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# WORLD LOGIC DAY LECTURES

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INDIA

To celebrate the third edition of the World Logic Day, two online lectures were organized in India. The details are as follows:

## Organizers

[Association for Logic in India \(ALI\)](#), in co-ordination with [Calcutta Logic Circle](#) and [Mathematics Teachers' Association](#) (India)

## Contact Person

Md. Aquil Khan, IIT Indore

## Date

January 14, 2021

## Lecture 1

### *TITLE*

Logic for school mathematics

### *SPEAKER*

R. Ramanujam, IMSc Chennai

### *LECTURE LINK*

<https://www.youtube.com/watch?v=rvKSGeksyO4>

### *ABSTRACT*

All through school, students learn deductive procedures in equational theories and employ deliberate means of reasoning in algebra and geometry. Yet, the question of whether these procedures are reliable never comes up in the curriculum, though there is an excellent answer: Tarski's theorem on the decidability of real arithmetic. Formal propositional logic is introduced at school, but when seen in company with topics like the differential calculus, is treated rather dismissively.

Logic is not only about deductive reasoning, it is also a conscious use of formal language, understanding truth relative to models, figuring out consequence, relating assertions to algorithms that check those assertions, and studying limits to reasoning. Viewed thus, logic can serve a range of pedagogic purposes in school mathematics.

## Lecture 2

### *TITLE*

Models of non-classical set theories [https://www.youtube.com/watch?v=xGk\\_V7MPVP8](https://www.youtube.com/watch?v=xGk_V7MPVP8)

### *SPEAKER*

Sourav Tarafder, St. Xavier's College, Kolkata

### *LECTURE LINK*

[https://www.youtube.com/watch?v=xGk\\_V7MPVP8](https://www.youtube.com/watch?v=xGk_V7MPVP8)

### *ABSTRACT*

In this presentation, we shall discuss algebra-valued models of set theories. Different classes of algebras will be introduced which produce non-classical algebra-valued models of ZF, ZFC, a proper fragment of ZF, and finally a new version of ZF axiom system, which is classically equivalent to ZF. The validity of the mathematical statements like the Axiom of Choice, the generalized continuum hypothesis, Cantor's theorem, Schröder-Bernstein theorem depends on their validity in the ground model. Though the models are non-classical, the foundations of cardinal numbers including the cardinal arithmetic in these models are similar to those in classical set theory. Finally, we shall discuss a few independence results in these non-classical set theories.