in ring theory, homological algebra, and group theory. Educated at St Stephen's College and the University of Cambridge.

Teaching Assistants

Mihir Jewalikar

Mihir, a computer science graduate and former Microsoft engineer, is a dedicated RAM alumnus who teaches in math programs and plans to pursue an MS in Mathematics.

Sharang Thimmaiah

Sharang, PhD scholar in Mathematics at Krea University, with a BSc and MSc from St. Joseph's, and he enjoys exploring mathematics' history and philosophy.

R. Mahalakshmi

R. Mahalakshmi from Madurai, with BSc and MSc in Mathematics, is pursuing a PhD at VIT on fractional-order systems and loves teaching and connecting math to real-world problems.

Sundarm Sharma

Sundarm, final-year MSc Mathematics student at Mumbai University, is a RAM TA, Maths Circle faculty, content writer, aspiring armed forces officer, and active in sports and research.

Vighneshini Bharathi

Vigneshini is a Mathematics PhD scholar at Krea University, currently studying representation theory. She is passionate about teaching and enjoys playing badminton in her free time.

Gunjan Karnwal

Gunjan, a mathematics enthusiast and life lover, believes in learning and creating together, seizing opportunities, and looks forward to exciting academic adventures ahead.

Kushwaha Anand

Anand is an M.Sc. Atmospheric Science student at the National Institute of Technology, Rourkela. His academic interests includes atmospheric dynamics, weather and climate data modeling, and climate-related studies. He holds a B.Sc. degree in Mathematics from M.G. Science Institute, Ahmedabad.

Teaching Aides

Shreeram Nair

Shreeram, a grade 12 student. He loves math and computer science and have attended a lot of camps and courses in those fields.

Raghav Jeyan Prabu

Raghav, a class 11 student passionate about Mathematics, prepares for Olympiad and JEE, exploring advanced concepts, and has attended multiple RAM camps since 2021.

Dikshha Sinha

Dikshha, a class X student at Podar International School, Navi Mumbai, actively participates in RAM Foundation's training program and MathPath USA, driven by her passion for mathematics.

Outing

A day tour was organized, allowing the participants to explore notable destinations such as the VGP Marine Kingdom and Dakshina Chitra. These outings offered a refreshing break from academic activities while enriching the overall camp experience. Through interactive exhibits, cultural showcases, and real-world observations, participants gained scientific and cultural insights that complemented their classroom learning and encouraged curiosity beyond textbooks.

Games integrated with learning

The camp offered a rich variety of games and activities designed to balance learning with fun. A wide selection of board games kept the participants actively engaged, including classics such as Othello, Mastermind, 3D Tic Tac Toe, Chess, and the uniquely designed Wall Trap, a strategy-based game. All aimed at building critical thinking and problem-solving skills. Alongside these, outdoor games such as football, cricket, and badminton gave students a refreshing break while fostering teamwork and enthusiasm.

Partners

Krea University

Krea University's sponsoring body, IFMR Society was set up in 1970 as a not-for-profit society focused on research, training and education in the areas of macro and micro economics, finance and management including a full-fledged business school.

Established in 1970 as a not-for-profit society, the Institute for Financial Management and Research (IFMR) was set up to provide research-based inputs to industries and the government in the areas of finance and economics. Sponsored by the erstwhile ICICI Ltd, the House of Kotharis and other major industrial groups, IFMR Society was the first of its kind in Asia.

Conclusion

Epsilon India 2025 provided an exceptional platform for young mathematical talents, seamlessly combining rigorous academic instruction with enriching extracurricular activities.

Participants not only deepened their knowledge and sharpened their critical thinking skills, but also built meaningful connections with peers and mentors. The camp's holistic approach has empowered these young minds with the confidence and preparation to excel in their future mathematical pursuits.

Mail
epsiloncampindia@gmail.com

Website
www.epsilonindia.org

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