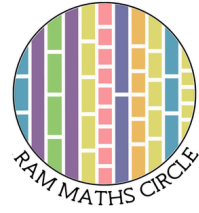


2025-26



RAM Maths Circle

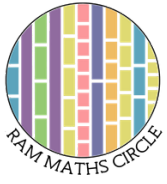


INDRAPRASTHA INSTITUTE of
INFORMATION TECHNOLOGY DELHI

Delhi Chapter

Report





About Maths Circle

Maths Circles originated in Russia and have since expanded globally, attracting students eager to explore mathematics beyond the standard curriculum. These circles involve weekly sessions where mathematicians and educators engage students in solving non-routine mathematical problems.

Raising a Mathematician (RAM)'s Delhi Maths Circle, in collaboration with Indraprastha Institute of Information Technology (IIIT), Delhi aims to cultivate deep mathematical thinking and problem-solving skills among students through interactive and discussion-based sessions. The programme encourages students to move beyond rote learning and develop curiosity, creativity, and analytical thinking in mathematics.

The sessions were designed to be highly interactive, collaborative, and student-centred. Students were encouraged to work together in groups, discuss different approaches, and independently discover mathematical ideas through guided exploration.





Summary

RAM Maths Circle Delhi Chapter successfully engaged students in advanced mathematical thinking through collaborative problem-solving sessions, mathematical games, and discussion-based learning.

The programme focused on developing conceptual understanding, logical reasoning, and confidence in tackling challenging mathematical problems.

Student selection

Students were selected through an offline screening test. The selection process focused on identifying students with strong conceptual understanding, curiosity, and problem solving abilities.

Selection Criteria

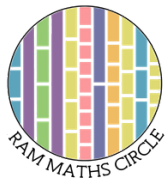
- Performance in the screening test
- Accuracy and problem-solving approach
- Conceptual understanding of mathematics
- Overall score obtained in the test

The selection process aimed to identify students who showed enthusiasm and potential for engaging with higher-level mathematical thinking.

Classroom structure

The RAM Delhi Maths Circle adopted an interactive and discussion-based learning environment where students actively engaged with challenging mathematical problems rather than receiving direct instruction. Sessions typically began with carefully selected problem sheets containing exploratory questions, conjecture-building tasks, and proof-based challenges. Students were encouraged to work individually as well as collaboratively, discussing ideas, testing examples, identifying patterns, and presenting their reasoning to peers.





Faculty members acted primarily as facilitators, guiding students through questions and providing hints when necessary rather than supplying complete solutions. Teaching Assistants interacted closely with students, supporting group discussions and encouraging multiple approaches to problem solving. Regular board presentations allowed students to explain their methods and mathematical thinking, fostering confidence, communication skills, and deeper conceptual understanding.

The overall classroom culture emphasized curiosity, independent thinking, mathematical creativity, and collaborative learning. Students were encouraged to make conjectures, search for patterns, justify their claims rigorously, and appreciate different solution strategies.

Role of Facilitators/Faculty and Teaching Assistants

Facilitators/Faculty:

The primary role of facilitators / faculty was to facilitate discussions, encourage independent thinking, and address students' doubts while fostering curiosity about mathematics. The teaching approach was friendly and informal, ensuring that students felt comfortable sharing their ideas and approaches openly. Facilitators / faculty guided students towards discovering concepts on their own rather than directly providing solutions.

Sessions focused heavily on discussion-based learning and exploratory thinking, helping students engage deeply with mathematical concepts.

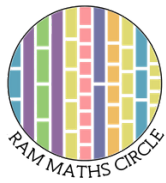
Teaching Assistants

Teaching Assistants came from diverse academic backgrounds, including Engineering and Chartered Accountancy.

Their primary responsibilities included:

- Facilitating discussions within small groups
- Helping students clarify doubts
- Providing hints and guidance when required
- Encouraging participation from all students

The TAs played an important role in maintaining an interactive and supportive learning environment.



Topics Covered

Delhi Maths Circle explored a broad range of advanced mathematical ideas beyond the regular school curriculum. The sessions focused on developing mathematical thinking, proof-writing skills, and problem-solving abilities through rich mathematical investigations.

Major topics covered during the programme included:

- Graph Theory: Graphs and connectivity, Degrees of vertices, Eulerian graphs and Königsberg bridge problems, Connected components and network problems.
- Combinatorics and Counting: Addition and multiplication principles, Counting techniques, Permutations and combinations, Derangements, Counting subsets, and Integer partitions.
- Number Theory: Divisibility, Greatest Common Divisor (GCD), Euclidean Algorithm, Bézout's Identity, Modular Arithmetic, Wilson's Theorem, Sums of squares, Consecutive integer representations.
- Geometry: Triangle Inequality, Distance problems, Reflection methods, Geometric optimization, Perimeter and diagonal inequalities
- Set Theory: Sets and subsets, Set operations, Venn diagrams, Power sets, Cartesian products, and De Morgan's Laws.
- Recreational and Exploratory Mathematics: Magic Squares, Mathematical games and strategy, Nim-type games, Logic and reasoning puzzles
- Mathematical Proof and Conjecture Building: Pattern recognition, Formulating conjectures, Constructing proofs, Generalization of results.

These topics were introduced through carefully designed problem sets that encouraged exploration, experimentation, and rigorous mathematical reasoning.

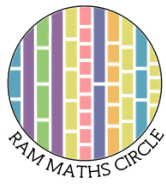
Session synopsis documents were maintained regularly to record mathematical activities, discussions, and topics explored during each session. The session reports are uploaded here: <https://www.mathscircle.org/delhi-sessions>.

Assignments

Weekly problem sheets formed an integral part of the Delhi Maths Circle programme. Rather than routine exercises, assignments consisted of challenging non-routine mathematical problems designed to encourage independent exploration and deeper engagement with mathematical ideas.

The assignments aimed to:

- Reinforce concepts discussed during the sessions.
- Develop proof-writing and logical reasoning skills.
- Encourage students to identify patterns and formulate conjectures.
- Promote persistence in solving unfamiliar problems.
- Foster creativity through multiple solution methods.
- Extend classroom discussions into independent mathematical investigation.



Students were encouraged to revisit unsolved problems between sessions, discuss ideas with peers, and return with new approaches. Many assignments included open-ended questions that required students to generalize observations, test conjectures, and provide rigorous justifications. This approach helped students develop mathematical maturity, resilience, and confidence in tackling challenging problems independently.

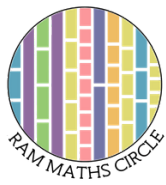
Appreciation and Recognition

The Delhi Maths Circle encouraged active participation and celebrated students' mathematical thinking throughout the programme. Students who demonstrated creativity, persistence, collaborative problem-solving, and strong reasoning skills were appreciated during the sessions. Recognition was aimed at building confidence, encouraging deeper engagement with mathematics, and fostering a supportive learning community.

Recognition Methods:

- Inviting students to present their solutions and ideas on the board.
- Appreciating innovative and elegant solution strategies during discussions.
- Recognizing students who actively contributed to group work and mathematical conversations.
- Encouraging peer learning by allowing students to explain concepts and approaches to others.
- Acknowledging perseverance and improvement in problem-solving skills over time.

These appreciation methods motivated students and created an enjoyable mathematical learning environment.



Meet Our Team

FACULTY

The Math Circle Delhi Chapter faculty consists of educators and mentors from Indraprastha Institute of Information Technology Delhi who guide students through engaging problem-solving sessions and mathematical explorations. They facilitate discussions, encourage creative thinking, and nurture students' interest in mathematics beyond the classroom.



DEBIKA BANERJEE

Dr. Debika Banerjee obtained Ph.D. in Mathematics from Harish-Chandra Research Institute, Allahabad in 2017 and M.Sc. in Mathematics from IIT Kanpur in 2011. Prior to joining IIIT-Delhi, she was a National Post Doctoral Fellow (NPDF) at IISER Pune from 2017 to 2019. She worked as a Post Doctoral Fellow at Technion, Israel from 2016 to 2017.



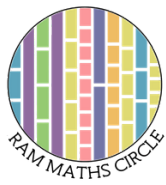
PRAHLLAD DEB

Prahlad Deb is currently a faculty member at IIIT Delhi. Prior to joining IIITD, he was a postdoctoral fellow in the Department of Mathematics at Ben-Gurion University of the Negev, Israel. He earned his Ph.D. in 2020 from the Indian Institute of Science Education and Research (IISER) Kolkata, following an M.S. degree from the Indian Institute of Science (IISc), Bengaluru, and a B.Sc. degree from Jadavpur University.



SACHCHIDANAND PRASAD

Sachchidanand Prasad is an Assistant Professor in the Department of Mathematics at IIIT Delhi. He completed his PhD from IISER Kolkata and held postdoctoral positions at ICTS-TIFR, Jilin University, and the University of Göttingen.



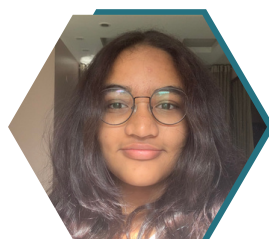
Meet Our Team

TEACHING ASSISTANTS

The RAM Maths Circle Delhi is a student-parent led initiative that nurtures mathematical curiosity and problem-solving skills among young learners. From the students' side, this math circle is led by alumni of RAM and their peers.



AARYAV TAGRA



DIYA GUPTA



PRATISHTHA GUPTA



RITVIK TALWAR



SHAILY SHIVANGI



SHARVANI JADHAV



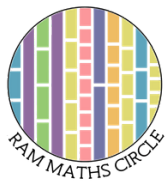
SHASHWAT GUPTA



**SARVESH
SHASHIKUMAR**



VEDIKA JAIN

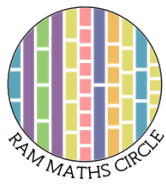


Core Team



MANVEE BANSAL
CHAPTER HEAD

Ms. Manvee Bansal, a parent who helped in managing the Maths Circle in terms of logistics and operations. Their active involvement and support throughout the course played a crucial role in the smooth execution of the programme.

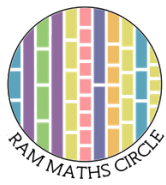


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Indraprastha Institute of Information Technology Delhi (IIIT-Delhi) was established by an Act of Delhi legislature empowering it to carry out R&D, conduct educational programs, and grant degrees. The General Council is the apex body of the Institute, chaired by Hon'ble Lt. Governor of Delhi.



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