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TiGES

Transitions in Global Education

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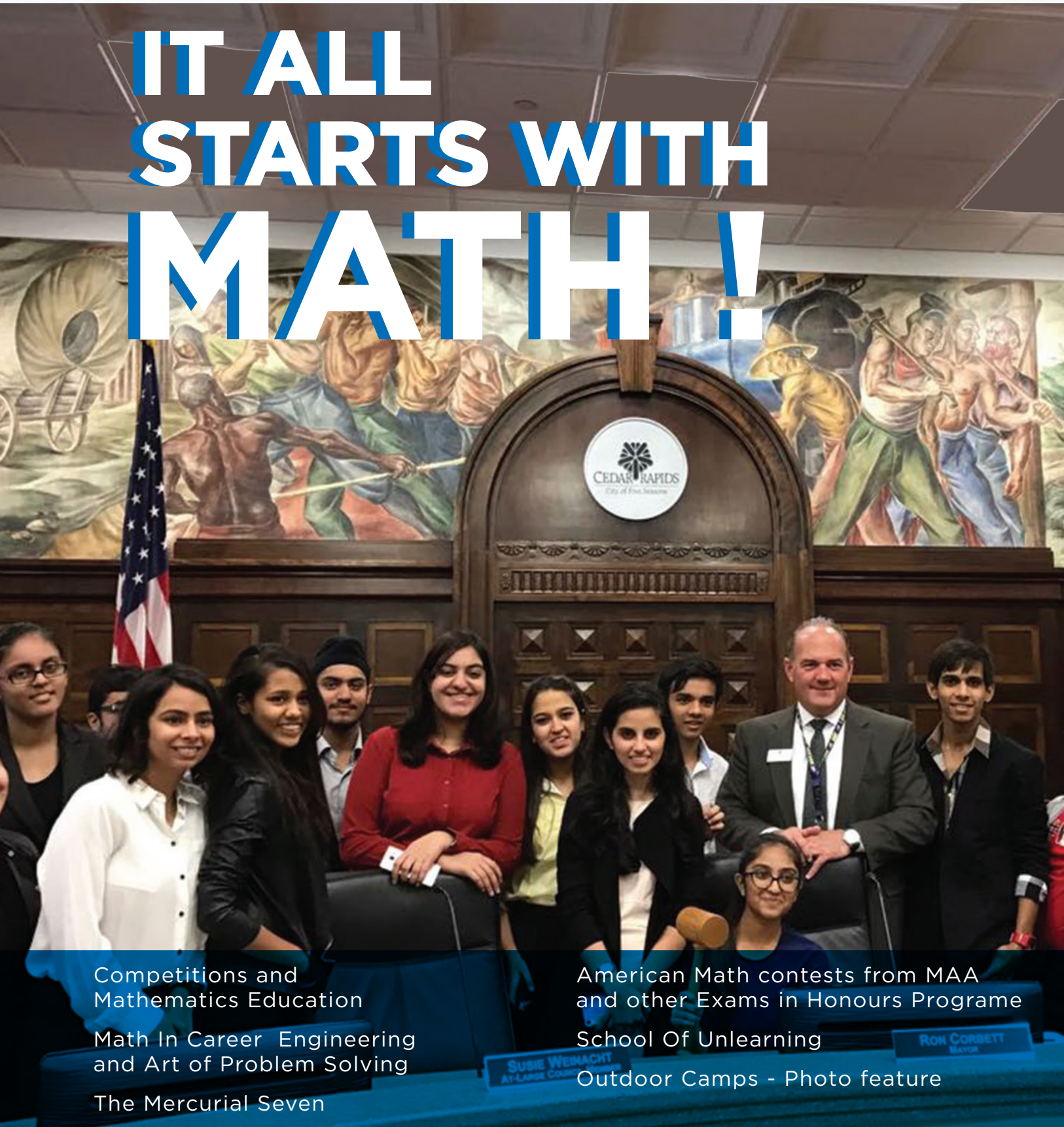
IT ALL STARTS WITH MATH !



Competitions and Mathematics Education

Math In Career Engineering and Art of Problem Solving

The Mercurial Seven

American Math contests from MAA and other Exams in Honours Programe

School Of Unlearning

Outdoor Camps - Photo feature

The Cedar Rapids Community School District Welcomes You!

A FEW OF OUR POINTS OF PRIDE

- District students consistently score above the state average on ACT College Readiness Indicators. Our five-year average composite score is 24.
- **We celebrate diversity! Over 30 languages are spoken in our schools and we provide English Language Learner programming for students at all levels.**
- Over 166 athletic programs and diverse activities are offered in the middle or high schools. From archery to zumba, there is an opportunity for every student to showcase their talents.
- **Students looking for the challenge of AP (Advanced Placement) courses, can choose from more than 28 AP courses.**
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- **The District recognizes nearly 1200 students annually for distinguished academic achievements.**
- We embrace world cultures, welcoming numerous foreign exchange students to our high school communities each year.

"I extend a heartfelt invitation to students, parents, and educators from around the world to visit our Cedar Rapids schools and city and to experience the programs offered here. I have been involved with the Student Enrichment Program from the start and I am thrilled about the possibilities and opportunities it provides students to learn and reflect; this is the core focus on any enrichment program. My team and I are committed to supporting the program and those involved with it."

-Dr. Brad Buck, Superintendent,
Cedar Rapids Community School District

"Participating students have the opportunity to study in one of the top high schools in Iowa as part of this experience. We're proud to have high schools named in the Washington Post's list of "America's Most Challenging High Schools." We also offer an innovative project-based learning opportunity – known as Iowa BIG – which provides students opportunities to engage in authentic business, entrepreneurial, and community projects to earn academic credit. Our teachers and administrators are some of the best in Iowa and nationally. "

-John Laverty, Board of Education President
Cedar Rapids Community School District

Cedar Rapids Community School District
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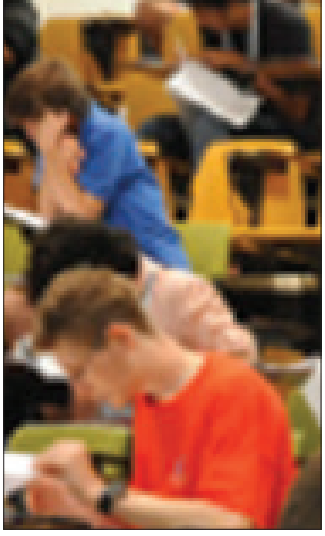

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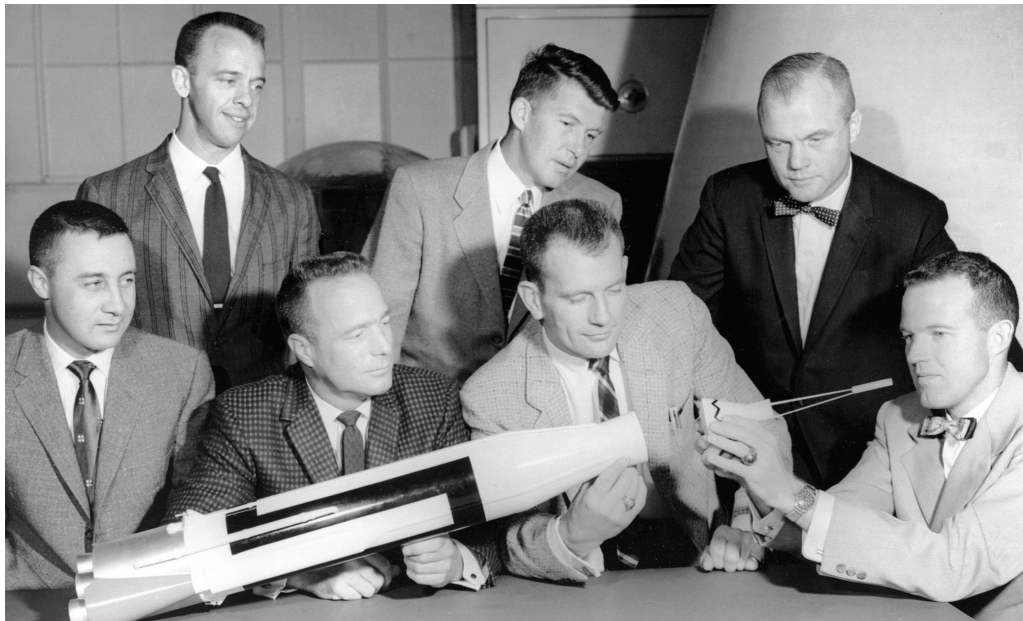

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Why Take AMC?

- Provides an opportunity for high school students to develop positive attitudes towards analytical thinking and unique problem-solving challenges in a low-stress and friendly environment.
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- College admissions officers love to see problem-solving skills on applications.
- Students can use their AMC score in common application form.
- Ivy League Schools, Carnegie Mellon University, CalTech University, MIT specifically ask for AMC score.

American Mathematics Contest 8 (AMC 8)

The AMC 8 is a 25-question, 40-minute, multiple choice examination in middle school mathematics designed to promote the development of problem-solving skills. The AMC 8 provides an opportunity for middle school students to develop positive attitudes towards analytical thinking and mathematics that can assist in future careers. Grade 8 and below can participate

American Mathematics Contests 12 (AMC 12)

The AMC 12 A/B (Grade 11 and 12) is 25-question, 75-minute, multiple choice examinations in high school mathematics designed to promote the development and enhancement of problem-solving skills. The AMC 12 covers the entire high school curriculum including trigonometry, advanced algebra, and advanced geometry, but excluding calculus.

American Mathematics Contest 10 (AMC 10)

The AMC 10 A/B (Grade 9 and 10) is a 25 question, 75 minute multiple choice examination in secondary school mathematics containing problems which can be understood and solved with algebra and geometry concepts.

AMC 8 COMPETITION
Date: 18 To 24 January 2022

AMC 10/12 A COMPETITION
Date: 10 November 2021

AMC 10/12 B COMPETITION
Date: 16 November 2021

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www.tlups.com
http://www.maa.org/math-competitions / international-registrations

TIGES
Transitions In Global Education

FROM THE EDITORIAL BOARD

This edition of TIGEs is special, because this marks the beginning of a new era for TIGEs. As our dedicated readers are aware, TIGEs previously was focused on the competitive aspect of education. This edition explore the boundaries of what education really encompasses. Our passion for honest and truthful learning motivates us to really understand, and possibly represent different facets of the experience that is education. It is this passion that we believe graces every page of this brand-new edition.

This year we take a closer look at avenues of human interest. Besides keeping our central focus intact, we explore different takes on how the world around us has changed. We would like to thank the one constant in this journey – the love and unwavering support that our readers give us.

The journey is lengthy, but nevertheless a promising and an exciting one, and we are glad to have you as a part of it. We hope you enjoy this edition of TIGEs. Happy Reading!

Editorial Board

COMPETITIONS AND MATHEMAT EDUCATION

Petar S. Kenderov

Petar S. Kenderov is a distinguished Bulgarian scholar with an outstanding contribution to the development of Mathematics, to the establishment of a system for early identification and development of young talents in Bulgaria in the field of Mathematics and Informatics, to the improvement of school education in Mathematics, and to the development of civil society in Bulgaria. Kenderov was born on April 5, 1943, in the town of Pazardzhik, Bulgaria. He graduated from secondary school in his hometown and, in 1960, became a student in mathematics at the Faculty of Physics and Mathematics, Sofia University, after passing a special exam aimed at selecting students (among the best performers in the national Mathematics Olympiad).

Mathematics competitions, together with the people and organizations engaged with them, form an immense and vibrant global network today. This network has many roles. Competitions help identify students with higher abilities in mathematics. They motivate these students to develop their talents and to seek professional realization in science. Competitions have positive impact on education and on educational institutions. Last but not least, a significant part of the classical mathematical heritage known as "Elementary Mathematics" is preserved, kept alive and developed through the network of competitions and competition-related activities. Nevertheless, competitions need to evolve in order to meet the demands of the new century. These and many other items are outlined and discussed in the paper.

Introduction

Competition is essential and intrinsic to life. Every day, living things in nature and economic subjects in society compete for resources, for better living conditions, and for higher efficiency. The desire to compete in overcoming a challenge is deeply rooted in human nature and has been employed for centuries to help people sharpen their skills and improve their performance in various activities. Competitions, however hotly debated, praised, or condemned, remain central and inherent in education. Both the traditional marking (grading) of students in school and the more innovative measuring of their basic scholastic abilities (implemented by methods such as PISA, TIMSS, or SAT) inevitably create, directly or indirectly, competition among students, among teachers, among schools, and even among whole countries. Heated debates aside, few would deny the positive influence such competitions bring to the process of teaching and learning, and to the overall performance of the educational system. The interaction between competition and education is more complex, however. It is not only that competitions enhance education. Education itself can be viewed as preparation of individuals (or groups of individuals, even whole nations) for future competitions. In what follows, we give a brief history of contemporary math competitions and present the state of the art in this area. Then we outline how competitions help identify, motivate, and develop higher-ability and talented students. Next we focus on the impact of competitions on education, on educational institutions and on mathematics as a science. Finally, we pose challenges and identify venues for improvement.

Brief history of mathematics competitions

It is difficult to trace precisely the origins of mathematics competitions for school students; after all, in-class testing (which often resembles small-scale competitions) has accompanied the school system from its very beginning. In fact, the archetype of some competitions can be found outside school, in the society. Newspapers and recreational journals frequently offer prizes for solving crosswords, puzzles, and problems of a deeper mathematical nature. This practice is widely used

today by many mathematical journals that publish problems and give awards to school students who provide good solutions.

V. Berinde reports that a primary school math competition with 70 participants was held in Bucharest, Romania, as early as 1885. There were eleven prizes awarded to 2 girls and 9 boys. It cannot be excluded that other competitions were held elsewhere before or after that date too. Nevertheless, the 1894 Eötvös competition in Hungary is widely credited as the forerunner of contemporary mathematics (and physics) competitions for secondary school students. The competitors were given four hours to solve three problems individually (no interaction with other students or teachers was allowed). The problems in the Eötvös competition were specially designed to challenge and check creativity and mathematical thinking, not just acquired technical skills; the students were often asked to prove a statement.

As an illustration, here are the three problems given in the very first Eötvös competition in 1894 (the entire collection of problems and their solutions is maintained by John Scholes at www.kalva.demon. co.uk/ eotvos.html):
P1. Show that {(m, n) : 17 divides 2m + 3n} = {(m, n) : 17 divides 9m + 5n}. P2. Given a circle C, and two points A, B inside it, construct a right-angled triangle PQR with vertices on C and hypotenuse QR such that A lies on the side PQ and B lies on the side PR. For which A, B is this not possible?

P3. A triangle has sides length a, a + d, a + 2d and area S. Find its sides and angles in terms of d and S. Give numerical answers for d = 1, S = 6.

The Eötvös competition model still dominates the competition scene. The year 1894 is notable also for the birth of the famous mathematics journal KöMaL (an acronym of the Hungarian name of the journal, which translates to High School Mathematics and Physics Journal). Founded by Dániel Arany, a high school teacher in Györ, Hungary, the journal was essential to the preparation of students and teachers for competitions (about one third of each issue was devoted to problems and problem solving and readers were asked to send solutions). As noted by G. Berzsenyi in the preface of about 120–150 problems were published in KöMaL each year; about 2500–3000 solutions were received. The best solutions and the names of their authors were published in following issues. This type of year-round competition helped many young people discover and develop their mathematical abilities; many of them later became world-famous scientists. (For more information, see the journal web site, komal.elte.hu.)

About the same time, similar development occurred in Hungary's neighbor, Romania. The first issue of the monthly Gazeta Matematic ˇa, an important journal for Romanian mathematics, was published in September 1895. The journal organized a competition for school students, which improved in format over the years and eventually gave birth to The National Mathematical Olympiad in Romania. For legal reasons, the journal was transformed to Society Gazeta Matematic ˇa in August 1909. The following year, the Romanian Parliament approved the legal status of the new society and this is considered to be the birthday of the Romanian Mathematical Society.

What happened in Hungary and Romania in the late 1800's was not something isolated and special to these two countries only; most likely, it reflected a much broader trend. Indeed, international collaboration and solidarity were rising steadily and many national math societies were founded around the same time. The Olympic Games were revived in 1896. The First International Congress of Mathematicians took place in Zürich in 1897. Within several decades, other countries started to organize mathematics competitions. In 1934, a Mathematical Olympiad was organized in Leningrad, USSR (now St. Petersburg, Russia).

3. Mathematics competitions today Today the world of mathematics competitions encompasses millions of students, teachers, research mathematicians, educational

authorities, and parents, who organize and take part in hundreds of competitions and competition-like events with national, regional, and international importance every year. Even greater is the number of books, journals, and other printed and electronic resources that help students and their mentors prepare for the various types of competitions.

3.1. International Mathematical Olympiad (IMO). Of course, the most important and most prestigious math competition is the International Mathematical Olympiad (IMO) – an annual competition for high school students. Directly or indirectly, all other competition activities in mathematics and sciences are related to the IMO.The idea to organize an international mathematics competition crystallized during the Fourth Congress of Romanian Mathematicians in 1956. Paul Jainta points out that "IMO, the pinnacle of competitions among individuals, was the brainchild of Romania's Tiberiu Roman, an educator of monumental vision." The first IMO took place in Romania (1959) with participants from seven countries: Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania, and the Soviet Union (USSR). The second IMO (1960) was organized by Romania as well, but since then it is hosted by a different country every year (except 1980, when no IMO was held). Over the years, the participation grew dramatically: the 2005 IMO inMexico gathered 513 competitors from 93 countries! Strict formalized rules govern every aspect of the IMO, such as participation, problem selection, assessment of solutions, and distribution of medals (for a description of the IMO, browse erdos. fciencias.unam. mx). Each country sends a team of up to eight (four in 1982; since 1983, six) high-school students, chaperoned by a team leader and a deputy team leader. The competition itself is held on two consecutive days; each day, the students have four and a half hours to solve three problems. Each year, just before the competition, the six problems are selected by an international jury formed by the national team leaders and representatives of the host country. Even though confined to secondary school mathematics, the problems are rather difficult and solving them requires a significant degree of inventive ingenuity and creativity. Each problem is worth seven points, so the perfect score is 42 points. Formally, like the Olympic Games, the IMO is a competition for individuals; participants are ranked according to their score and (multiple) individual medals are awarded. Nevertheless, again as in the Olympic Games, the medals and points obtained by the participants from each country are totaled and the countries are unofficially ranked, providing grounds for comparison between countries.

The two days of heavy problem- solving are followed by a social program for all the participants. Students get to know each other, discuss alternative solutions to the competition problems, and make plans for their future, while the team leaders share their experiences and best practices in creating new problems and preparing their students for the competition. With its high standards, the IMO prompts the participating countries to constantly improve their educational systems and their methods for selecting and preparing the students. This yielded a great variety of competitions and mathematical enrichment activities around the world which resists any classification. There are "Inclusive" (open for all) competitions which are intended for students of average abilities, while "exclusive" (by invitation only) events target talented students (a prime example of the second type is the IMO and the national olympiad rounds beyond the first). There are "Multiple-choice" competitions where each problem is supplied with several answers, from which the competitor has to find (or guess, as no justification is required) the correct one. In contrast, "classical style" competitions (like the IMO) require the students to present arguments (proofs) in written form. In "correspondence" competitions, such as those organized by KöMaL and

Gazeta Matematics , the students do not necessarily meet each other, while in "presence" competitions (which form the majority of math competitions) the participants are gathered together, which is believed to provide "equal rights" to all students. There are even mixed-style competitions, with a presence-style first stage and correspondence-style subsequent stages. (We will present some newer styles in more detail later.) Another indication of the importance of the IMO is the fact that other sciences, such as physics, chemistry, and biology, soon followed suit and started international olympiads of their own. Bulgaria organized the first international olympiads in informatics/ computer science (1989) and in mathematical linguistics (2003).

4. Why are the competitions needed? Here is a short and incomplete list of reasons on which we expand later on:

1. higher abilities and talent are identified, motivated and developed;

2. what happens before and after the competition is good for education;

3. talented students are steered to careers in science;

4. competitions raise the reputation of an educational institution.

4.1. Finding higher abilities and talent. The educational systems in most countries target mainly students of average mathematical abilities (who form the majority in schools). Additional care is often provided for lower-ability students, so that they could cover the educational standards. The standard curriculum and syllabus requirements pose no significant challenge however to students with higher abilities. They do not feel the need to work hard and, as a result, their mathematical abilities and talent remain undiscovered and undeveloped.

This is a pity, of course, since these higher-ability youngsters are a very important resource for the development of society, provided they are properly educated, motivated, and supported. Unlike other natural resources, such as mineral deposits, which remain preserved for the future generations, if undiscovered and unused, the talent of a young person is lost forever, if it is not identified, cultivated, and employed properly. Competitions and other enrichment activities are obvious remedies for this shortcoming, as they allow students to exhibit their abilities and talent. Moreover, competitions motivate the participants to work hard while preparing for them and, as a result, further develop their abilities and talent.

4.2. Before and after competitions. Some opponents to competitions complain that there is no apparent direct connection between the competitions and the mathematics as taught in the classroom. This, in our mind, is a rather narrow approach to the issue.

Classroom is only one of the many homes of the educational process. One should take into account the integral impact of competitions and competition-related activities on education. What frequently escapes public attention, which often focuses on a rather small group of happy winners, is the fact that the other, "non-winner" participants, also gain a lot. While preparing for the competition, and trying to solve the problems during the competition itself, all participants increase their knowledge significantly.

Taking into account that in some competitions hundreds of thousands of students are taking part, the integral impact on the learning of mathematics becomes significant for the overall development of the contemporary society. From this point of view the contribution of the International Competition "European Kangaroo" with more than 3 millions of participants is difficult to over estimate.

We should not neglect also what happens in the corridors of the school (or outside the school) after the competition is over. The students are sharing their experiences (successes, failures, new ideas generated, etc.). This has a tremendous educational effect which however is not always given proper

attention. The competitions and mathematics enrichment activities can be viewed as events that provide impetus for subsequent discussions among the students (as well as among their friends, parents, etc.). From the viewpoint of acquiring new mathematical knowledge (facts and techniques) these after competition discussions might be as important as the preparation for and the competition itself. Many of us owe a significant part of our knowledge to just such "corridor mathematics". From this point of view the social program after IMO gains additional importance. All this could (and should) have some practical implications for the ways the competitions and other enrichment activities are planned and organized. One should deliberately incorporate possibilities (the more the better) for "after event" discussions, reflections and interactions.

There is an unexhausted potential for introduction and sharing new practices in this area. Finally, while preparing their students for competitions the teachers gain experience how to teach mathematical topics that are currently not in the curriculum. This may become important at later stages, if some of these topics become a part of theschool program.

4.3 Steering talented students to careers in science. The health and longevity of any social sector depends on how many talented young people are attracted to it. The role of math competitions in identifying talented young people and in attracting them to science should be obvious. Indeed, the fact that a significant number of successful participants in math competitions later become famous scientists was recognized rather early.

4.4. Raising the reputation of an educational institution. The academic reputation of a university depends primarily on the merit of the intellectual achievements of its academic staff. "The higher the reputation of the professors, the higher the reputation of the university" is the essence of this widely accepted belief. What is often overlooked, though, is that the level of the students also has a significant impact on the outcome of the educational process and, in the long run, on the reputation of the institution. While higher-ability students still have the chance of becoming good professionals if trained by ordinary professors, even outstanding professors can fail to produce high-level specialists from mediocre and unmotivated students.

Teachers know well that a few good students in class not only motivate the other students and make them work harder, but also place higher demands on the preparation of the teachers themselves. This two-way challenge influences positively the educational process and improves, directly or indirectly, the reputation of the entire educational institution. It is no wonder that many universities try hard to attract good students. One of the best ways to achieve this is to organize competitions for secondary school students and to offer incentives, such as stipends or entrance exam waivers, to the winners. Such policies usually yield the expected results, as a special type of relationship develops between organizers and the winners during the preparation for the competition, the competition itself, and the post-competition period, which encourages the winners to consider seriously (sometimes as the first option) enrolling in the university where the competition (and/or the preparation for it) takes place.

In addition to the obvious advantages, enrolling competition winners has a delayed "value-added" effect to the reputation of a university. After graduation, math competition winners, as people with good problem- solving skills, are more likely to get rapid professional recognition, because they are likely to find solutions to difficult and complex real-life problems easier and faster than others. Once their success is noticed and registered by the working environment, the recognition of the problem-solvers' alma mater increases immediately and almost automatically.

As a success story, consider the University of Waterloo, Canada, and the breathtaking rise of its reputation during the seventies and eighties of

the last century. Alongside other plausible explanations, such as good management and excellent academic staff, its success can also be attributed to the fact that the University of Waterloo was the host of the Canadian Mathematics Competition [www.cemc.uwaterloo.ca], which attracted a good portion of the best young minds in Canada.

TheWilliam Lowell Putnam Competition, widely known as the "Putnam Exam" and administered by the Mathematical Association of America, is the flagship of annual competitions for university students in North America. While enrolled at the University of Waterloo, the former winners in school competitions performed consistently well in the Putnam Exam, securing a prominent presence of Waterloo in the top five teams in North America. This also was contributing to the reputation of the institution. It is no wonder that, within less than 20 years, the University of Waterloo became one of the leading centers for mathematics and computer sciences in the world. There is another success story related to the University of Waterloo and the Canadian Mathematics Competition, which shows how a new implementation of an inspiring idea at a new place can yield fantastic results.

The Australian mathematician Peter O'Halloran (1931–1994) spent a part of his 1972–73 sabbatical leave from the Canberra College of Advanced Education (now University of Canberra) at the University of Waterloo. There he gained, as Peter Taylor (Executive Director of the Australian Mathematics Trust) recalls, … the idea of a broadly based mathematics competition for high school students. On his return he often enthused to his colleagues about the potential value of such a competition in Australia. In 1976, while President of the Canberra Mathematical Association, he established a committee to run a mathematics competition in Canberra. This was so successful that the competition became national by 1978 as the Australian Mathematics Competition, sponsored by the Bank of New South-Wales (nowWestpac Banking Corporation).

It is now well known that this competition has grown to over 500,000 entries annually, and is probably the biggest mass-participation event in the country. The success of Peter O'Halloran was encouraging for others. André Deledicq started in 1991 the Kangaroo Competition in France (the name reveals the Australian influence). The Kangaroo Competition is now truly international (albeit with focus on Europe), enjoying more than 3 million participants each year.

It is an appropriate place here to pay tribute to Peter O'Halloran, who had the vision for the future of mathematics competitions and knew the strategies how to achieve the goals. He understood the role of international collaboration in this field and was the major force behind the inception of WFNMC and its association with ICMI as an Affiliated Study Group.

Summary

Competitions have influenced positively mathematics education and its institutions in different ways for more than a century. Engaging millions of students and educators, math competitions have a distinguished way to identify, motivate, and develop young talent, steering it to careers in science. Mathematics competitions have matured and formed an immense and vibrant global network which contributes significantly to the preservation and the maintenance of mathematical heritage. The flagship IMO not only serves as the "golden standard" for numerous other competitions in mathematics and the sciences (especially with its often-overlooked social program), but it also provides a constant stimulus for improvement of school systems around the world. Traditional competitions are complemented by more inclusive and less known events that emulate more closely real research and engage even broader student audience. Nevertheless, stronger consolidation and collaboration of teachers, schools, universities, and educational authorities is needed in order to meet the challenges of the new century.

MATH IN CAREER ENGINEERING AND ART OF PROBLEM SOLVING

NNS Chandra

Chandra teaches grad students in United States and he leads Mathematical Association of America (MAA) efforts in South Asia and Middle East Asia. He works with high school students from around the world preparing them for university in his capacity as an accredited/certified counselor

When the project team of the Mathematical Association of America heard that I was going to be in Europe, the Middle East and Asia for a few weeks, they asked me to speak at several schools in between my various other meetings. My trip was initially intended to have been a fairly personal one, including a get-together in Dubai with my old college friends (some of whom I hadn't seen in nearly two decades!)and spending time with my father, but I promised I would do my best. I had in possession after all, a tried and true presentation on the very same subject that I had honed for years, and I was sure that I could make it through without much trouble.

I was wrong. I knew things were going poorly when, while at one of the first schools I was going to be speaking for, the International School in Amsterdam, one of the attending students stopped me three quarters of the way through my perfected pitch and demanded why on earth she should be studying math in the first place! At another school, in Dubai, a young man also seemed equally unconvinced about my talk of taking part in academic challenges . A 9th grader from Jaipur had her entire family drive her to Delhi to meet me, but her question encapsulated the general perspective of many of the young students that are confronted with the American Math Contest for the first time: what do these academic competitions actually do towards improving her academic and professional future?

I realized that my presentation was behind the times. Children today are more pragmatic than ever before, than even many adults I've met! They want to know exactly what they'll be getting for their time and effort, and even though I firmly believe in the practical use of the math contests, my lecture had failed to emphasize those aspects.

I decided to rework my entire presentation from the ground up, and try to bring an exact sense of what we do at

Mathematical Association of America and how participating in AMC competitions will help a high schooler not only in preparing for university or securing an admission in a top school but also for a future in the field of mathematics. The following is a sneak peek of what I have to say to answer a few of those questioning voices from Amsterdam to Jaipur:

Any mathematics student with a love for problem solving can look forward to a fulfilling and profitable career. The skills you develop while studying mathematics are in high demand, and there is no shortage of interesting jobs that will use your analytical, problem-solving, and logic skills.

For example, here are some of the careers a math student can consider:

1. Biostatisticians solve biological problems, particularly in healthcare. A biostatistician can studythe effectiveness of new drugs, or identify the source of an outbreak using data and mathematical modelling. Biostatisticians can also work in ecology to predict how ecosystems helping farmers choose which crops to grow and which methods will be most effective.

Qualification required: Master's degree

2. Actuaries assess and minimize risk. They model outcomes for different scenarios, often for insurance companies. If you're not interested in working in insurance, large businesses and startups also hire actuaries to help executives determine what risks to take.

Qualification required: Bachelor's degree

3. Logisticians develop plans to maintain and repair equipment. They work to improve efficiency and reduce downtime by tracking the state of the equipment and planning preventative maintenance to avoid repairs.

Qualification required: Bachelor's degree

4 Data Scientists research problems and model solutions for everything from data

security to the production of semiconductors. They often work with other scientists such as chemists and physicists to develop solutions.

Qualification required: Bachelor's degree

5. Financial Analysts study trends in financial markets. Most work for businesses and help them make economic choices. The Federal Reserve System also hires financial analysts to assist in making decisions about monetary policy.

Qualification required: Bachelor's degree

6 Market Research Analysts forecast sales trends and gather data on consumers. They develop and track marketing campaigns to find the most effective strategies to maximize sales.

Qualification required: Bachelor's degree

7. Technical Writers create technical documents like owner'smanuals, detail technical procedures, and instructions on how to put together economical Swedish furniture using only a hex key. Technical writers can also write journal articles, grant proposals, and government reports.

Qualification required: Bachelor's degree

On top of these specific math related careers, the AMC prepares you for a stable future in a job market that is anything but. With the rise of artificial intelligence, we are experiencing a mass extinction of jobs that require nothing more than number crunching (complex or otherwise).

However, the kind of careers that I believe AMC guides you toward can never be replaced; and that's because the experience of training for and completing the AMC gives you the most fundamentally human skill set of all: the ability to creatively solve problems. Do not mistake the American Math Contest for a high school math exam that, usually, asks you to memorize a set of formulae and then spit them out on command. After all, in the real world, a computer can do that, faster and more precisely than any human could dream to. But creative problem solving? You can use that in any career under the sun, in any environment and at any time. And not just in the professional sphere, the skills the AMC trains can help students successfully make the difficult transition from high school to university and navigate the treacherous waters of academia.

This is the real reason why the American Math Contest is so highly regarded by admissions counselors around the world, and why its such a high distinction to score well on it. Because the fundamental skill that AMC tests for, is one that will be used again and again and again throughout your entire academic and professional life; regardless of the specific path you take.

I would love to hear your own responses to this. But for now, I hope I've successfully calmed down a few of those young voices I heard around the world!

THE MERCU

Sabu S

Nobody can forget the precursors of people landing on moon

Capt. S.Sabu has been flying for the past 35 years as Airline Pilot and Instructer. He now functions as an Instructor on the Airbus fleet of Air India.

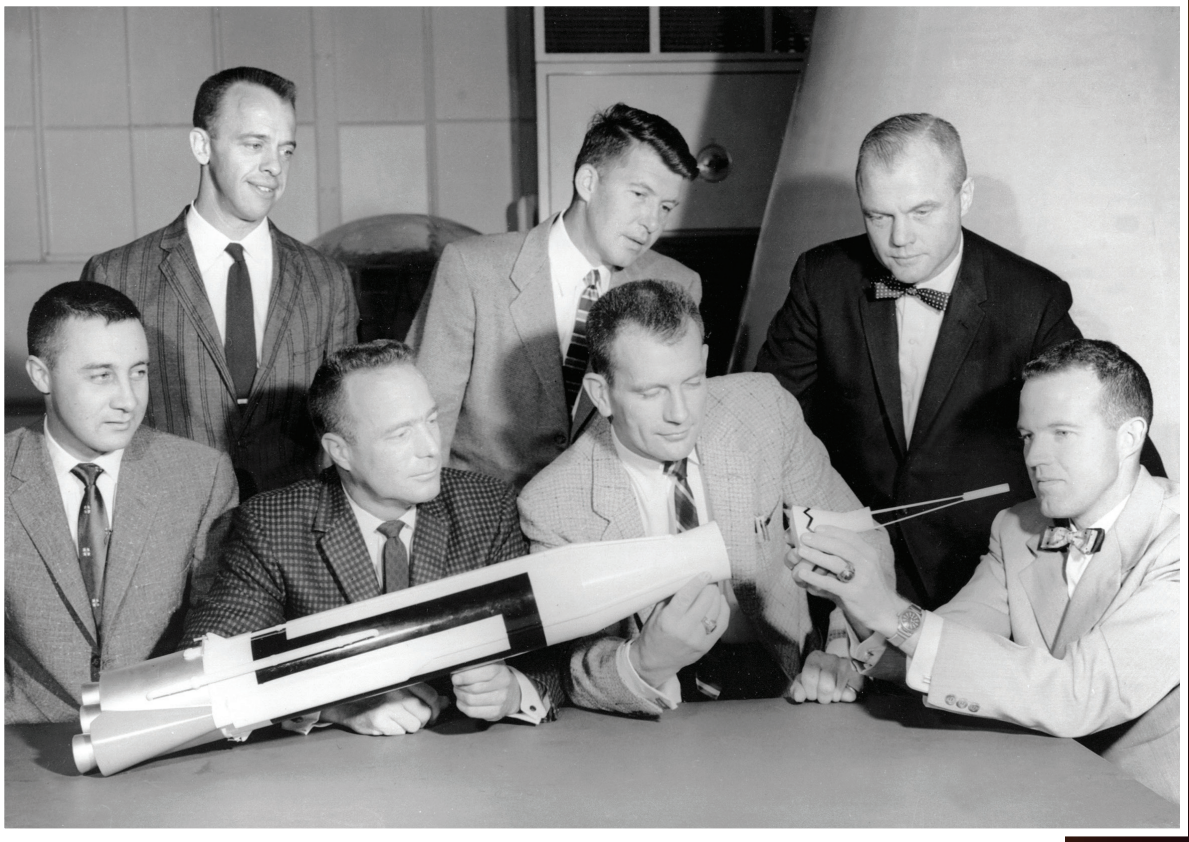
Sabu is a Member of the Royal Aeronautical Society, UK, an Upper Freeman of the Honourable Company of Air Pilots and a Life Member of the International Aerobatic Club.

All of us are aware of the Apollo astronauts as they were the ones who landed on the moon and brought back moon samples back to Earth. Who can ever forget the immortal words of astronaut Neil Armstrong as he stepped on to the previously unchartered territory, "That's one small step for man, a giant leap for mankind". The Apollo missions and the lunar landings might not have happened had they not been preceded by the two-crew Gemini missions and the single crew Mercury missions.

At the height of the 'Space Race' between the Americans and the Russians, the Americans first started the Mercury missions with the aim of putting the first man in Space. For this purpose, seven bright young men were selected from the ranks of military pilots. In order to select the very best, NASA laid down some basic requirements:

The men would have to be daring and courageous but at the same time mature enough not to be impulsive. As they would be required to guide a new machine through a hostile environment, they would have to be the kind who would be cool under pressure. As the space of the spacecraft was very limited, they had to be less than 5 feet and 11 inches and less than 180 pounds. The applicants had to be military Test Pilots with a formal

RIAL SEVEN

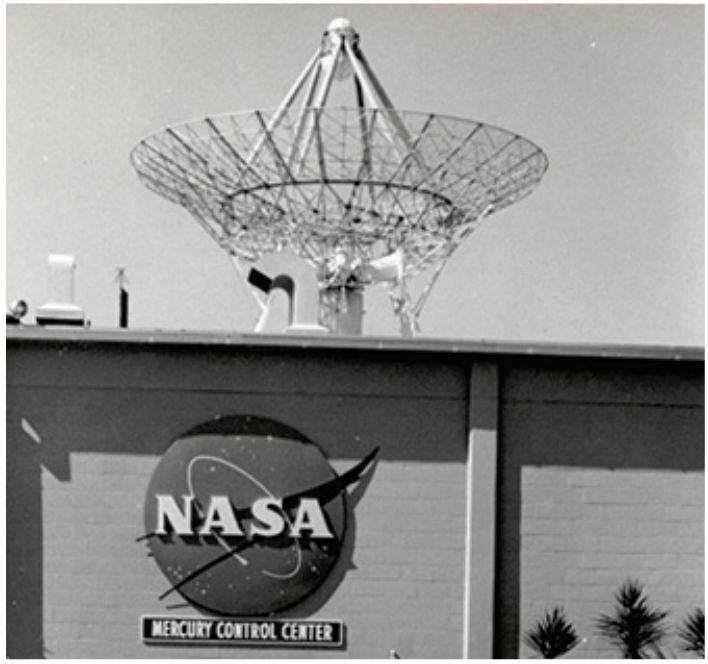


degree in engineering. In short, they were looking for “ordinary supermen”.

A total of 508 pilots first met the basic requirements, but the list was narrowed down to 110 initially and then pared down to 69. After a series of tests and interviews the final list had seven candidates and they were named the “Mercury Seven”. They were Alan Shepard, Virgil Grissom, John Glenn, Scott Carpenter, Walter Schirra, Donald Slayton and Gordon Cooper. During the training Donald Slayton was grounded from flying due to a mild heart abnormality and was appointed as Chief of Astronauts.

Alan Shepard became the first American to go into space on May 5th, 1961. He was beaten in the race to be the first man by Russia’s Yuri Gagarin who became the first human to be launched into space on 12th April 1961. After Alan Shepard it was Grissom’s turn to be launched, who thus became the second American to visit space. All these flights were in fact sub-orbital flights and the first full orbital flight was achieved by John Glenn, who did a full orbital flight. Glenn’s flight was followed by Scott Carpenter, Wally Schirra and finally Gorden Cooper. With Cooper’s flight the Mercury programme came to a halt and it was followed by the two-man Gemini flights.

Now when flights to space has almost become a routine affair, we should not forget the ‘Mercury Seven’ who led the way.



AMERICAN MATH CONTESTS FROM MAA AND OTHER EXAMS IN HONOURS PROGRAME

Santhosh Kumar K. P

Mr Santhosh is our Project Management Officer coordinates all our operation from Trivandrum, Kerala. He is a what we call, in short, a Financial Management Technologist . A core IT/Finance/ Administrative guy he was co-developer of India's first Window based Accounting Software - RE FiMS

Jayan Rajan

Jayan Rajan, is a part of the MAA competitions research team at India office and coordinates the American Math Contest for international students.Jayan has 25 years of experience in the field of Advertising, Communication and Publishing.

Mathematical Association of America to hold American Math Competition (AMC) for school students across the world, including India

- Competitions to be held in Nov. 2021 and January 2022
- AMC a series of exams culminating in International Mathematical Olympiad

Transitions Lab Preparatory School brings to you the best of world MATH Competition. It is our endeavor to help the Indian students get exposure to the world of Maths in a way that is done outside India enabling them to flag off their preparation for higher studies in prestigious Universities across the world.

The Mathematical Association of America (MAA) will hold the American Math Competition (AMC) for middle and high school students across major centres of the world, including India, during November 2021 January 2022 to test their math-solving competencies and help them develop the analytical skills needed for future careers in an innovative society.

The AMC examinations, considered as the world's leading mathematics competition for students ranging from grade 8 to 12, are a series of tests and curriculum materials that culminate with the International Mathematical Olympiad (IMO).

Students who take the AMC competitions have the opportunity to develop creative quantitative thinking and problem-solving skills, which prepare them to succeed in high school math classes.

The contest dates are 2022 January 18-24 for AMC 8; 2021 November 10 for AMC 10 and 12A; and 16th November, 2021 for AMC 10 and 12B. The cost of participation is Rs 950. Those students, who perform exceptionally well in the AMC 10/12, can continue to participate in the AMC contests.

Both the A and the B versions of the AMC 10 and the AMC 12 have the same number of questions, the same scoring and the same rules for administration. The only differences are the competition dates and that each version has a distinct set of questions, although the two examinations are designed to be equal in difficulty and distribution of topics.

Transitions Lab Preparatory School is an exclusive international partner of the MAA to conduct AMC exams throughout India. It is our desire to bring the best in the world of Maths to the students of India enabling them to become true global citizens in terms of developing their

CEMC CONTESTS 2020-2021					
Contests	Date of contest	Rate	Participants	Awards & benefits	Deadlines for registration
CEMC- UNIVERSITY OF WATERLOO, CANADA					
Euclid	6th April 2022	2200	Grade 12 & below	All participants will get certificates, a special certificate as per performance	8th March 2022
Pascal	24th February 2022	900	Grade 9 & below	All participants will get certificates, special certificate as per performance	4nd February 2022
Cayley	24th February 2022	900	Grade 10 & below	All participants will get certificates, special certificate as per performance	4nd February 2022
Fermat	24th February 2022	900	Grade 11 & below	All participants will get certificates, special certificate as per performance	4nd February 2022
Fryer	13th April 2022	1100	Grade 9 & below	All participants will get certificates, special certificate as per performance	18th March 2022
Galois	13th April	2022	1100 Grade 10 & below	All participants will get certificates, special certificate as per performance	18th March 2022
Hypatia	13th April 2022	1100	Grade 11 & below	All participants will get certificates, special certificate as per performance	18rd March 2022
BCC		800	Grade 6 or below are eligible for 5/6 BCC Grade 8 or below are eligible for 7/8 BCC Grade 10 or below are eligible for 9/10 BCC	All participants will get certificates, special certificate as per performance	
Canadian Senior & Intermediate Math Contest		2200	Grade 10 or below for CIMC Grade 12/11 and CEGEP students for CSMC Motivated students in lower grade also encouraged to write these contests	All participants will get certificates, special certificate as per performance	
SIN-Sir Isaac Newton	May 2022	900	Online contest- Physics Graders 10 & below	All participants will get certificates, a special certificate as per performance April 2022	
Avogadro Chemistry	19th May 2022	900	Online contest- Chemistry Graders 10 & below	All participants will get certificates, a special certificate as performance	2nd May 2022
Canadian Computing Competition	17th February 2022	2000	Online contest - Junior - Any student with elementary Programming skills, Senior - Any student with advanced programming skills	All participants will get certificates, a special certificate as per performance	5th February 2022

Gauss 7&8	19th May 2022	750	Gauss 7 - Grade 7 & below, Gauss 8 - Grade 8 & below	All participants will get certificates, a special certificate as per performance	23th April 2022
University of Toronto					
Biology Contest	Not declared	1100	Grade 11 & below	Certificates will be provided only for the students get marks above the criteria fixed by university. May vary yearly	Not decided
Note : for all offline contest you have to pay ₹.200/- extra except Gauss					

problem solving skills.It provides students with AMC Resources which consist of material to help with mathematical problem solving and to prepare for the AMC competitions. Limited scholarships are available for top math performers recommended by school math teachers.

Students can enroll with Transitions Lab Preparatory School for the AMC 8, 10 and 12 contests on email amc@tlups.com.

Over 3,50,000 students participate in this competition annually in over 6,000 schools worldwide. Last year more than 2,000 students participated in the contest from different schools in India. Twelve Indian students got invitation to participate in AIME (American Invitational Mathematics Examination) contest, which is the first in this series.

The MAA, the largest professional society with a focus on undergraduate mathematics education, has a mission "to advance the mathematical sciences, especially at the collegiate level." The AMC programme is intended to strengthen the mathematical capabilities of the next generation of problem-solvers.

The AMC 8 is a multiple choice examination in middle school

mathematics designed to promote the development of problem-solving skills. The AMC 10 is for students in 10th grade and below, and those under 17.5 years of age on the day of the contest can take this test. Students in grade 12 or below and under 19.5 years of age on the day of the contest, can take the AMC 12.

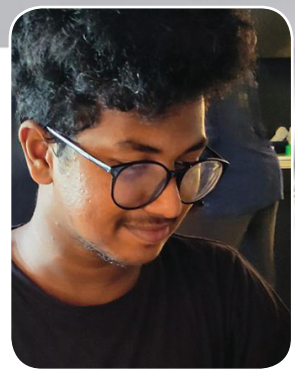
OTHER HONORS PROGRAMME EXAM

American Scholastic Math Association (ASMA) is a first examination to start the journey of your Honors Program. The contest has many interesting questions that increase the students thinking power. Students also sharpen their skills to answer math section of standardized tests like The ACT and the SAT. Every year students from around 40 countries participate in these contests. Every participant receives a participatory certificate and students with the highest cumulative score receive the highest-scoring student certificate.

CEMC – Univrtrsity of Waterloo is Canada's largest and most recognized organization for promoting and creating activities in mathematics and computer science. Their math contests for grades IX to XII are contests like Pascal, Cayley, and Fermat which have multiple-choice questions and Fryer, Galois, Euclid and Hypatia where questions are answered showing full working. They also have a Physics and Chemistry contests called Sir Isaac Newton (SIN) and Avogadro and a computing challenge called Beaver Challenge.

There are several other exams and competitions to consider and our students participate, like Biology Olympiad (Toronto), Essay competitions for students interested History, English and Psychology.

SCHOOL OF UNLEARNING



Rajdeep Jayan

Rajdeep Jayan
A graduate in English from EFLU Hyderabad, Rajdeep's passion lies in linguistics and the English language. Besides constantly questioning things around him, he also occasionally dabbles in writing, music production and culinary arts.

The offices of public education have always come under constant revision, adapting to the times and their needs. Student priorities and circumstances have shifted immensely since the Gurukul times. Chalks and boards were replaced by state-of-the-art smart screens as we went from sharpening our pencils to calibrating E-pens.

This constant revision however, was inspired by a need to make advancements and subsequently become more "modern". Changes in the field of education were reflective of the advancements that society made as a whole. Although pen and paper retained more information than a chalk, word documents were more easily shared among students, not to mention, they gifted the writer a much-needed pause from worrying about their handwriting. Having had stints with pencils, pens and keyboards, one cannot help but see the later changes as ones that were prompted by the embrace of comfort. They did not add or take away from the quality of education, they simply made the entire process easier.

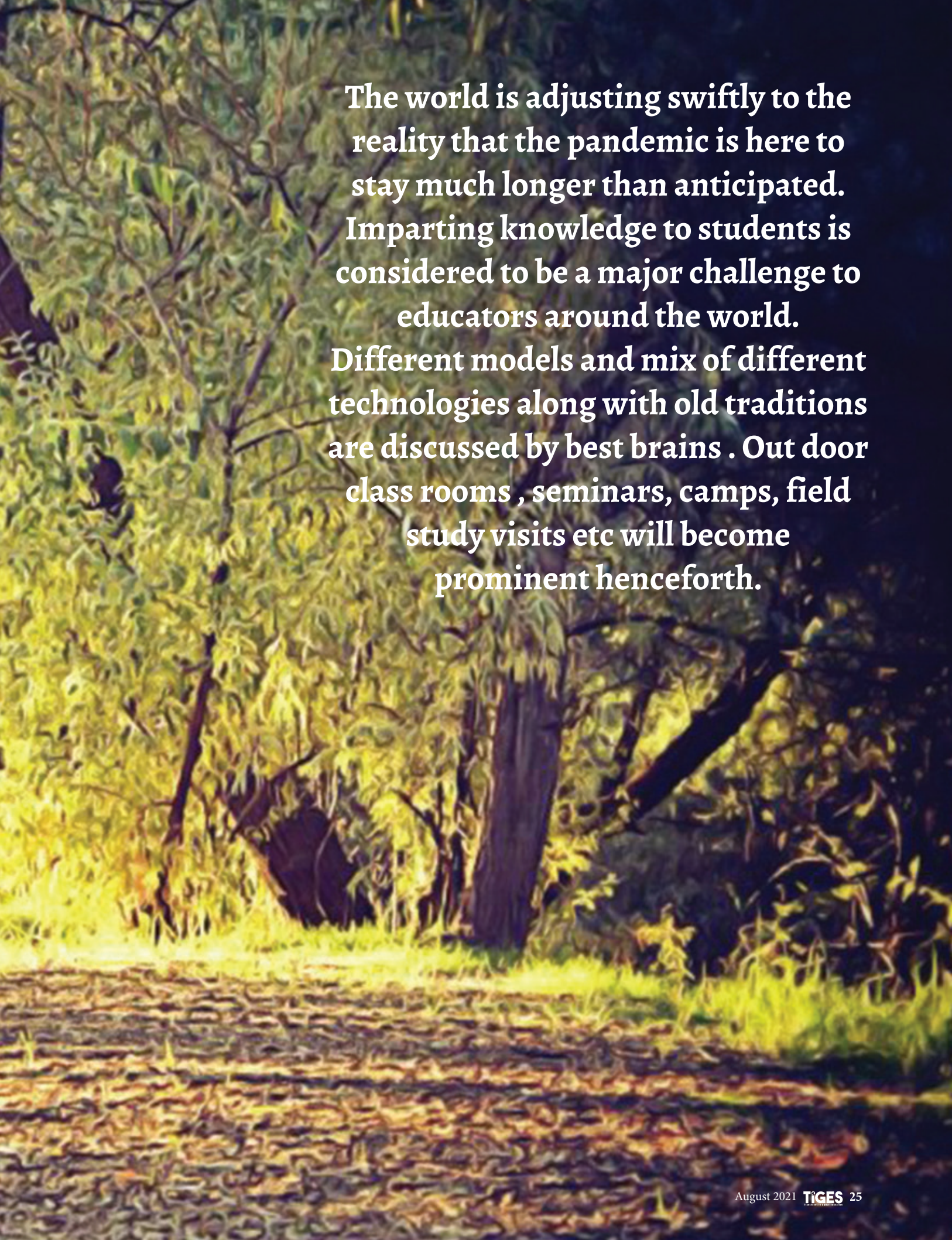
Since the world began to recognize the coronavirus as a potential threat, educational universities across the country rushed to return to normalcy. Two-week breaks that incited hope in the minds of students and teachers alike were the only definitive plan of action during the time. This tendency to revert to a preexisting modern can be linked to our unfamiliarity with the virus and its implications. However, having assumed this dystopian reality as our own, one can begin to see how the lack of preparedness was not merely born out of naivety. Instead, it could have been because of our orthodox system that we have been shielding under the pretext of the norm. Why would anyone fix something that isn't broken?

Reviewing a year's worth of experience in this new climate, one can infer that the coronavirus blurred the lines between home and work. Class timings began to encroach into hours that were previously off limits. Moreover, there was a general suffocation that was felt nationwide amongst members of the student community. Although the initial hiccups in the authorities' attempts to create verisimilitude in education are justified, it is surprising how the same problems persist a year later.

Maybe the focus is on the wrong aspects. Instead of attempting to revive the preexisting model of education, perhaps a revamping of the entire idea of education might be more fruitful. As work cultures and daily functions are changing, the adherence to schedules that were popular in the past generates a tremendous amount of friction that is simply swept under the rug. During an unassuming conversation with a former teacher of mine, I was introduced to the idea of how this pandemic is much more than just coping. Perhaps the pandemic has been unearthing flaws that already existed with these models of education that were previously held up to standards that were near perfect.

It was in the year 2020 that schools actively acknowledged the practicality of the internet to conduct classes. Colleges that had faulty Wi-Fi, employed teachers that blamed students for having slow internet connections. Moreover, large areas all over the country were severely unequipped to cross this digital divide. Education thus became inaccessible and even dismissive at a certain point. Clearly the superficial success of the model is not absolute. We as a group seem to have invested all our resources and belief into the first way out.

True learning teaches one to unlearn. It encourages one to question, listen and analyze. Maybe what education during the pandemic needs is a revisit to its fundamentals. The way ahead is foggy but the destination is clear - to make education accessible. Coming up with a sustainable solution might take an indefinite amount of time. But what is definite is what we have learnt along the way.



The world is adjusting swiftly to the reality that the pandemic is here to stay much longer than anticipated. Imparting knowledge to students is considered to be a major challenge to educators around the world. Different models and mix of different technologies along with old traditions are discussed by best brains . Out door class rooms , seminars, camps, field study visits etc will become prominent henceforth.


Learning will be
shifted to open spaces


Field study and
frequent outdoor camps

Thematic Camps will enter into school curriculums

Camps will bring teamwork and camaraderie into students

Ritika Srivathsan

Ritika Srivathsan is a high school student from KC High International School, Chennai. Among many things she learns, she particularly enjoys ballet, tap dancing, cricket, and writing poetry the most. She is a left-handed batsman and aspires to be an opener for the Indian Cricket Team. She enjoys studying Mathematics and Physics.

My Reflection

Mathematics has always been a subject of interest for me. During primary school, I enrolled for a recreational mathematics program that made me realise that there is more to mathematics than just formulae. I got to play around with numbers, patterns and solve problems purely for fun.

Since then I have been enjoying Math both at an academic and recreational level. While preparing to qualify for the Additional Mathematics course offered by Cambridge in high school, I found out about the American Mathematics Competitions (AMC). The AMC format further increased my interest in Mathematics. It was an enjoyable approach to the subject. My main goal was to understand the format and difficulty level of the questions. I enjoyed solving each and every question as they were challenging and fun. The tools available in 'The Art of Problem Solving' website were efficient in helping me prepare better and the past papers allowed me to practice for the competitions.

As an aspiring cricketer, my strategy while playing a game and taking a test is quite similar. Practice beforehand and make it count. Practising in the nets in cricket is similar to attempting practice problems before a test. In a match, the batsman has to make each ball count. Similarly in a test, you have to make each problem count. While writing the AMC, I tried not to worry about the results. This helped me stay calm and try my best.

The AMC was quite challenging. I came across many new topics like trigonometry and higher level Algebra in the test. I am highly motivated to attempt the AMC 10 in 2021 since I will be learning many new concepts throughout the year and I am looking forward to applying them.

Overall, I think the American Mathematics Competitions is an enriching and wonderful experience that motivates students to look at the fun side of Maths.

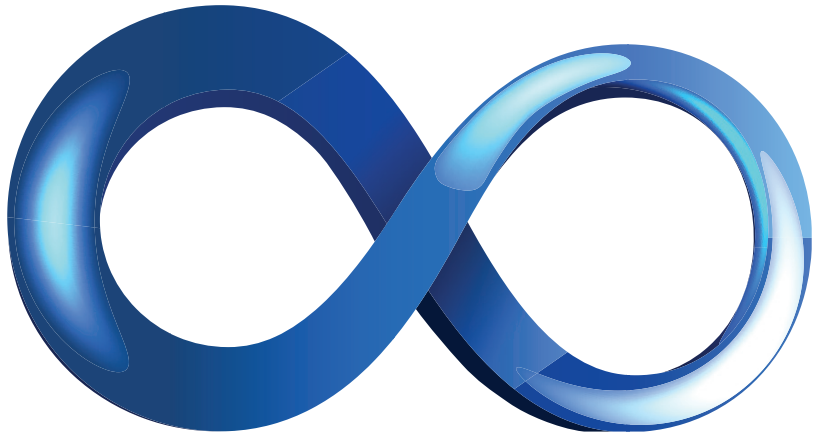
Madhav Anand Menon

Madhav After living in Singapore for nearly a decade, has moved to Chennai. Maths, especially Algebra has always been one of his many interests. He takes great pride in his work and always strives to better himself in all aspects of life. He loves to write, play chess, debate and learn something new. He loves expanding his knowledge and his favourite area in Maths is Calculus.

Preparing for and writing the AMC was an interesting experience. A few weeks into the year at my new school, the AMC was announced. There were many students eager to participate and thus a test was devised; the baseline test. This test was to shortlist the candidates. Finally four of us were chosen. In class, we spent our time scribbling equations, squinting at the screen and letting out little squeals when we got questions right. We prepared using the past papers which were available on the AMC website; it gave us a general idea of the structure and the skill level that would be required to solve certain questions.

The AMC is a very unique test. Most tests require us to memorise things or to apply content in a given situation but that was not the case here. The AMC required us to think out of the box and look at the question from a different perspective (sometimes quite literally!). The questions were designed in a way that memorising equations and formulas would not have helped you. You had to approach a question from all sorts of angles and you had to try the countless possibilities that existed to solve it. The exam consisted of twenty five questions to be completed in forty minutes. Calculators were not permitted. The short time period was stressful, and if I had to give advice to someone taking the test, it would be very clichéd, "Spend a minute reading the question. If you know how to approach and solve it, then attempt it. If you feel your mind is blanking, move on and come back." The AMC has definitely improved my problem-solving skills. It has taught me that approaching questions blindly will prove futile. I will now definitely think twice before solving a question. Chances are there's a quicker and easier way to solve it.

The AMC was not a test, but rather a journey and during this journey, I have developed many skills. One such skill is to think outside the box. I will definitely take the AMC 10 and I will try to prepare in a different way. Apart from solving questions from previous years, I would try preparing with my classmates that are taking the exam. The collaboration will help me improve in some aspects. Overall, AMC was a valuable experience. If you are given the chance, seize the opportunity.



Venugopal Vasant Kulkarni

In love with Math, Science, Space and Music and a lot more, Kulkarni Venugopal sincerely believes it is not possible to summarise an individual's life experience in just a few lines. He does, however, believe that learning is the key to success, and hopes to learn something new every day. He dreams of becoming an astrophysicist or a teacher in the future.

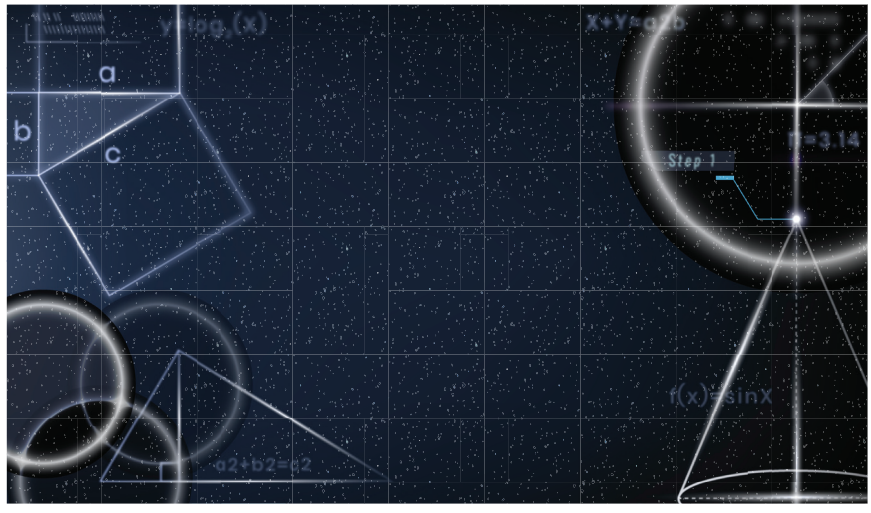
Upon hearing about the registration for the American Mathematics Competition, I rushed to get to myself signed up. It had been quite a while since I had done any competitive math, my academic focus had shifted quite a bit over the years to other areas. But most of the time I thought it would be fun to experience the challenge and I signed up anyway. Nothing like difficult questions in a restricted amount of time that seems to go faster the closer you are to an answer to remind you that there's still so much to learn and to appreciate. This time though, I decided to spend a little more time preparing for the competition than usual.

I discovered that you can find past year papers online when my teacher handed me a print out of the 2018 papers, and I took it upon myself to finish the 2018 papers and work on as many of the other past papers too. I found myself struggling with most of the questions, though I sincerely enjoyed the struggle. Checking the solution and going "Oh" was something I looked forward to while doing those past papers - the answer was almost always hiding in plain sight, and that only motivated me further to think outside the box.

As other exams drew closer, I spent less time on AMC preparation, but I could definitely see myself improving, slowly but surely. Taking the test on that day, I didn't worry too much about the results, I was excited to see the kind of questions that were going to come out, and whether I could get that sweet satisfaction of solving the problems. My only strategy was to skip questions for which I couldn't immediately see any connection to any ideas that would help me solve the problem after all blanks still gave points.

It was probably the stress of the time constraint but the problems in the test felt much harder than those during my practice. But that only made it more enjoyable as I tried to work out the connections between the numbers in my head, scribbling down anything that could help. It was once again a reminder that there was still a lot left to learn and appreciate to really get the hang of Olympiad math.

While I am likely too old now to take part in AMC 10 again, I'm most definitely looking forward to taking part in AMC 12. I hope to have improved by the next time, and I feel the best way to learn to think outside the box is to keep practising.



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- Cedar Rapids Mayor Brad Hart

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City of Five Seasons®

BONHOMIE 2021

संजीवनी

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August 18-21,2021

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MINDSCAPE

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MAA- International Programs Group

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