Topics in Level 3 - Out Of The Box Thinking

Total number of Topics: 20.
Net Lecture Duration: 30 hours.

Syllabus

- **FACTORS AND MULTIPLES**

Several interesting non-routine problems are dealt in this familiar topic.
Outcomes: Exploration of learning the unknown challenges in a familiar topic.

- **NUMBER BUILDER**

This is a game of building numbers from given conditions, with limited usage of arithmetic symbols, but unlimited usage of arithmetic operators and functional characters like factorial, square root, floor, ceiling, and concatenation.
Outcomes: Constructing functions and realising its usage of different kinds.

- **CONFIGURATION**

Geometric configurations of specified characteristics are generated based on the given input. Configuration could also be arithmetic.
Outcomes: Logical reasoning skill

- **"NO CHANGE" MATH**

This is famously known as the Invariance Principle in the pure math circuit. Interesting problems using these principles in several fields are discussed.
Outcomes: Recognising famous scientific laws, mathematical theorems, and properties, as invariance facts in a varying system.

- **GRID MATH**

Through several types of grids, mathematical concepts can be realised. The topic emphasises this idea and also tests it through a variety of problems.
Outcomes: Builds up the skill of developing theories by means of grid visualisation.

- **SHAPING UP GEOMETRY**

Very interesting facts about the geometric shapes are discussed in this topic. It poses questions related to this idea and thereby provides an opportunity to discover the shape properties of geometric figures while answering.
Outcomes: Gives a broader perception of geometric shapes.

- **BALANCING WEIGHTS**

This topic poses various problems in weighing masses where answering involves logical conclusions at each step.
Outcomes: Improves logical thinking skills.

- **GEOMETRIC ESTIMATION**

This topic in Geometry is of a new kind where the focus is on an estimation of length, area, angle measure, volume, etc… not necessarily the exact value.
Outcomes: Develop estimation skill set.

- **SYMMETRY**

There is content symmetry in algebraic expressions that makes it special. There is also geometric symmetry where the object is invariant and not affected due to transformation **such as reflection, rotation, etc…**
Outcomes: Gives an insight into symmetry.

- **WHERE IS MY FRIEND x?**

Several algebraic problems that require usually unknowns such as x,y,z, etc… can be solved without the use of even a single variable. This creative technique is illustrated in this topic.
Outcomes: Builds manipulative techniques and develops non-routine thinking.

- **NUMBER GAMES**

Two or more players play number games following the rules with a specific winning target. Problems are mostly on the winning strategy of a player in the game.
Outcomes: Emphasise the importance of mathematics theory in developing strategy.

- **SPECIAL EQUATIONS**

There are numerous special equations that cannot be solved in ordinary ways. It requires special techniques to solve such equations. These are illustrated in this topic.
Outcomes: Develops very good observation and higher-order thinking.

- **RATIOS AND PROPORTIONS**

Unfamiliar but very useful applications of ratios and proportions in solving problems are discussed in this topic.
Outcomes: Problem-solving skill enhancement.

- **CONGRUENCY AND SIMILARITY**

Congruency and similarity - two important characteristics of certain geometric shapes, not necessarily triangles, are discussed in detail both on concepts and its applications.
Outcomes: A deeper understanding of the concepts and their applications.

- **COUNTING**

Using ten simple tips, effective counting methods were introduced earlier in basic counting. The same tips are used effectively and innovatively in solving problems here.
Outcomes: Assimilating several techniques in counting.

- **WHAT'S YOUR ID?**

Introduction of coordinate geometry with coordinates as an identity of a point in a plane or space. We discuss elegant solving methods, more from a geometric sense, to problems in

coordinate geometry.
Outcomes: Develops elegant problem-solving skills.

- **DEAR TRIGONOMETRY**

Basic Trigonometric ratios and properties are introduced. Interesting problems are solved.
Outcomes: Effective usage of trigonometric formulae.

- **STATISTICS**

Introduction of the necessity of measures of central tendency and measures of dispersion. Illustrates how the concept itself helps in developing varied techniques in the solution process.
Outcomes: Establishes the fundamental basis of statistics.

- **A JOLLY RIDE WITH MODULO**

The topic explains modulo theory (an important branch of number theory) and its applications. Very interesting problems are dealt with.
Outcomes: Learning the power of cyclic remainders in number theory.

- **SETTING UP THE RATIO**

This is a very powerful creative tool in factorisation of algebraic expressions and the theory of polynomials.
Outcomes: Speed of solving is enhanced.