

Math Kangaroo Contest Workshop

Organizers:

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The Second Math Kangaroo Contest workshop event was generously supported by BIRS and PIMS. BIRS provided the venue for the workshop, PIMS supported the Math Kangaroo Contest with \$2000 for travel and meals of participants. Contest representatives and volunteers from the Greater Toronto Area, Ottawa, Halifax, Sudbury, Calgary, Edmonton, and New Orleans attended the workshop. Also, there were participants from IEEE Northern Canada and Southern Alberta sections, CMS, Math Pickle and the University of Lethbridge. In total, the number of in-person participants was 21. In addition, three participants attended sessions via skype conference calls.

1 Overview of the Field

Math Kangaroo is an annual international math competition for school children. This is the world's largest math competition, with more than six million participants worldwide. The main purpose of Math Kangaroo is to introduce participants to math challenges in an enjoyable way, thus, inspiring their further interest and advancement in mathematics. It has the potential to provide each student with a great and valuable experience in competitive math.

The competition consists of multiple-choice questions, arranged in increasing difficulty. In Canada, the 2012 competition took place on March 25 and was offered to students in grades 2-12. The involvement of the youngest group of students in second grade was a pilot project for this year. The 2012 Canadian edition of the competition was administered in Ottawa, the Greater Toronto Area, Edmonton, Calgary, Montreal, Halifax, St. John's, Winnipeg, Sudbury, North Bay, and Langley. Almost 1800 students participated in the contest, and hundreds were involved in various training and learning activities prior to the contest day.

The Canadian Math Kangaroo program contributes to the science, engineering and education communities through its activities that revolve around the contest but go far beyond its organization.

2 Recent Developments and Open Problems

The objectives of the workshop were for the participants to share experiences and have discussions on issues related to the Math Kangaroo program, namely:

1. Organizing training sessions and the use of appropriate training material

Since training is a part of the contest preparation, Math Kangaroo representatives have organized practice classes. The development of appropriate materials assists regions with offering training sessions.

2. Running math clubs and groups

Training sessions provide opportunities for school children to explore and expand their math and logical skills in a non-competitive environment. Running math clubs/circles became popular during the last years. The math outreach educational materials developed through Canadian Math Kangaroo help educators and parents to reach each student and address individual strengths and learning styles. There is an increased interest in training materials, consequently, an increased need to make these materials more accessible.

3. How to financially support activities

Financially supporting activities is important for centres if they wish to deliver more extensive training and organize long award ceremonies.

4. Pre-contest activities, contest day, and post-contest activities

Sharing experience on running the above activities always help to improve the organization of the competition.

5. Expanding the competition locally and nationally

Expanding the competition locally and nationally is a continuous process. The partnership with the Canadian Mathematical Society plays an important role in the expansion. There is a mutual interest to continue the collaboration between CMS and the Canadian Math Kangaroo contest in future. The effort put into the registration system and the contest-related support activities from the CMS staff exceeded the preliminary expectations and it was worth it. The system is functioning, the updates and improvements will require significantly less effort, and it provides a good base for handling the expected increased numbers of centres and participants in future.

6. Informing the community about the Math Kangaroo program by hosting workshops and seminars for teachers and educators

It is necessary to inform the community about the Math Kangaroo program by hosting workshops and seminars for teachers and educators. Some universities offer public lectures for parents and relatives during the competition. Math Kangaroo volunteers make presentations at conferences and meetings on the program activities.

7. Get together national and local coordinators as well as meet new coordinators and help them in the organization of the contest in their city/school

The workshop in BIRS offered a great opportunity to get together national and local coordinators as well as meet new coordinators in order to help them in the organization of the contest in their city/school.

8. Sending winners in Europe to participate in math camps

Sending winners in Europe to participate in math camps or/and organizing math camps in USA and Canada are objectives of Math Kangaroo that need solutions.

9. Organizing math camps in USA and Canada for winners from USA, Canada, Mexico, France, Romania, Bulgaria, Poland, and others

This is a long-term goal of CMKC, which requires planning and cooperation with other organizations.

The Math Kangaroo contest is unique to Canada. Almost all other competitions run through schools. Students can participate in Math Kangaroo independently of their home school's involvement, typically at universities. It is still one of the very few math contests available for Canadian elementary students. While the reputation, the merit, and the quality of inspired learning are at a very high level, the atmosphere on the contest day is unique compared to most of the other contests.

3 Presentation Highlights

The workshop consisted of several presentations with discussions on topics of interest to the organization and the workshop participants.

- **Valeria Pandelieva:** *Priorities of the Math Kangaroo contest in Canada.* The presentation started with a brief history of the Canadian Math Kangaroo and its relationship with other similar organizations including the international organization "Kangaroo without Borders." The workshop participants learned about the international organization and the ways the competition is organized in other countries. It was pointed out that the 2012 edition of the contest was successful with more than a 35% increase in participants compared to 2011 including more than 1000 students receiving training in 2012. Also, it highlighted the priorities of the organization approved by the Board of Directors in June 2012.
- **Josey Hitesman and Kathy Huyng:** *Administration of Math Kangaroo: legal matters associated with children; training and contest events; awards presentation; advertising; fund-raising; website; reporting; feedback.* Although relevant materials have been provided to all representatives through the administrator portal, they need to be updated and new materials should be developed.
- **Rossitza Marinova:** *Math enrichment activities: contest training; clubs; circles; camps.*
The purpose of the contest training classes is to introduce students to the contest environment and the type of Math Kangaroo problems. It is a problem solving class, where students also may learn new mathematical concepts; circles / clubs have been offered in some Math Kangaroo centres and the material can go beyond the standard curriculum. The atmosphere is relaxed rather than formal and students are encouraged to share ideas and solve problems together. International Math Kangaroo camps provide a unique experience in an international environment and there have been several attempts for organizing (or at least participating) in regional summer math camps.
- **Gordon Hamilton** from Math Pickle [1] talked about math enrichment programs and demonstrated a sample lesson on unsolved problems for third grade students.
- **Anis Haque, M. Sherman:** *IEEE and Mathematics.* This presentation consisted of an overview of the organization IEEE and its Teachers In-Service Program (TISP). Two lesson plans were discussed. A demonstration on how binary system can be used to build circuits was made.
- **Tchavdar Marinov:** *Introduction to L^AT_EX.* This presentation introduced participants to L^AT_EX, including how to install and start with the editing system. Examples were provided for illustration.
- **Sophie Chrysostomou** from Toronto and **Mariya Svishchuk** from Calgary each gave 15 minutes presentations regarding the competition in their city.
- **Johan Rudnick**, the Executive Director of the Canadian Mathematical Society (CMS) gave an hour talk on the role of CMS and its partnership with Canadian Math Kangaroo Contest (CMK). CMS and CMK have worked together since 2011 and intend to continue their collaboration.

4 Meeting Progress Made

As part of the workshop, the Canadian Math Kangaroo Contest held its Annual General Meeting on Sunday, August 5th. The 2012 Annual report was presented by Valeria Pandelieva and it stressed again on the priorities for the next two years. The 2012 Financial report was presented by Rossitza Marinova. A discussion on the two reports took place and the reports were approved. A new Board of Directors was elected, as follows: Valeria Pandelieva, Rossitza Marinova, Pamela Brittain.

The two-days BIRS workshop facilitated discussions and decisions on how to further improve the organization of the Math Kangaroo program. In particular, this includes contributions from all members and interested workshop participants to the priority areas and activities as follows: transition and future collaboration with CMS; website improvements and automated marking; development of forms, templates, promotional materials; corporate policies; translation in French.

Extensive discussion took place on how to do *marking and calculating the contest results*. Indeed, the Website and its functionality are important for assisting administrators.

5 Outcome of the Meeting

The workshop is another significant milestone for the Canadian Math Kangaroo Contest organization. Representatives from various cities and provinces exchanged ideas and discussed issues. The major meeting outcomes include:

- Increased the visibility of the contest and its accompanying activities.
- Connected volunteers to inspire and help them show K-12 students how fascinating mathematics is.
- Stated, discussed and approved the priorities of the program for next few years.
- Elected the new Board of Directors during the Annual General Meeting of CMKC.
- Expanding the partnership with the CMS.
- Formed groups to create forms for volunteers, photograph consent, liability issues involving children on campus, centre reports, etc.

Sharing information and ideas is crucial for maintaining a program of such scope, diversity, quality and continuity. The BIRS workshop facilitated efficient collaboration, coordination, and knowledge transfer among the Math Kangaroo volunteers and partners. New coordinators learned how to run the Math Kangaroo contest and related activities.

References

- [1] <http://mathpickle.com>