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COMAP
High School Mathematical Contest in Modeling (HiMCM)®
Middle Mathematical Contest in Modeling (MidMCM)
Procedures and Tips for a Great Experience

NOTE: This article accompanies, but does not replace the official Rules, Registration, and Instructions information found at the contest website (www.himcmcontest.org). Please ensure you understand and follow the rules and procedures outlined on the contest website. Note that both www.himcmcontest.org and www.midmcm.org will land on the same HiMCM/MidMCM webpage.

Introduction

The purpose of this article is to assist and guide students and advisors participating in the *High School Mathematical Contest in Modeling* (HiMCM) and in the *Middle Mathematical Contest in Modeling* (MidMCM). In the article, COMAP provides information about the administration of the contests from registration through solution submission, as well as tips to ensure your contest experience is smooth, successful, and enjoyable.

COMAP'S **High School Mathematical Contest in Modeling (HiMCM)** and **Middle Mathematical Contest in Modeling (MidMCM)** are international contests designed to provide high school and middle school/level students with the opportunity to work as team members to engage and improve their modeling, problem solving, and writing skills. Teams apply mathematics to model, develop, and communicate a solution to a real-world problem. Individuals who have graduated from high school, or moved on to an undergraduate level program, should consider our MCM/ICM contests.

The article is presented in three sections:

- **Before the Contest** – contest registration and preparation.
- **During the Contest** – contest process and avoiding common mistakes made by teams and advisors.
- **After the Contest** – submitting solution reports and contest forms and getting results.

Look for  which indicates an important contest tip.

BEFORE THE CONTEST

Participants. The HiMCM and MidMCM are true team competitions. Each team may consist of one, two, three, or four (maximum allowed) students: high school (or below) for HiMCM and students less than 14 ½ years old on the start date of the contest for MidMCM. Historically, the best teams have four members. All students on the team MUST be enrolled at the same institution at the start of the contest; COMAP will make no exceptions to this rule. After forming a team, the next step is choosing an advisor.

School or Institution: For the purposes of participating in the HiMCM and MidMCM, a team's school or institution is the primary and comprehensive full-time provider for all of the team members' education studies in all subjects. Tutoring, test-prep, contest-prep, and math- or STEM-learning centers are not considered schools/institutions for the purposes of registering and competing in COMAP contests.

Advisor. Any faculty or staff member at the students' school can fulfill the role of advisor. The advisor will act as the main point of contact for the team and will help ensure the team follows the contest rules and regulations. The advisor does not have to be from the mathematics department. An advisor can serve as the faculty/staff advisor to multiple teams. At no time can a student act as the team advisor.

Contest Preparation. We encourage advisors and students to prepare for the contest by viewing previous years' problems and solutions, as well as relevant contest articles, at Mathmodels.org. The problems are free to view, and the solutions and articles are available to mathmodels.org members. Look at the structure of the Outstanding papers in terms of organization and presentation.

The **best** contest papers present complete and logical analysis in an organized and clear manner above and beyond simply addressing the requirements. These papers are easy to read, easy to follow, logical, and comprehensive. These papers will usually include sections that address assumptions with justifications, modeling process(es), results of modeling/analysis, strengths and weaknesses, sensitivity, and conclusions. These papers have in-line documentation, footnotes, or endnotes with associated references.

The contest website has the *Consortium* HiMCM article and the *Consortium* MidMCM article, which includes the Director's Article and Judges' Commentary. These articles describe what judges look for in the various sections of solutions, along with exemplars for each section. Additionally, a webinar addressing HiMCM and MidMCM is available to view on the COMAP website.


Contest Tip

Look at problems from previous years to understand the choices you will have when the contest begins. Understand the general differences between the problem choices, both in terms of the mathematics involved and the topics addressed. Watch the HiMCM/MidMCM webinar.

Registration. Review contest information and register teams via the contest website (www.himcmcontest.org or www.midmcm.org) prior to the contest start date.

The registration fee is $100 per team. We accept payment via all major credit cards, and payment must be made via our secure web site. We regret that we are not able to accept other forms of payment. After we confirm your payment, the advisor will be able to continue the registration process. Be sure to print the page that displays your **PayPal** receipt number, as you will need this to continue the registration process. Additionally, this is your transaction receipt.

Example: PayPal Receipt number: 4147642012863986


Contest Tip

Be sure to print or save a copy of your team's receipt with your PayPal receipt number. You will also receive a copy of your receipt via email using the email address provided during the payment process.

Once advisors make payment for their teams, they register their team or teams online. Each team will have an individual designated Team Control Number. Advisors do not have to designate specific team members for each Team Control Number when initially paying for and registering the number of teams they need, BUT they will have to designate specific team members for each Team Control Number prior to the opening of the contest window. Team members cannot change after that time. Advisors should carefully check the order and spelling of team members' names when entering them online. The order and spelling is exactly what will be on participation and award certificates after the contest.

Advisors must register each team as either a HiMCM team or a MidMCM team. To participate in MidMCM, all student team members must be 14½ years of age or less on the start date of the contest.


Contest Tip

Be sure to print or save a copy of the screen with each Team Control number and whether that number is for a HiMCM team or a MidMCM team. You will not receive confirmation of this team/control number designation. Teams must include this Team Control Number on their solution papers and all contest correspondence.

DURING THE CONTEST

14-Day Window. We now allow teams to schedule their contest work at times conducive to team members within the 14-day contest window. We made this change in order to provide students, advisors, and parents more flexibility to schedule contest time around other required school, academic, and extracurricular activities. Also, we felt this would relieve advisors, especially those with multiple teams, from trying to find and track our previously required 36-hour window for each team. We emphasize that this change does not indicate an increase in difficulty of the problems, or a need for teams to spend more than 36 hours on their selected problem. The extended window is to provide teams flexibility for contest work sessions and, in turn, perhaps also encourage and allow participation by more students in this mathematical modeling activity.

Students do not have to be physically together at school to work on the contest. Students are allowed to work virtually. The advisor must be present at the start of the contest to give the problems to the students/teams. The team advisor must also verify that the teams stop working at the end of the contest window. Once a team has submitted its solution report to COMAP, the students and team advisor must sign the team control sheet stating that they did not work outside the 14-day window or violate any of the contest rules.


Contest Tip

Students do not have to be physically together at school for the full 14-day window and are not required to use the full 14 days. As in previous years, the problems are designed for teams to complete a solution within 36 hours of work. Students may work together virtually.

Viewing Problems. The contest problems will become available at 3pm EST on the starting day of the contest. At this time the team members must be set and cannot change during the contest. When a team is ready to compete, the team advisor must login to view the problems. Once logged in, look for the ***VIEW THE PROBLEMS*** link which will become active at 3:01 pm EST on the starting day of the contest. Once the advisor logs in and views the problems, we recommend that he or she print out copies to share with student team members. https://www.contest.comap.com/highschool/contests/himcm/login.php.

Problem Choice. With the addition of MidMCM, we will have three problems: one for MidMCM and two for HiMCM. HiMCM teams will have a choice of two problems: Problem A or Problem B. Only MidMCM teams may choose the MidMCM Problem C. MidMCM teams, however, may also choose either of the HiMCM problems, and if they do so they will be competing in the HiMCM contest. Teams are free to choose any of the problems available in their level contest but should submit a solution to only one problem.

Any relevant data files or supporting materials required to address our COMAP problems will be included on the contest website. During the contest you may find websites that appear to represent COMAP, asking you to purchase or pay for data and/or access to additional contest materials or information. These websites are **fake** and not official. COMAP will never ask you to purchase any material related to the contest. If you find such a site, please report site to himcm@comap.org.

The links below will become active at 3:01 p.m. EST Friday, Month, Day

CLICK HERE TO VIEW THE PROBLEMS (PDF)

CLICK HERE TO VIEW THE PROBLEMS (PDF) (Mirror Site)


Contest Tip
Be sure to read all available problem statements and requirements carefully before choosing your team's problem. Each problem will have different and specific requirements. You can work on any problem but should submit a solution to only one problem.

Contest Assistance or Sharing Information. During the HiMCM/MidMCM contest period, teams **may not** seek help in obtaining answers, ideas, or information, or in locating resources, from any persons outside of their team members to include their advisor, other teachers, other students, and/or experts or professionals in a field relevant to the problem. This restriction includes no use of electronic social media such as, but not limited to, emails, texting, chat rooms, interactive blogs, Twitter, Weibo, help or support sites, etc. Additionally, posting or sharing any part or all of the problem statement, your team's solution process, or any partial or complete work in any form or medium during the contest is strictly prohibited. COMAP will disqualify or deem unsuccessful any team that violates this rule. The relevant issue is one of intent: each team of students is expected to develop all of its substantive analysis and solution without the help of others. COMAP continually monitors the Internet during the contest period for violations of contest rules.

MidMCM Submission Assistance: For MidMCM teams only, advisors may assist students in preparing their final solution for electronic submission. While advisors are not allowed to assist students in the development of the solution, they may assist with actions such as scanning pages, file conversion, and/or preparing the PDF document for submission.

Comparison Software. COMAP compares each submitted solution to all other solutions of the problem your team chose. The result of this comparison identifies solutions and/or parts of solutions that are exactly and/or similar to other papers. COMAP uses these results to verify the originality of your team's solution.

Sources and References. Teams may use any inanimate source of data or materials: computers, software, references, websites, books, etc. All sources must be credited using in-line documentation, footnotes, or endnotes, as well as a full bibliographic citation in a Reference section. Failure to credit a source for data or materials (pictures, graphics, charts, background information, ideas, etc.) may result in a reduction of award level, or in disqualification if deemed plagiarism.

Use of Large Language Models and Generative AI Tools in COMAP Contests
This policy is motivated by the rise of large language models (LLMs), generative AI, mathematics software, translation software, code-copilots, auto-complete technologies, and other AI-assisted technologies. The policy aims to provide greater transparency and guidance to teams, advisors, and judges. This policy applies to all aspects of student work, from research and development of models (including code creation) to the written report. Since these emerging technologies are quickly evolving, COMAP will refine this policy as appropriate.

Problem Notes and Updates. Throughout the contest period, COMAP will post any problem notes and updates on the HiMCM/MidMCM website. If you have a question that is not covered on the website, please send an email to himcm@comap.org or midmcm@comap.org. Be sure to include your team number with your correspondence. Also, follow us @COMAPMath on X or COMAPCHINAOFFICIAL on Weibo for the most up to date contest information.


Contest Tip
Be sure to check the website for any updates during the contest. COMAP will update the website with current contest information which may include problem specific updates. Updates will also be sent via X @COMAPMath and via Weibo at COMAPCHINAOFFICIAL.

Solution Submission. Teams may send solution reports whenever they complete their work, but not later than the solution deadline.

Solution Report Length. Ensure your solution meets the 25-page submission limit. Your solution report should start with the Summary Sheet followed by your team's solution. We encourage a Table of Contents to guide the reader. Your reference list (or Bibliography), notes pages, and any appendices should be included after your solution presentation. We have found that a 25-page solution submission allows for teams to fully present and communicate a complete solution to their chosen problem, as well as include the summary page, any letters or memos, a reference list or notes page, and any supporting appendices. This 25-page limit keeps the

HiMCM/MidMCM aligned with our undergraduate contests, the Mathematical Contest in Modeling (MCM) and the Interdisciplinary Contest in Modeling (ICM).

Adobe PDF and 12-Point Type. Teams submit their entire solution report in one Adobe PDF document of at most 25 pages. Papers, including the Summary page, must be in English, typed in a readable font of **at least 12-point type**, and must use either US Letter or A4 page size. The solution should consist of written text, figures, charts, and supporting materials. Do not include or send programs, software, databases, and/or other files with your solution, as they will not be used in the judging process.


Contest Tip

There is no specific required minimum page length for a complete HiMCM/MidMCM submission. You may use up to 25 total pages for all your solution work and any additional information you want to include (for example: drawings, diagrams, calculations, tables). Partial solutions are accepted. We permit careful use of AI tools such as ChatGPT, although it is not necessary to create a solution to the problem. If you choose to utilize it, you must follow the COMAP AI use policy. This will result in an additional report that you must add to the end of your PDF solution file and does not count toward the 25 total page limit for your solution.

Team Control Number. Each solution paper must display the team control number and the page number at the top of every page; for example, use the following page header on each page:

Team # 1234 Page 6 of 13


Contest Tip

Be sure to carefully check your team number as it is not uncommon to mistype or transpose a number.

The names of the student team members, advisor, or institution should **NOT** appear on any page of the electronic solution. The solution should **NOT** contain any identifying information other than the team control number.


Contest Tip

Do not include any type of team identification such as student names, institution name or geographical region. If you are required to include a letter with your submission, be sure not to sign the letter with your name. If you feel as though you need to have a formal closing to such a letter we suggest using: Sincerely, Team #1234.

Submitting Solution Report. Each team is required to submit an Adobe PDF electronic copy of its solution using the new online submission page https://forms.comap.org/242386224483964. Any team member or the advisor may submit the PDF submission. You will need your **team's control number**, **advisor id number** and your **problem choice** to complete your submission.

Use your team's control number as the name of your PDF file attachments.
For example: **1234.pdf**

MidMCM Submission Assistance: For MidMCM teams only, advisors may assist students in preparing their final solution for electronic submission. While advisors are not allowed to assist students in the development of the solution, they may assist with actions such as scanning pages, file conversion, and/or preparing the PDF document for submission.


Contest Tip
Be sure to name your PDF file carefully and check your team number, as it is not uncommon to mistype or transpose a number.

COMAP will accept only an **Adobe PDF** file of your solution. DO NOT include your Parental/Guardian Authorization forms, programs or software with your submission as they will not be used in the judging process. Limit one team PDF solution per online submission. Your team's summary should be included as the first page of your PDF file and NOT in a separate file.
***Note: The attachment must be less than 20MB!!**

Authenticity. By emailing a solution paper during the contest period, you are guaranteeing that the work is completely your own. COMAP investigates and takes all suspected instances of plagiarism seriously. HiMCM/MidMCM also uses comparison software to identify possible plagiarism within contest paper submissions. Plagiarism will result in disqualification.

AFTER THE CONTEST

Parental/Guardian Authorization Form Submission: Parental/Guardian Authorization forms are no longer required. This step is now part of the registration process. Advisors should keep a copy of the Parental/Guardian Authorization forms for your records. You do not need to send these forms to COMAP.

Receipt of Solution. One day after the contest has closed (last day of contest), we recommend that you login to the contest web site using the **Advisor Login** link to verify that each team's Electronic Solution was received at COMAP.

> *Click here to verify if you email submission has been received*
> This link is now active. Updated 00/00/000 0:00PM


Contest Tip
Electronic Solutions status will be updated after the contest deadline has passed. In most cases COMAP will have solution status posted 24-48 hours after the contest is over.

If after 48 hours your team solution is not listed in the list of received solutions, we did not receive a PDF submission from your team. If this occurs, contact us as soon as possible via email himcm@comap.org or midmcm@comap.org with your team control number.

Judging. Contest judging will be completed in January and the results will be posted on or before February 1st each year. COMAP will recognize successful Solution Papers in the categories of Outstanding, Finalist, Meritorious, Honorable Mention, and Successful Participant. Papers that do not adequately address the problem or violate contest rules will be designated as Unsuccessful or Disqualified.

COMAP will not rejudge any contest papers. All contest papers go through a rigorous judging process and COMAP stands behind the designations awarded to papers. We recommend that you review the outstanding papers and read the judges' commentary after the contest for insights into the quality of the content and presentation of the best papers.

Once the results are made public on the website, PDF certificates will be available for download. The spelling and order of the student names on the certificate is input by team advisors during registration and COMAP does not change or edit this information.


Contest Tip

Advisors should ensure they spell team members' names correctly when registering, as certificates will reflect these names. The order of the student names has no bearing or importance on participation. The order of the names reflects what the advisor entered.

If you find that there is an error with your certificate, email COMAP with your team number, the error and the correction. We will only correct spelling errors and typos. We will not change any other information.

Resource Guides

HiMCM/MidMCM: Registration Walk Through

The purpose of this article is to assist and guide advisors participating in the High School Mathematical Contest in Modeling (HiMCM) and the Middle Mathematical Contest in Modeling (MidMCM). In the article, COMAP provides information about the contest registration process.

Use of Large Language Models and Generative AI Tools in COMAP Contests

This policy is motivated by the rise of large language models (LLMs) and generative AI assisted technologies. The policy aims to provide greater transparency and guidance to teams, advisors, and judges. This policy applies to all aspects of student work, from research and development of models (including code creation) to the written report. Since these emerging technologies are quickly evolving, COMAP will refine this policy as appropriate.

HiMCM-MidMCM: Online Submission Process

The purpose of this article is to assist and guide students and advisors participating in HiMCM/MidMCM. In the article, COMAP, provides information about the new online submission process using the new online submission page https://forms.comap.org/242386224483964. You will need your team's **control number, advisor id number** and your **problem choice** to complete your submission.