Nashik Maths Circle

January 17, 2026

Delhi Public School, Nashik

Session Overview

The Nashik Maths Circle session on January 17th was conducted by Mrs. Ashalesha Sambare. The session was structured as a "learn-from-problems" workshop, covering a diverse range of topics including number theory, modular arithmetic, and complex logical puzzles.

Core Mathematical Concepts

The session was designed to challenge students to apply abstract logic to concrete problems. Key areas of focus included:

- **Number Theory:** Exploring properties of integers and divisibility.

- **Modular Arithmetic:** Introducing students to "clock arithmetic" and its applications in remainder problems and cryptography.

- **Logical Deduction:** Solving multi-step problems that required a rigorous chain of reasoning.

The Problem-Solving Experience

Students engaged enthusiastically with the material, using the problem set to either sharpen existing skills or encounter entirely new mathematical territories.

Critical Challenges

Two specific problems stood out as pivotal moments in the session:

- **Question 1 and Question 2:** These questions were identified as critical because they introduced concepts that were previously unknown to the majority of the students. The successful resolution of these problems marked a significant expansion in their mathematical toolkit.

Conclusion

Overall, the session was an excellent example of active learning. By tackling challenging puzzles and unfamiliar theories, students moved beyond rote memorization into deep mathematical understanding.

Raising A Mathematician Foundation™

Nashik Mathematics Circle

Problem Sheet   17th January 2026

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P − 1: *Find the remainder when* $1^1 + 2^2 + 3^3 + \cdots\cdots + 100^{100}$ *is divided by* 4.

P − 2: 100 students stand in a circle and pass a ping-pong ball.

Starting from student 1:

Every time the ball is passed, the 5th student holding the ball leaves the circle. Passing

continues with remaining students. Who is the last remaining student?

P − 3: There are 100 doors in a row, and all doors are initially closed. A person walks through all

doors multiple times and toggles (if open, then close; if closed, then open)

- In the first walk, the person toggles (or opens) every door.

- In the second walk, toggles (or closes) every second door (i.e., 2nd, 4th, 6th, 8th, and so on).

- In the third walk, toggles every third door (i.e., 3rd, 6th, 9th, etc.).

   This pattern continues, and in the 100th walk, the person toggles only the 100th door.

100 Doors

Which doors are open in the end?

P − 4: A brother leaves his house 5 minutes after his sister if he walks at 1.5 times her speed how

long will it take him to catch up?

P − 5: Is it possible to cut several circles out of a square of side 10 cm so that some of the diameters

of the circles would be 5m or more?

P − 6: Here is the series of figures. The first consists of one square. How many squares are in the

100th figure? How many squares are in the first 100 figures altogether?
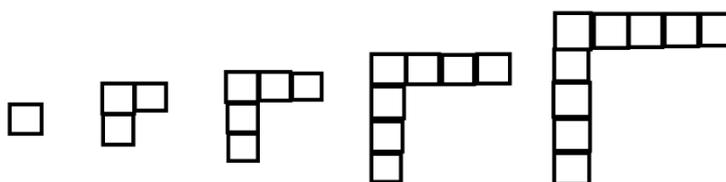
P − 7: Four people sit around a table. One of them has stolen a ring. Each person accuses another, and you know that exactly two of them are lying, and two are telling the truth. The statements are:

Person A: "Person B stole the ring."

Person B: "Person D stole the ring."
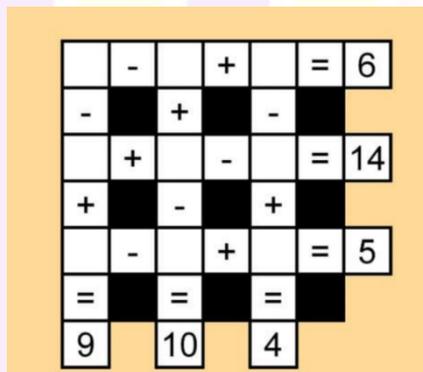
Person C: "Person A is lying."

Person D: "Person B is telling the truth."

Who stole the ring?

P − 8: An ant is sitting in a corner of the floor of a cubical room. It wants to move to the opposite corner using the shortest route. It can only move along the walls floor and ceiling of the room. What part should it take? (Show using diagram.)

P − 9: Solve the following puzzle.

P − 10: How can you make the number 720 using exactly six zeros and any mathematical operators?

The 1,000 with Eights: Using only addition, how can you combine eight 8s to equal exactly 1,000?