



# دیوار

## Fourth International Iranian Combinatorics Olympiad

### **Overview:**

Thanks to math lovers, professors and combinatorics teachers around the world, the 4th Iranian Combinatorics Olympiad (ICO 2024) is taking place on Thursday 31st of October and Friday 1st of November 2024. ICO 2024 is an online contest where contestants can participate in this event in a team of at most 3 solving IMO style combinatorial questions. The registration and participation is completely free of any charge. Before registration, please read this file carefully to familiarize yourself with the rules and regulations of ICO 2024.

### **Teams:**

There are three different levels of “Elementary”, “Advanced” and “Free” that teams can participate in. The level of each team is determined by the student in the **highest grade** in every team.

Elementary level: This level is for teams with students in grades 10 or below.

Advanced level: This level is for teams with students in grades 11 or 12.

Free level: This level is for anyone who is not a student in grades 12 or below.

### **A couple of points about your teams:**

- There is no need that all members of your team be from the same school or even in the same grade. (But you have to be from the same nation or country)
- The questions for the “Free” and “Advanced” levels are shared. We will only use different standings for announcing the results and winners of the contest.

- There is no kind of limitation for participating in the “Free” level. This means that University/ College Students and professors are welcome to challenge themselves in this level.
- ICO 2024 will be held in two versions of online and offline.
- The online version which is the main stream of the contest will take place at the same time which is written in this file all over the world.
- In the offline version, teams are eligible to participate in this exam up until 48 hours after the contest through representatives in different countries. If you are interested in participating offline, please email us using the following email [info@ico-official.com](mailto:info@ico-official.com) for more information.

### **Rules and Regulations:**

The exam will have two rounds of short answer questions and long answer questions. The exam will take place online and in our official website (<https://ico-official.com/>).

### **First Round: Short Answer Questions - October 31st 2024**

- The exam starts at 4:00 pm (Iran’s standard time) and the duration of the exam will be 2 hours.
- The exam will contain 15 short answer questions.
- The answer to each question is a single integer. There is no negative marks for incorrect answers, however the number of incorrect answers may be used as a tie breaker between the teams with equal marks.
- The mark to every correct answer is calculated using the formula  $\frac{2m}{m + n}$  where m is the total number of teams participating and n is the number of teams answering that question correctly.

- Remember that answers must be submitted using English digits.
- The finalized results and standings will be available in our website in at most 2 hours after the end of the first round.
- Teams in the Elementary level will end their challenge after the first round.
- After finalizing the results the Top 20 teams of the level “Free” and the top 30 teams of the level “Advanced” will be able to participate in the second round of the challenge.
- Please keep in mind that except the teams from the host country, at most 2 other teams from every nation may reach the second round and the next teams will be replaced by other eligible teams according to the standing.

### **Second Round: Long Answer Questions - November 1st 2024**

- The exam starts at 2:00 pm (Iran’s standard time) and the duration of the exam will be 5 hours.
- This round contains 7 long answer questions and there is no negative marks for answering any of them incorrectly.
- The answer to each question must be correct and complete. Every team can submit their answer to each question at most once (not necessarily at the same time, questions can be answered individually in this round).
- There is no need to use LaTeX or type the solutions. The solutions may be written by hand. However, please strive to use applications such as CamScanner to submit a picture with higher quality. Your solutions must be submitted in the PDF format.
- The mark to each question is calculated using the following formula  $g \times \left( \frac{20m}{10m + p} + \frac{a}{1500} \right)$  where  $g$  is the original grade awarded to your solution by our markers (from 10),  $m$  is the total number of participating teams in the second round,  $a$  is the number of minutes left in the exam when submitting the solution and  $p$  is the sum of the grades awarded by the markers to every team for that specific question.

- Based on the formulas for calculating the grades, your marks may change as the exam goes on. Remember that your final marks are the ones which you will receive at the end of the exam.
- The marking procedure will start immediately after your submission for each question.
- In this round, if one team does not submit an answer to any question, they will earn 1 mark (out of 10 marks) for that question.
- The final Ranking will be available on our website at 8:30 pm (Iran's Standard Time).

**Final Score:**

The final score of every team in the “Elementary” level is equivalent to the score they achieve in the first round of the exam and for teams participating in “Advanced” and “Free” is total marks they achieve in the first and second round of the exam in total.

**Registration Deadline:**

After perusing this file and forming your teams, you can register your team through our website by the end of October 26th (Iran's Standard Time).