

Mathematics Project

Rules and regulations

Theme: Any topic in Mathematics. The project can be a study on a mathematical topic or a study on application of using Mathematics to solve a real-life problem.

Report:

1. The cover page of the written report must include project title and full name of participant. The written report must be submitted in MS Word format, (as .doc/.docx file), using "Times New Roman" font size 12 in A4 format.
2. The written report must be written in English. Participants must not plagiarize the work of others. If the contents of any books or other references are quoted in the report, the details of the sources, such as the names of the books or the URLs of websites, must be indicated.

Interview with judges:

On the first day of competition students will be invited to attend an interview conducted by a panel of judges. Participants should bring one copy of printed report of a project and prepare a presentation.

Evaluation of projects and determination of degrees:

In the first phase all projects will be presented. Each student will have 10-15 minutes for introducing his project and answering judges' questions. Participants will be given their points according to the Grading Policy.

On the second day of the competition, participants will have an exam on topics of school program of algebra and geometry. Example questions are provided below.

1. Solve the equation $|x - 2|^{x^2 - 2x} = |x - 2|^{5x - 10}$
2. Solve the equation $\log_x(2x^2 - 4x + 3) = 2$
3. Solve the system of equations

$$\begin{cases} x\sqrt{y} + y\sqrt{x} = 6 \\ x^2y + y^2x = 20 \end{cases}$$

4. Solve the inequality $\frac{1}{x^2-5x+6} \leq \frac{1}{2}$
5. Find the sum $A = i + i^2 + i^3 + \dots + i^{15}$, where i is complex number
6. What is the coefficient of $x^{12}y^{13}$ in the expansion of $(x + y)^{25}$?
7. Find the remainder on dividing 3^{20} by 7.

Grading Policy:

Projects will be assessed according to the following criteria:

1. Whether the mathematical principles described/adopted are appropriate and whether the used methods are reliable;
2. Whether the project is innovative, creative and able to exhibit/apply problem-solving skills, critical thinking skills and creativity;
3. Whether the presentation is logical, systematic and analytical.
4. Participant should be able to answer judge's questions about their work.