

International Youth Math Challenge

Introduction and Information Flyer

Edition of 2019

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1 What is IYMC?

1.1 Vision and Values

The International Youth Math Challenge is an international mathematics competition that enables students from all countries to prove their math skills and to unleash their creativity:

"Mathematics is the language with which God wrote the universe." — Galileo

Indeed, mathematics is essential for the understanding of the world, scientific achievements, and progress, and for engineering and prosperity in our society. There is no doubt that math education is crucial for students of all ages around the world. IYMC aims to establish a global competition that is accessible to all students and teachers - youths receive the unique opportunity to challenge their skills, be encouraged and rewarded, and to enjoy the fascinating world of mathematics.

1.2 What makes IYMC unique?

There are several other math competitions besides IYMC that promote mathematical education. However, IYMC is unique and has many advantages due to a variety of aspects:

- **Internationality:** The International Youth Math Challenge is a global competition from the first round! All participants solve the same problems in every round: This enables a fair evaluation and international exchange.
- **Online Submission:** The competition uses the possibilities of the modern internet to give all students the opportunity to participate regardless of nation, region, or school.
- **Special-Creativity Problems:** The pre-final round includes two special problem types that only exist in the IYMC competition: the special-creativity-problems. This problem type represents real examples of mathematical research and requires special originality and advanced understanding of mathematics.
- **Teacher Support and Online Tool:** We supply teachers and schools with further materials and support them in case of questions, requests, or wishes. Teachers are provided with a separate interface to manage submissions of their students for the final round. Also, we have implemented an online tool to check submissions and results (see page 13).
- **IYMC Ambassador Program:** The IYMC ambassador program enables motivated students and supportive mentors to encourage youths for mathematics and competitions. Every IYMC ambassador is presented on the website so that interested students may get in touch with their respective ambassador. Ambassadors have access to a special interface to manage and report on developments and advancements in their area of responsibility.

2 Who can participate?

In order to be eligible to participate in IYMC you have to be at least 10 years old and you have to be a student (high school or university). There are no other restrictions and students from all grades and all countries are invited to participate!

There are two age categories:

- **Under 18:** Age from 10 to 17 years.
- **Over 18:** Age from 18 years.

Students from both categories will receive the same problems in all rounds, however, students that are 18 years or older will have to reach more points (e.g. to qualify for the pre-final round, students that are under 18 years have to solve three problems correctly and students that are over 18 years have to solve four problems correctly).

I will turn 18 after the submission deadline. To which category do I belong? The age criteria is determined by your age on the submission deadline of the qualification round (29. September 2019). It does not matter if you turn 18 after the submission deadline of the qualification round.

Do I have to be a student to participate? Yes, you have to be a student in a high school or a university to participate. If you are currently between high school and university (e.g. gap year) and plan to start university any time soon, you are also eligible to participate.

3 Why participate?

IYMC gives you the unique opportunity to unleash your math skills and to apply them to challenging problems. Participants receive certificates, awards, cash prizes, and global recognition.

3.1 Prizes and Awards

The prizes and awards worth a total of 700 USD which includes cash prizes of 450 USD: All participants (regardless of the results) receive participation certificates to honour their efforts. In the final round participants receive either a Bronze, Silver or Gold Honour, depending on the performance. The best students can achieve the 1. prize, 2. prize, and 3. prize as well as special awards for the best students from each region:

1. Prize	200 USD Cash Prize, Special 1. Prize Certificate
2. Prize	150 USD Cash Prize, Special 2. Prize Certificate
3. Prize	100 USD Cash Prize, Special 3. Prize Certificate
All Finalists	Bronze Honour, Silver Honour or Gold Honour
All Participants	Official Participation Certificate + Special Honour for digital Submission

What is the "Special Honour for digital Submission"?: All participants that use professional computer programs (e.g. TeX) to write down their solutions receive a special honorary note on their certificates, since this skill is important for the future career of all students.

Because IYMC is an international competition, we honor the best participants from each region of the world with a special certificate (not all countries are listed below):

- **Best Participant from Europe** (includes Germany, Austria, Switzerland, France, Italy, Spain, UK, Czechia, Poland, Portugal, Hungary, Greece, Ukraine, Russia, etc.)
- **Best Participant from Greater Middle East** (includes Egypt, Iran, Iraq, Israel, Jordan, Oman, Syria, Turkey, Yemen, Saudi Arabia, Lebanon, Morocco, Tunisia, etc.)
- **Best Participant from Africa** (includes Nigeria, Namibia, Kenya, Ethiopia, Congo, South Africa, Tanzania, Uganda, Mozambique, Ghana, Zimbabwe, Gambia etc.)

- **Best Participant from South Asia** (includes Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, etc.)
- **Best Participant from (South)East Asia** (includes China, Japan, Mongolia, South Korea, Singapore, Indonesia, Cambodia, Malaysia, Philippines, Thailand, Vietnam, etc.)
- **Best Participant from America** (includes USA, Canada, Mexico, Brazil, Bolivia, Argentina, Colombia, Peru, Cuba, Venezuela, Chile, Ecuador, Paraguay, Uruguay, etc.)

3.2 Awards for Ambassadors

Each year, special awards are given to the most active and responsible ambassadors to honour their excellent performance. The IYMC coordinators use the information about the number of participants that you encouraged as well as your documented activities to honour following awards:

- **1x IYMC Ambassador Award for Most Overall Participants:** The ambassador that has encouraged the most students to participate in IYMC will receive this award.
- **1x IYMC Ambassador Award for Most Finalists:** This award is received by the ambassador that was able to support most students to get into the final round.
- **IYMC Ambassador Award for Excellent Encouragement:** Ambassadors that are extraordinarily active and that have documented numerous activities to inspire students for mathematics as well as to encourage them to participate in IYMC receive this award.

3.3 Awards for Schools

We understand the crucial role of teachers and schools for mathematical education. Because of that, we award three school awards to honor the efforts of the teachers and the school (the awards are not connected to cash prize):

- **1x IYMC School Award for Most Participants:** This award receives the school with the most overall participants of the qualification round to honor the efforts of the teachers for encouraging students to participate in mathematical competitions.
- **1x IYMC School Award for Most Finalists:** This special award receives the school with the most students participating in the pre-final and final round.

- **IYMC School Award for Excellence:** This award receives the school with many outstanding students that have achieved high results throughout the overall competition to honor the quality education. The organizers decide which school receives the award.

How do schools participate to win the awards: Schools participate automatically if a student registers with the school name. Please make sure that all of your students write the school name correctly and in the same way! Also, we highly recommend that teachers of the school register at IYMC.

3.4 Further Achievements

Participating in international competitions is important for the personal development of students and it is a great achievement for your career. Furthermore, to participate in IYMC is a unique experience that will bring encouragement and motivation to all youths.

Global IYMC Network: Winners and former participants of IYMC become part of the IYMC network: This network consists of outstanding and talented students from all around the world! It enables you to get in touch with inspiring youths and to connect with students worldwide. If you have successfully participated you will receive all information from us.

Meetups: The IYMC team organizes meetups in several regions of the world – all participants are welcomed to attend these. The meetups are announced via email and on the social media channels.

Do I receive a hard copy of the certificate? We will send hard copies of the certificates to all prize winners and to the best participants of each region. All participants and finalists will receive a soft copy of the certificate via email (in order to protect the environment).

4 Process and Deadlines

The IYMC competition consists of three stages: qualification round, pre-final round, and final round. Each round has its unique features to enable a challenging and interesting experience!

4.1 Qualification Round

The qualification round is the first stage and consists of five math problems: A, B, C, D, and E. The problems are available online on the official IYMC website. These math problems vary in topic, difficulty, and subject. The problems range from geometry to number theory to make sure that everyone finds interesting problems to work out. The problems will not only sharpen your mind but also challenge your math skills!

All participants of the qualification round will receive participation certificates. You need to solve at least three problems (under 18 years) or four problems (over 18 years) correctly to qualify for the pre-final round.

The submission deadline is **Sunday 29. September 2019 23:59 UTC+0.**

Submission Information

In order to avoid connection issues, upload errors, and other problems, please be encouraged to submit your solution *before* the submission deadline on 29. September 2019. The solution file may be typed digitally (recommended) or it may be a clear picture of your handwritten notes. In case you have multiple pictures you may use an online tool to combine the pictures to a single file. Make sure that you write your forename and surname correctly. It will be used for the participation, finalist, and winner certificates. There are no fees or registration costs to participate in the qualification round.

The results of the qualification round will be announced on **07. October 2019.**

Announcement and Status

You will receive an email about the results, however, you can also check your submission status, your results, your performance report, and your certificates online on the submission status page created for you. We highly encourage you to log into your account: www.iymc.info/login.

4.2 Pre-Final Round

Participants that have solved the qualification round successfully are qualified to participate in the pre-final round. The problems will be more challenging, but even more interesting!

Problems and Points

The pre-final round consists of 10 problems that vary in difficulty, points, and topic. All topics from geometry to number theory are included. There are three types of problems that give you three, four, and six points:

- **4x Basic Problems:** The pre-final round includes four basic problems (lowest difficulty). A correct solution to a basic problem adds three points to the total score.
- **4x Advanced Problems:** The pre-final round includes four advanced problems that are more difficult. A correct solution to an advanced problem gives four points.
- **2x Special-Creativity Problems:** The pre-final round includes two special-creativity problems: These problems do not necessarily have a final answer, but the approaches and interim results give between zero to six points: Participants could be required to perform more complex proofs, to read scientific materials, or to combine mathematical techniques.

It is possible to reach up to 40 points in total. Students have to reach at least 20 points (under 18 years) or 28 (over 18 years) to qualify for the final round.

Process and Submission

All participants that are qualified and that are registered for the pre-final round will receive the problems via email or at the online status page on Monday 28. October 2019. From that day on you have one week until Sunday 03. November 2019 to solve as many problems as possible!

You can submit your solution online via a special submission form: You can choose if you would like to submit the solution as handwritten version or as computer typed document. We recommend to write the solution in the blank space on the problem sheets of the pre-final round. Please highlight your final solution for each task. However, computer typed versions do not receive a special note on their certificates.

Registration and Costs

If you succeed in the qualification round, you have the unique opportunity to participate in the pre-final round. You can register for the pre-final round via your online status page.

The registration deadline for the pre-final round is **Friday 25. October 2019**.

This global competition is attached to many costs such as human resource, technical infrastructure, materials, and much more. Our sponsors cover most of the expenses, however, to make this international opportunity possible we ask the participants to cover the registration costs of 8 USD for the pre-final round.

The registration costs are necessary to provide the resources for the evaluation of this year's competition and in particular for the comprehensive pre-final round. The registration costs will exclusively be used to make this global opportunity possible and are the only costs attached to this competition. The registration costs can be covered with any common payment option available and we will inform all qualified participants about further details. You can learn more information about the registration costs here: <https://iymc.info/costs>

Can I only participate in the qualification round and not in the pre-final round?: Sure, you can participate in the qualification round and receive your participation certificate and not register for the pre-final round. However, in this case, you would miss this opportunity.

The results of the pre-final round will be announced on **11. November 2019**.

4.3 Final Round

Participants that have solved the pre-final round successfully are qualified to participate in the final round: a multiple-choice exam for which students have 60 minutes time.

Exam and Points

The final round consists of a single exam with 15 calculation, 10 knowledge, and 15 advanced multiple-choice questions. The questions require math skills as well as knowledge about mathematical definitions. Finalists have 60 minutes for the exam! To every question there are four possible answers given (only one is correct). A correct answer equals one point. The awards and prizes are given to the finalists with the most points in the final round.

Teacher Registration

The exam will take place in the school of each finalist supervised by a teacher. All finalists have to select a teacher who agrees to supervise the final exam. We will send all required information

and the final exam to the selected teacher who has time to conduct the 60 minutes exam until **29. November 2019**. We will provide a special online form for all teachers to upload the results without much effort!

The teacher has to make sure that the finalist does not cheat and the teacher has to end the exam as soon as the 60 minutes are over regardless of the number of questions answered.

The results of the final round will be announced on **02. December 2019**.

4.4 Timetable (All Deadlines)

Below you find a table of all relevant dates and deadlines (changes are possible). The exact time which applies to all dates in the timetable below is 23:59 UTC+0.

Qualification Round:

Sun 29. Sep 2019 Submission deadline of qualification round

Mon 07. Oct 2019 Announcement of results of qualification round

Pre-Final Round:

Fri 25. Oct 2019 Registration deadline for pre-final round

Mon 28. Oct 2019 Release of problems of pre-final round

Sun 03. Nov 2019 Submission deadline of pre-final round

Mon 11. Nov 2019 Announcement of results of pre-final round

Final Round:

Fri 29. Nov 2019 Teacher registration / submission deadline for final round

Mon 02. Dec 2019 Announcement of results of final round

5 Information for Teachers and Schools

Inspire and Challenge your Students

Teachers, parents, and schools are invited to share this opportunity with their students and to make talented students in particular benefit from IYMC.

The IYMC competition is a great way to sharpen the mind of your students, to give them motivation and to challenge them with creative math problems. The problems can be used as homework or project work as well: The competition includes various topics that range from geometry to number theory. Furthermore, teachers and schools may use the IYMC challenge for after-school classes or workshops. The problems will inspire students to get engaged with mathematics and will provide a unique opportunity for talented students to challenge their math skills.

Special School Awards

Schools and teachers with many participants and very successful participants receive special awards. The awards are not connected to a cash prize but are supposed to honour the efforts of the schools and individual teachers. (read more on page 6)

Teacher Registration, Interface and Online Tools

All teachers and supervisor can register to access the special online teacher interface. This tool gives you the possibility to view the results and performance reports of your students, to cover the pre-final registration costs for the whole class, to supervise and upload the final exam results, and more! You register as teacher on this page: <https://iymc.info/teacher-registration>

If you are interested in implementing an IYMC group in your school or using the IYMC problems for your curriculum or as project work, do not hesitate to get in touch. You can also find additional materials, flyers, and posters on our official website.

6 IYMC Ambassador Program

Since IYMC is an international contest with participants distributed all around the world, it is crucial to have official IYMC ambassadors in several schools, cities, and nations. IYMC ambassadors are being honoured with a certificate: You represent your school/city and you can also manage an IYMC student group, promote IYMC in your country, and ensure that your country has vital IYMC activity! Being an IYMC ambassador is not only good for your CV and career experiences, but it gives you the unique opportunity to prove your skills as coordinator and to encourage students to get engaged with IYMC.

Requirements

You have to be at least 14 years old, be interested in mathematics or programming and be willing to spend time to encourage students to participate in IYMC.

Responsibilities and Benefits

You have a variety of responsibilities such as to encourage students and youths to participate in IYMC and to inform schools, local institutes, etc. about this opportunity. You also have the power to establish a strong and vital IYMC group in your region! However, this unique opportunity is not the only reason to become IYMC ambassador: There are more benefits such as high-class career experiences and the ambassador certificate.

All official IYMC ambassadors additionally receive a personal ambassador page to manage their activities and an official IYMC email address. Accepted IYMC ambassadors can login here: <https://iymc.info/ambassadors>

However, the unique opportunities are just a few of many reason to become official IYMC ambassador: There are more benefits such as high-class career experiences and the official IYMC ambassador certificate. Possible activities as IYMC ambassador include following:

- Using social media to spread information about the IYMC opportunity.
- Informing teachers and schools about the IYMC opportunity.
- Hosting workshops or events related to IYMC problems.
- Contacting and collaborating with local clubs, networks, and organizations.

A full list of ideas for ambassador activities can be found here: <https://iymc.info/amblist>

Special Awards for Ambassadors

Special awards are given each year to the most active ambassadors to honour their excellent and responsible performance. This includes awards for encouraging many participants as well as for coordinating many activities. However, your main purpose of becoming ambassador should always be to inspire youths! You find more information on page 6.

Application Process

In order to verify your eligibility as IYMC Ambassador please fill out the ambassador application form: this includes your CV and a short motivation statement that explains your reasons and plans for becoming IYMC ambassador. After you applied, the Public Relations Manager of 2019, Mr. Rami Aly, and other coordinators will review your application and contact you.

The application form is available on this page: <https://iymc.info/application>

7 Further Information

7.1 Preparation and Previous Problem

Preparation recommendations and all problems and solutions to previous editions of the International Youth Math Challenge are available online: www.iymc.info/training

7.2 Login and Submission Status

We provide all participants with a great tool to check your submission, your results, and your certificates in all round. The online feature is available via this link: www.iymc.info/login

7.3 Certificate Verification Page

All certificates and documents issues by IYMC will contain a verification-ID. On this way, other people can check your certificates issued by us via this page: www.iymc.info/verify

7.4 Materials and Documents

On our official website, you find a list of materials with additional information and that you can use to promote IYMC. The materials include:

- Information Flyers
- Paperhead (for notes)
- Official Posters

7.5 Newsletter

The IYMC Newsletters and alerts will inform you about upcoming challenges as well as general information and activities. You can subscribe to the newsletter on the IYMC website.

7.6 Social Media

In order to stay tuned and receive all recent posts and updates from IYMC make sure to visit our Facebook page. Also, we encourage you to share our post on social media to give everyone this great opportunity: www.facebook.com/theIYMC

7.7 Contact and Questions

If you have questions, comments, issues or feedback regarding IYMC feel free to send us a message via email. However, please note that it may take a while to respond to your individual request or problem: submission@iymc.info

7.8 Organizers and Sponsors

The International Youth Math Challenge is an independent youth competition and not affiliated to any organization. The main coordinators of the IYMC competition of 2019 are:

International Coordinator

Mr. Fabian Schneider
schneider@iymc.info

Public Relations Manager

Mr. Rami Aly
rami.aly@iymc.info

Website: www.iymc.info

Email: submission@iymc.info

Facebook: @theIYMC

We thank all other involved people and coordinators that do their best to make this competition possible for students from all countries as well as our partners and sponsors:



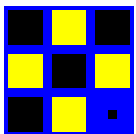
International Astronomy and Astrophysics Competition

Spokesperson: Stefan Amberg
amberg(at)iaac.space



Youth Opportunities Ltd.

Spokesperson: Maliha Iqbal
maliha(at)youthop.com



The Beauty of Math Foundation

Spokesperson: Simon Pateck
info(at)beautyofmath.org



Youth Planet Protector Organization

Spokesperson: Rami Aly
info(at)planet-protector.org



Lucid Science Foundation

Spokesperson: Suzanne Monir Abu-Nadar
lucidsci(at)gmail.com



sXript Projekt Company
Spokesperson: Fabian
info(at)sxript.de



Full Opportunities
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ask.fullopportunities(at)gmail.com