

The Mathematical Olympiads in Mexico

Radmila Bulajich, Rogelio Valdez
Facultad de Ciencias, UAEM

The organization of the Mexican Mathematical Olympiad

At present, there are three important national contests in Mexico. These are: First, the Mexican Mathematical Olympiad (OMM), organized by the Mexican Mathematical Society (SMM).

Second, the Mathematical Olympiad for elementary and middle school students (ONMAPS), organized by the National Association of Mathematics Teachers (ANPM).

Third, the Mathematical Spring Contest, organized by the Mexican Academy of Sciences (AMC) and the National Council of Science and Technology (CONACYT).

Mexican Mathematical Olympiad

Organized by the Mexican Mathematical Society since 1987, it is the first mathematics competition initiated in Mexico. The details and history of this Olympiad will be given in the next section, since it is the most important mathematical contest in the country. Therefore, we will dedicate a great portion of this presentation to it.

For further information, see <http://www.ommenlinea.org/>

Mathematical Olympiad

for elementary and middle school students

The National Association of Mathematics Teachers has been organizing this contest for several years. In the first years, this competition was focused only in middle school students. However, five years ago they started working with students studying in the last two years of elementary school. Today, around 20 states participate in the national contest, out of the 32 states into which Mexico is divided.

In the first stage “the States contests” are the responsibility of the state delegates. At the end of every year, the delegates organize the states contests and the training sessions with the goal of preparing the students who will participate in the national contest, which takes place in May; invariably in some state that chooses to host the event. Before 2010, this Olympiad ended in May. There was not continuity; for the winners of this Olympiad did not go on to participate in any international competition afterwards.

In 2010, the Mexican Mathematical Olympiad started to get interested in those state winning students. Therefore, today the selected students from this contest are trained by the national committee of the OMM in order to participate in the International Mathematics Competition (IMC).

See <http://www.anpm.org.mx/?q=olimpiadas>.

Mathematical Spring contest

The Mathematical spring contest was organized for the first time in 1996 by the Mexican Academy of Sciences. This contest is aimed for middle school students and it is divided in two levels: students younger than 13 years; and students younger than 15 years. This contest takes place in a few Mexican states; but not in all of them. Furthermore, the first stages are conducted by mail, similar to the APMO.

The Mathematics Spring contest consists of three stages. In the first two, the exam is applied in the students schools under the supervision of volun-

teers teachers that help with the organization of the contest. The top ten percent of the contestants of the second stage, from each level, are selected to participate in the third stage. At this point, the best 10 students from each level, are chosen to represent the country in the Olympiad of May and in the Rioplatense Mathematical Olympiad.

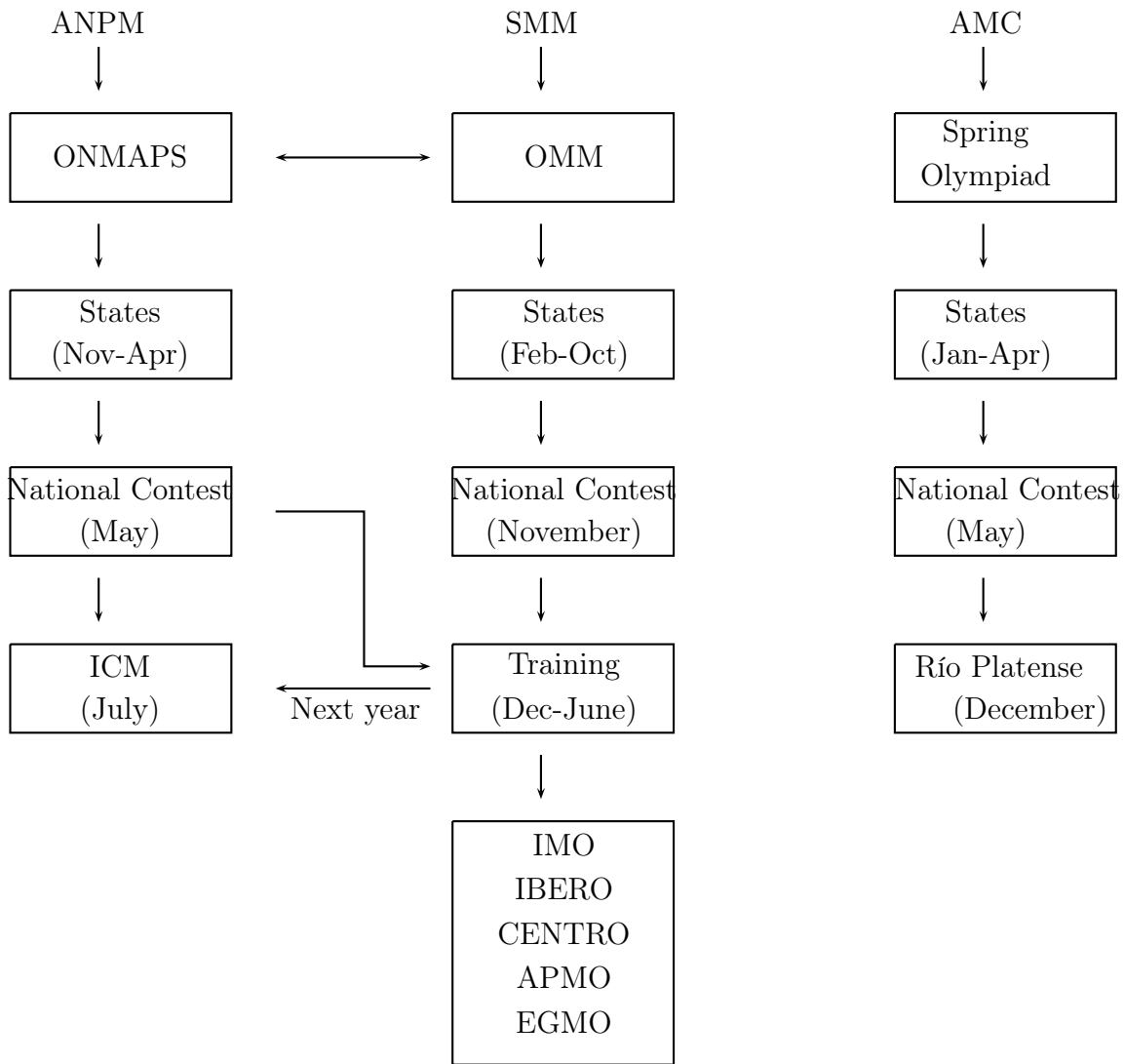
See <http://www.coniunctus.amc.edu.mx/>

Participation in the international contests

The Mexican Academy of Sciences has two permanent invitations to participate in international contests:

First, the Olympiad of May is a contest organized by the Iberoamerican Federation of Mathematical Competitions. This competition is by mail and it takes place at the same time in many of the spanish and portuguese speaking countries. Following the results of this contest, two teams are chosen to represent Mexico in the Rioplatense Mathematical Olympiad. Second, this is a contest organized by the Iberoamerican Federation of Mathematical Competitions as well, and it is held every year during the second week of December in Rio de la Plata. In this competition, Iberoamerican countries participate. Mexico has participated in this event since 1996.

**Diagram of the distinct “contests”
that take place in Mexico**



History of the OMM

In 1987, a group of Mexican mathematicians, including José Seade, Mónica Clapp and Carlos Bosch, shared their concern about the low level of mathematical education in Mexico. They conceived and explore a wide range of ideas for spreading and extending mathematical knowledge among young students. This lead them to take the initiative of organizing a national mathematical contest. . The goal was to extend mathematical thinking among more students. An additional goal was to find a mechanism to select students to represent the country in the International Mathematical Olympiad (IMO). Mexico had already participated in the IMO in 1981 for the first time as well as in 1987. Yet, there was no inclusive procedure in place that encouraged all high schools in Mexico to participate for the selection of the Mexican team for the IMO. The five students who represented Mexico in the IMO in 1981 were chosen through only two exams applied in a very small sample of high schools. In 1987, the IMO was held in Cuba. The Cuban minister of education, on a diplomatic visit to Mexico in 1987, invited our country to participate in the IMO. The students that represented Mexico in that IMO, were selected from high schools belonging to the Instituto Politécnico Nacional and to the Universidad Nacional Autónoma de México: the two most prestigious universities in the country at that time. That same year, the national ministry of education (SEP), gave its confidence vote to the Mexican Mathematical Society (SMM) to organize and promote the Mexican Mathematical Olympiad.

The first national contest of the OMM was held in the city of Xalapa, Veracruz, during November 1987 at the national congress of the SMM. This national contest only assisted the winners of the previously held 12 regional contests. The winners of this first national contest were trained to compete in the IMO held in Canberra, Australia in July, 1988. During 1988, several school teachers and university professors from different states were invited to start an organization of state contests in order to choose students for the next national competition. This second year, 1988, 10 states out of the 32 states of Mexico, including Distrito Federal, joined the competition.

During 1989, the number of state delegates increased. An additional 15 states joined the national Competition. This meant that in 1989, there was a total of 25 states with at least some kind of olympiad organization. At the end of 1989, there were delegates in all the Mexican states. However, in some of them the organization was poor which resulted in their inability to participate in the national competition. Today, every state brings six students to the national competition. The only exception is the Distrito Federal team, which consist of 10 students. In 2001, it was the first time that all states participated in the national competition bringing with them complete teams.

Even though the number of participants from each state in the national competition is small, the work required by the delegate from each state to select its team is enormous. Today, there are also state contests and in some regions, local competitions are organized previous to the national contest. Later on, Mexico joined other international Olympiads. At present, the winners of the national competition are trained in order to get the best students representing Mexico in:

- The International Mathematical Olympiad since 1987,
- The Iberoamerican Mathematical Olympiad since 1989,
- The APMO since 1991, however in some years Mexico has not participated.
- The Central american and the Caribbean Mathematical Olympiad since 1999.
- In 2010, for the first time, Mexico participated (with a middle school team) in the International Mathematics Competition (IMC) for elementary and middle school students.
- In 2014, Mexico participated for the first time in the European Girls Mathematical Olympiad (EGMO).

Mexico has hosted three Iberoamerican olympiads (Tepotztlán 1993, Guadalajara 1997 and Querétaro in 2009), two Central American (Mérida in 2002 and Colima in 2011) and one IMO (Mérida in 2005).

The present organization

The yearly program of the Mexican Mathematical Olympiad is divided in 3 stages:

- States Contests.
- National Contest.
- Training, selection and participation of the national team that represents Mexico in the international contests.

The first stage, “the States Contests” remain the responsibility of each of the 32 state delegates. During the year, the delegates organize state contests and training sessions in order to prepare the students who will participate in the national contest of the OMM, which is held in November every year. In most states, the olympiad process starts in the first months of the year. In some states, the state contest has participation of around 2000 students, but in others the participation is much less than that, with around 200 students. Actually, these state competitions are in some ways independent of the National Committee. However, during the last few years, there has been some work done trying to help the states with poor performance to prepare better for the national competition.

The national competition is held in November every year in some Mexican state. There are two written exams in the competition, each four and half hours long, during two consecutive days. Each test consists of three mathematics problems. Each contestant writes his/her solutions to these problems. The topics of the problems in the national contest belong to different basic mathematical areas such as Geometry, Algebra, Combinatorics and Number Theory. In order to get the correct solution to the problems, a lot of skills and knowledge of these basic topics are required. The National Committee of the OMM elaborates the exams based on problems received from the states delegations, and from members of the Mexican mathematical community.

In fact, this process is similar to the one adopted for the IMO. There is, however, one major difference: there is no participation in the making of the exam from the Mexican states.

Based upon the results of the National competition, 16 students are awarded gold medals and selected for the next stage. In addition 8 students not older than 15 years and 8 girl contestants are chosen; and not necessarily from the group of the gold medalists. This requirement, for the younger students, is necessary to select a Mexican team to participate in the Central American and the Caribbean Mathematical Olympiad; and the girls are chosen in order to have a Mexican team for the EGMO competition.

Every year in December, the last stage starts and ends before the international competitions. During these training camps, some selection exams are applied in order to choose the students who will represent the country in each of the international competitions mentioned above.

This job is the responsibility of the national committee of the OMM. The Committee is formed by a President and a large number of professors and students who participated at some point in the Mathematical olympiad. Thanks to the commitment of all the people who support the olympiad, and who have worked all these years without any monetary compensation but for the sheer joy and generosity of supporting and preparing new generations of students, Mexico has travelled an admirable distance in achieving its current position in the international arena.

The list of the Presidents of the OMM Committee are: Carlos Bosch Giral (1987-1995), José Antonio Gómez Ortega (1996-1999), María Luisa Pérez Seguí (2000-2003), Radmila Bulajich Manfrino (2004-2011), José Antonio Gómez Ortega (2012-)