

Junior Batch

In our Maths Circle, we learnt that “**solving a problem**” did not mean just guessing the final answer. It meant figuring it out properly, step-by-step. We also learnt that “**presenting a solution**” was not just writing down the final answer. It meant explaining *how* we got there clearly and logically, showing all the important reasons and rough work.

In today’s session, we solved problems together as a group. We worked on a mix of different brain-teasers and logical problems. The main focus was on learning how to think carefully, explain our reasoning, and find ways to prove that an answer was correct.

- **Worst-Case Scenarios:** Students explored how to build mathematical certainty using problems about pulling marbles and gems from a dark room. By thinking about the absolute “worst luck” possible, they learnt how to guarantee a specific outcome rather than relying on probability. This helped them understand how to plan for the most difficult possible case.
- **Cause and Effect Diagram:** The group examined logical rules and discovered that they worked like “one-way streets.” By drawing cause-and-effect diagrams, students visualised how a single outcome, such as being in a great mood, could come from multiple alternative causes. This helped them understand why the reverse of a logical statement was not always true.
- **The Power of Counterexamples:** Using a “sour mango” analogy, students learnt that disproving a universal rule did not require a long explanation. Finding just one valid counterexample was enough to break a mathematical claim.

Mathematical rules were usually One-Way Streets. Just because A caused B, it did not mean that B was caused by A. To show that a universal argument was wrong, students learnt that they did not need a long paragraph—they only needed to find ONE Counterexample (an alternative cause).

- **Secret Mathematical Symbols:** We then introduced two powerful shorthand symbols used by mathematicians:
 - $\forall$ (**For All**): This represented a universal claim. Students practised testing false $\forall$ claims by looking for a single counterexample. They learnt that one valid example was enough to show that a “for all” statement was not true.
 - $\exists$ (**There Exists**): This represented the existence of at least one case. Students used this idea to prove claims by finding and presenting a specific “magic” number that satisfied a special rule.
- **Challenging Brain-Teasers:** The session concluded with lateral-thinking puzzles.

Note: For full details on the specific puzzles, analogies, and mathematical proofs discussed, please refer to the worksheet dated September 27, 2026.