



Bangladesh Mathematical Society - A F Mujibur Rahman Foundation

১২শ জাতীয় স্নাতক গণিত অলিম্পিয়াড ২০২১

12th National Undergraduate Mathematics Olympiad 2021

Office: Department of Mathematics, A. F. Mujibur Rahman Ganit Bhaban, University of Dhaka

website: www.bdmathsociety.org



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Prof. Munibur Rahman Chowdhury
01552467908, mrc@member.ams.org

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masarker45@gmail.com

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Mrs. Ruby Ghuznavi
Chairman
AF Mujibur Rahmhan Foundation
aranyacrafts@gmail.com

Executive Director
AF Mujibur Rahmhan Foundation

Modality of the NUMO 2021

The time allotted for each Regional Olympiad, as well as the Final Round of the Olympiad, is 90 minutes. There will be two types of problems: broad and short. There will be 6 broad problems each carrying 10 marks, and 8 short problems each carrying 5 marks. All questions are to be answered. Contents of the questions will not exceed second year level in mathematics. The problems will be set from among the topics comprising the subject areas listed below.

- 1. Vector and Analytic Geometry:** Vectors in two and in three dimensions. Scalar product. Vector product. Applications to plane geometry. General equation of second degree: Conic section. Coordinates in three dimensions: Direction cosines. Planes and straight lines in three dimensions.
- 2. Algebra:** Complex numbers. DeMoivre's theorem and applications. Polynomials and algebraic equations. Summation of algebraic and trigonometric series. Basic knowledge of groups, rings and fields. Elementary number theory.
- 3. Vector spaces. Linear independence: Basis and Dimension. Linear transformations. Linear equations, Matrices and determinants.**
- 4. Calculus of One Variable:** Functions and their graphs, limits, continuity, differentiation and application, integration and applications, fundamental theorems and applications. Convergence of infinite sequences and series:
- 5. Calculus of Several Variables:** Differentiation and integration of vector functions. Line, surface and volume integrals. Cylindrical polar and spherical polar coordinates. Theorems of Green, Gauss, Stokes and their applications.