

# Regulations of the ETEAM: European Tournament of Enthusiastic Apprentice Mathematicians

## 1. Preamble

The European Tournament of Enthusiastic Apprentice Mathematicians (ETEAM) is aimed at providing the outstanding high school students with a first encounter with mathematical research, together with teamwork process and international experience

It combines competition with friendly exchanges to encourage emulation and conviviality. Participating students will have to work on open problems which, to the best knowledge of the authors, do not yet admit complete solutions

The expected participants are high school students at an excellent mathematical level, not yet enrolled in university studies. They enter the ETEAM in teams of four to six members, led by one or two additional team supervisors.

The following regulations are established to allow the smooth running of the ETEAM, and in particular fair conditions for competition between the teams.

The ETEAM is the European version of two similar tournaments:

- ITYM, which is the International version
- TFJM<sup>2</sup>, which is the French national version

These regulations are heavily influenced by that of the aforementioned tournaments.

The Tournament invites participation from all European countries. In order to ensure fair competition and scientific excellence, it is expected that the ETEAM is first contacted by working mathematicians from a given country, willing to register and prepare a team for the tournament, and willing to suggest and overview a competitive selection process for the team in their home country.

## 2. Organizational structure of the Tournament

### a. General aspects

The ETEAM is co-organised by the Multinational Organization Committee (MOC), Scientific Organization Committee (SOC), and Local Organization Committee (LOC) For each edition (one per year) of the ETEAM, a list of problems (between 9 and 11) is published on the ETEAM website at least 8 weeks before the beginning of the Tournament.

The Tournament consists of debates on the solutions provided by the Participating Teams. These debates are organized in 3 different **Rounds** each having several **Stages**. In each Round, the Participating Teams are divided into several **Groups** each of 3, 4 or 5 different Teams. The composition of the groups is determined by the MOC. The different Groups proceed simultaneously to the debates of a given Round. Two different Rounds cannot take place on the same day.

### b. The Multinational Organization Committee (MOC)

The organization of the ETEAM is managed by the Multinational Organizing Committee (abbreviated MOC).

The MOC is made up of members of at least 3 distinct nationalities. The MOC members may be professional mathematicians (researchers, teachers, etc.), former team leaders, graduate students in mathematics, or former participating students of tournaments similar to ETEAM (such as ITYM, TFJM<sup>2</sup>, etc.). Anyone satisfying the above conditions can apply to become a MOC member. The approval or not of such an application is at a discretion of current MOC members.

The MOC:

- organizes all non-local organizational tasks (website, timetable, rules, etc.)
- manages the ETEAM communication (addition of new teams, media, etc.)
- proceed to the participation procedure (team registration, team selection, etc.)
- provides the goodies, the final rewards, publishes the final results
- organizes the opening and the closing ceremonies
- coordinates the other committees
- selects the LOC and SOC, and approves changes of their members

The MOC is the ultimate authority for conflict resolution as specified in section Final provisions. The list of MOC members is published at least four months before the beginning of the encounter.

### c. The Local Organization Committee (LOC)

The Tournament has a Local Organizing Committee (abbreviated LOC). This committee changes every year. It is appointed by the MOC. The mission of the Local Organization Committee is to organize the venue and amenities the Tournament, and in particular:

- to provide space for the debates, the jury deliberations, the opening and the closing ceremonies

- to find and book lodging for participating students, team leaders, organizers and jurors
- to organize additional social activities for participating students, team leaders, organizers and jurors
- to organize meals for participating students, organizers and jurors
- to provide local jurors

The LOC can be a group of individuals or an already formed association. They need not to have a connection to mathematics, but are expected to have organizational skills.

#### d. The Scientific Organization Committee (SOC)

The tournament has a Scientific Organization Committee (abbreviated SOC). Its mission is:

- to organize the good scientific behavior of the tournament
- to appoint the juries, their chair and co-chair
- to arbitrate possible scientific disagreements
- to create the list of problems for ETEAM

The list of members of the Scientific Organization Committee is approved by the MOC. The list of SOC members is published at least two months before the beginning of the encounter.

#### e. The Jury: Local and International jurors

Participating Teams will compare their results during mathematical debates in each Round, graded by a jury. This jury is composed of researchers, teachers, former participating students, graduate students and, if necessary, of Team Leaders.

Each jury of a Group has 5 to 8 members of at least 3 distinct nationalities. A Team Leader cannot be a juror in a Group in which their team is participating. Each jury is led by a chair, assisted by a co-chair. The jury of each Group of each Round is appointed by the SOC. The chair is responsible for the smooth running of the group as well as the resolution of unforeseen cases that require a rapid decision.

The jurors are selected, either by the LOC or by the SOC. A juror hired by the LOC is called a "local juror" (abbreviated LJ) while a juror hired by the SOC is called an "international juror" (abbreviated IJ). The composition of the different juries is decided by the SOC.

### 3. Conditions of participation (formal aspects)

Participation in the Tournament requires following a procedure described in Appendix. Participating students must register as a team satisfying certain composition rules, respect certain deadlines, have sufficiently appropriate motivation according to an evaluation by the SOC, and pay participation fees if such fees are required in the current year of the tournament.

#### a. Composition of a team

A team consists of:

- four to six (4-6) Participating Students
- one to two (1-2) Team Leaders

It is strictly forbidden for the same person to be part of more than one team, even for the Team Leaders. An organizer (member of the MOC, the SOC, or the LOC) cannot be a member of a team either as a Participating student or as a Team Leader.

#### i. Participating Students

The Participating Students are General Upper Secondary Education students (~15 to 19 y.o. students). They cannot have started university studies at the time of their application for participation in ETEAM.

Participating Students work within their team to look for solutions to the proposed problems. They write up Written Materials for the ETEAM, present their work, and participate in debates at the Tournament.

Any participating student registered in more than one team will be disqualified from the ETEAM of the current year.

#### ii. Captain

Each team has to nominate a captain among the Participating Students (a Team Leader cannot be a captain).

#### iii. Team Leaders

Team Leaders are people qualified in mathematics (such as teachers, researchers, PhD students, or graduate students). Team leaders must have obtained a graduate degree (or equivalent) in mathematics, computer science or physics. If a person who does not have one of these qualifications wants to be a Team Leader, they may address a request to the MOC. The MOC may accept or refuse this request and may require an additional Team Leader.

Throughout the tournament, the Team Leaders ensure that their team's work runs smoothly. Before the beginning of the encounter, their role is to:

- ensure the regular work of the team and good collaboration within the group;
- manage coordination;
- answer students' questions;

- provide the students with specific mathematical knowledge (including bibliographical references) when they request it (and only in that case);
- correct any major errors and prevent the team from falling into a dead end;
- supervise the editing of the written material and give advice on how to write a scientific paper.

It is strictly forbidden to provide elements of the solution to a question of a problem or any direct indication. Likewise, the written material is the responsibility of the Participating Students. The work of Team Leaders must be limited to proofreading and advice.

During the Tournament, team leaders are responsible for the members of their team. Their role is also that of a coach and a manager of their team. They can also be part of the jury of a Group other than the one in which their team is running. Exceptionally, if no Team Leader cannot be present during the tournament, another adult may replace them in this role after prior authorization from the MOC. The absence of all the Team Leaders of a team may result in the disqualification of the team.

#### iv. Name of the Team

Each team has to choose a name and a fourgram (four letters), that will be used to identify the team. Two different teams cannot choose the same name or the same fourgram. The name or the fourgram cannot carry inappropriate messages or connotations (subject to the decision of MOC). This name should represent valuable characteristics of the team, such as the high school and the city of origin of the participating students.

Any team that does not respect the structure above, or the role of Participating Students and Team Leaders is subject to sanctions which may go up to the disqualification depending on the seriousness of the breaches.

#### b. Spectators

With authorization from the LOC and the MOC, spectators may attend the tournament.

Spectators who have ties to participating students are not allowed. For example, non-participating students coming from the same establishment as one of the teams cannot be authorized. The interpretation of this criterion is left to the discretion of the MOC.

## 4. Process of the tournament (scientific aspects)

The **working language** of the ETEAM is English. Other languages are not authorized and will not be considered during the official tournament events.

### a. Problems

A list of 9 to 11 problems is established by the SOC and published on the website of the ETEAM at least 8 weeks before the beginning of the Tournament.

The problems for the ETEAM are expected to be difficult and to contain parts with no currently known solution by the authors.

### b. Research into solutions of the problems

The participating students are supposed to solve the Problems working with other members of their teams and under supervision of their team leaders, with possible additional input from their teachers.

Each team conducts its research independently of the other teams. While it is permitted to discuss problems with people not participating in the tournament, it is forbidden to ask them for direct help, i.e. explicit solutions or hints towards parts or the whole of the Problems. This prohibition extends to asking for help on groups, websites or forums over the Internet. Any violation of this part of the regulations will be punished by disqualification.

### c. Written Material

For each problem handled by a team, the team prepares a **Written Material**. Each of these Written Materials must be sent to the MOC in a PDF file following a process detailed in the Appendix. There is a limit of a maximum of 30 pages (A4, 11pt) and not exceeding 5MB. The Final Written Materials must be sent at least one week before the beginning of the encounter. If these limits (size, deadlines) are not satisfied, the Written Material will be rejected by the MOC and the solution may be either truncated by the MOC or considered as empty.

External links (such as internet links) are permitted in the Written Material if, and only if, they are bibliographical resources. Any extension of the work submitted online will not be considered valid and will not be evaluated by the jury.

The first page of each file has to contain the team's name, the team's fourgram, the problem's number, and the problem's name. The written material is the product of the team's work. Any reference to other works must be duly cited (title, author, date, page, link). If the reference is not easily accessible (in particular if one has to pay to access it or access is restricted), the team must provide a sufficient summary.

The Written Materials have to be sent by separate PDF files, one for each investigated problem.

Apart from the titlepage, a Written Material should also adhere to the following

- the pages should be numbered;
- should contain a summary;

- if external references are used in the solution, there should be bibliography.

These, and only these Written Materials, will be discussed during the tournament and no text editing will be permitted after the deadline submission.

#### d. Draws

5 days before the beginning of the encounter, and right after the announcement of the results of the First and the Second Rounds, Group Draws are organized by the MOC. They determine:

- the ordering of the Stages of the teams within the Group (and their role);
- the problem that will be defended by each team.

A dedicated section explains the draws procedure of the current year, in the Appendix of these regulations. It meets the following conditions:

- a given problem cannot be presented more than once in a given Group of a given Round;
- a given team cannot defend the same problem in two different Rounds;
- each team can refuse a certain number of problems (described in the section of the Appendix dedicated to the draws);
- the draws do not favor any team in its design and are conducted in good faith.

The captain of each team must be present or have to nominate another captain in their team. Other members can attend (including Team Leaders) but they are not authorized to intervene during the draws. For the Final Round, the team allocation in Groups is determined by the ranking in the previous Rounds.

#### e. Draws

During the Draws, a team is allowed to decline a maximum of  $P-6$  problems without penalty, where  $P$  (from 9 to 11) is the number of problems provided by the SOC for the current year of the ETEAM. Any additional refusal reduces the default coefficient of the Defender's oral scoring by 25% of its initial value (for example, if  $P=10$ , the default coefficient is  $c=3$  and the team refuses  $P-3=7$  problems for a Stage, the effective coefficient for the oral scoring of the Defender at this Stage will be  $c' = 0,75$  instead of 3).

#### f. Groups

In each Round, the participating teams are divided into groups of 3, 4 or 5 teams (see also section on the Draws in the Appendix). The case of a group within 5 teams arises if, and only if, the amount  $N$  of non-disqualified participating teams equals 5. In any other case, the number  $g$  of Groups in at Round is  $g=\lceil N/4 \rceil$  (the ceiling of the quarter of the participating teams to the Round). In that case, the number of Groups with 3 teams is  $4g-N$ , the number of Groups with 4 teams is  $N-3g$ .

The participating teams will play the different roles described in the section Roles during the debates in the order of passage indicated by the following tables:

Group with 3 teams	Stage 1	Stage 2	Stage 3
Team 1	Reporter	Reviewer	Opponent
Team 2	Opponent	Reporter	Reviewer
Team 3	Reviewer	Opponent	Reporter

Group with 4 teams	Stage 1	Stage 2	Stage 3	Stage 4
Team 1	Reporter	Observer	Reviewer	Opponent
Team 2	Opponent	Reporter	Observer	Reviewer
Team 3	Reviewer	Opponent	Reporter	Observer
Team 4	Observer	Reviewer	Opponent	Reporter

Group with 5 teams	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Team 1	Reporter		Observer	Reviewer	Opponent
Team 2	Opponent	Reporter		Observer	Reviewer
Team 3	Reviewer	Opponent	Reporter		Observer
Team 4	Observer	Reviewer	Opponent	Reporter	
Team 5		Observer	Reviewer	Opponent	Reporter

The team that is not playing a role at a stage in a Group with 5 teams can have a break.

### g. Roles during the Stages

Any person disturbing the Stages can be excluded immediately from the room by the Chair of the Jury, whether they is a Team Leader, a Participating Student or a Spectator.

Only one team member may take the floor during each Stage, other members of the team are allowed to make brief remarks if, and only if, the Chair of the Jury gives permission to the captain of the team. Although it is permitted for the Participating Students to communicate discreetly with each other until their speaker has started to speak in their timeslot. They are however prohibited from communicating by any means with the speaker once they has started speaking.

Within each Round, the roles of Reporter, Opponent and Reviewer must be performed by different members of the team. For instance, the same person cannot be Reporter and



Opponent in the same Round, but they can be Reporter and Observer. In the event of very exceptional circumstances (such as sickness of other members of the team), the Chair of the Jury may authorize a participant to play two different roles in a given Round.

The whole team attends the Group of which they are a part. During the Stages, the Team Leaders are allowed to spectate (unless they are part of another jury) but cannot, under any circumstances, communicate with their teams. They watch the debates from a place in the room away from their team.

### i. The Reporter

The **Reporter** presents the main ideas and results obtained by his team while solving the problem. Black or white boards, a laptop and a projector will be available so that the Reporter may use slides. One of the main goals of the Reporter is to make his performance understandable by the audience. It is entirely permissible to add examples and illustrations.

The presentation should be based on the Written Materials (see section Written materials). We emphasize on the fact that the Reporter is only allowed to present:

- parts of the written materials with no modification, e.g., exact statements with their original numberings, figures and diagrams;
- sketches of solutions and proofs, and ideas used in the written materials.

Minor adjustments with respect to the written material can be made provided they are explicitly indicated. The jury may penalize any breach of this rule.

In a second part, the Reporter will answer as best as possible the questions addressed to him by the opponent, the reviewer and the jury.

### ii. The Opponent

The **Opponent** analyzes the Reporter's oral presentation with the aim of detecting errors and inaccuracies, as well as strong points, assessing their importance. For the purpose of revealing possible shortcomings, the Opponent has time to ask questions to the Reporter allowing the Reporter to fix them. Among the questions, they may ask the Reporter to explain an element of his or her solution.

However, the Opponent should not turn the discussion towards a presentation of his or her own solution. Excessive opposition, as well as any form of aggressiveness, will be severely penalized in the scoring given by the jury.

They then has time to provide an analysis of the content of the Reporter's oral presentation, as well as the debate that took place between the two participants. They specifies, in particular, the positive elements provided by the Reporter and indicates, when it arises, the points on which they was not convinced. In particular, their evaluation may assess what is:

- correct and proven,
- correct with minor inaccuracies,
- correct but not proven (a proof is missing or there are crucial mistakes),
- doubtful,
- wrong.

### iii. The Reviewer

The **Reviewer** evaluates the debate between the Reporter and the Opponent, indicating the positive and negative aspects of the exchanges. One of the main intentions of the Reviewer is to detect whether the Opponent said anything wrong or overlooked Reporter's faults.

He has time to ask questions to both the defender and the opponent. These questions aim to return to the points raised during the discussion between the Opponent and the Reporter, in the event of disagreement or to explore them in greater depth. If there are more significant mistakes (in themselves or by their consequences) than those raised by the Opponent, the Reviewer's questions must address them.

They then has a short time to provide an analysis of the Reporter-Opponent-Reviewer exchanges. He or she specifies, in particular, the positive elements brought by the discussion and indicates, if necessary, the points of disagreement which persist.

### iv. The Observer

The **Observer** only makes important and useful remarks on crucial points missed by the other participants. If no crucial point has been omitted by the other participant, the Observer should not participate in the discussion. If the Observer takes stage unnecessarily time, the Jury may score their performance negatively.

### v. The Jury

The debates take place in front of a Jury which evaluates both the written materials and the oral performances (independently), taking into account both the scientific understanding of the elements, but also the way in which they are presented.

At the end of each Stage, the Jury will ask questions to any participating student who spoke during the stage. These questions will help the Jury to clarify how deeply each participating student understands the material presented or discussed.

### vi. The Spectators

Even if the LOC or the MOC authorize any Spectators to watch the Stages, the Spectators are not authorized to speak or to make any noise or communication during the Stages.

### h. Written Reviews

Before each Round, the Opponent, the Reviewer and the Observer teams prepare **Written Reviews** about the Reporter's Written Materials (see section Written material) that will be defended during their Round. The Written Reviews are independent of the role played by the team at the oral.

These written reviews indicate the overall appreciation of the solution, a critical evaluation by highlighting both positive and negative aspects of the work, and the errors and inaccuracies the team students may have found in the solution of the Reporter.

The format to be respected is communicated to the teams by the MOC as well as the date and deadline for submission. The files (one for each Stage) will be rendered in PDF format, must not exceed 2 pages (A4, 11pt) and 5 MB. If these limits are exceeded, the MOC may either truncate the file or consider it as empty.

The written reviews are graded by the Jury (see section Evaluation in the Appendix).

If a team doesn't send a Written Review before the deadline, there will be penalties as described in the Appendix.

## 5. Application of the regulations and disputes

### a. Assignment of responsibilities

All the committees defined in the section Organizational structure of the Tournament are responsible for the application of these regulations. In terms of sanctions, their powers are defined below.

The MOC may take sanctions in the event of manifest non-compliance with the rules defined in sections Composition of a team, Participating students and Team leaders. These sanctions cannot in any way interfere with the function of the jury. They can go as far as disqualification. They are also justified in taking sanctions in the event of inappropriate behavior or disciplinary problems during the tournament but outside the rounds.

The chair of the Jury (and not the other members of the Jury) may take sanctions within his Group in the event of manifest non-compliance with the sections Research and writing of solutions, Roles and content of the debates, Written reviews, and Organization of debates with the aim of putting an end to the violation of the regulations. These sanctions cannot exceed the scope of his function, namely one Round. In particular, he cannot proceed with a disqualification. On the other hand, he is in particular justified in excluding from the room where his Group's debates are held any person who would disturb the smooth running of them.

The MOC may take sanctions within his tournament in the event of non-compliance with the sections Composition of a team, Participant students, Team leaders during the tournament, and the sections Research and writing of solutions, Roles and content of the debates, Written reviews and Organization of debates. Sanctions taken by the MOC may go as far as disqualification.

### b. Disqualification

In principle, only the MOC is able to pronounce the disqualification of a team or a team member. It can be advised in its decision either by the LOC, the SOC or the chair of a Jury. Any disqualified team or person cannot claim its participation in the tournament without explicitly mentioning their disqualification. In particular, it or he or she will not be recognized as a team, a participating student or team leader in the event of a request for verification by a third person. Furthermore, a disqualified team does not appear in the edition's ranking.

### c. Appeal

Each sanction decision may be subject to an appeal described below:

- a decision taken by the MOC may be appealed to the same MOC which will have to re-examine the question;
- a decision taken by a LOC may be appealed to the MOC;
- a decision taken by a SOC may be appealed to the MOC;
- a decision taken by the chair of a Jury may be appealed, after the end of the Round and before the end of the tournament, to the SOC.

Any appeal is sent in writing by electronic means to the usual email address of the MOC. In the case of an appeal, taking into account the deadlines, the person making the appeal shall

orally inform the MOC. An appeal contains an explanation of the facts and the plaintiff's arguments. The MOC judges the advisability of hearing from different people to determine his decision.

#### **d. Final provisions**

Unless otherwise stated in these regulations, the MOC is the appropriate body for the management of any situation not covered in these regulations, where applicable upon consultation with other competent committees.

# Appendix (Additional rules for the ETEAM 2024)

## 1. Procedure for the Draws

To be written...

## 2. Procedure for the Subscription of the Team







To be written...

## 3. Procedure for sending the Written Material

To be written...





## 4. Timeline of a Stage

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	~2 min	Preparation of the Reporter
	~2 min	Presentation of the Jury (1st stage only)
	<10 min	Oral presentation of the Reporter
	<8 min	Questions of the Opponent to the Reporter, answers of the Reporter and Performance of the Opponent
	<2 min	Reply of the Reporter
	~7 min	Questions of the Reviewer to the Reporter and to the Opponent, answers to the questions, and Performance of the Reviewer

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### Non-obligatory actions:

	<2 min	Questions and remarks of the Observer
	<2 min	Additional remarks of the Reporter
	<2 min	Additional remarks of the Opponent
	<2 min	Concluding remarks of the Reviewer

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		Questions and remarks of the Jury to the oral participants
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	~20 min	Discussion of the Jury about the oral
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The time limit for the presentation of the Reporter is strict (at most 10 minutes). The other time limits can be extended by the Chair of the Jury if they estimate the debate to be crucial. The Chair or the Co-chair of the Jury can provide an indicative sign to the leader of the debate when the time limit is close to the end (for example, holding up a “1 min” sign).

## 5. Scoring of the ETEAM

### a. The grading

After all Stages the Jury grades the teams evaluating, independently, the Written Materials and reviews (x), as well as the oral performances together with the participation in the discussion (y). The Jury takes into account not only the scientific understanding of the material, but also the way in which they are presented.

Each juror gives two (x), (y) integer marks, for the written and oral part, respectively, from 0 to 10 for the Reporter, the Opponent, the Reviewer, and the Observer, with the exception that the oral mark (y) of the Observer is between -10 to 10, according to the table below.

	Written material or review (x)	Coefficient (k)	Oral performance (y)	Coefficient (l)	Score role by role
Reporter	$0 \leq x_{Rep} \leq 10$	$k_{Rep} = 2$	$0 \leq y_{Rep} \leq 10$	$l_{Rep} = 3^*$	$S_{Rep} = k_{Rep}x_{Rep} + l_{Rep}y_{Rep}$
Opponent	$0 \leq x_{Opp} \leq 10$	0.9 or 0.6	$0 \leq y_{Opp} \leq 10$	$l_{Opp} = 2$	$S_{Opp} = k_{Opp}x_{Opp} + l_{Opp}y_{Opp}$
Reviewer	$0 \leq x_{Rev} \leq 10$	0.9 or 0.6	$0 \leq y_{Rev} \leq 10$	$l_{Rev} = 1.2$	$S_{Rev} = k_{Rev}x_{Rev} + l_{Rev}y_{Re}$
Observer	$0 \leq x_{Obs} \leq 10$	NC or 0.6	$-10 \leq y_{Obs} \leq 10$	$l_{Obs} = NC \text{ or } 0.5$	$S_{Obs} = k_{Obs}x_{Obs} + l_{Obs}y_{Obs}$

The coefficient on the written reviews is either 0.9 for Rounds within 3 Stages or 0.6 for Rounds within 4 or 5 stages so that, excluding the Observer, oral performance that deserves to be always 0, each round results in a score out of 100 points for a given team.

### b. The rating

The rating  $R_n$  of a team in the Round  $n \in \{1, 2, 3\}$  is determined by sum of the average scores by role given by the jurors as follows:

$$R_n = S_{Rep} + S_{Opp} + S_{Rev} + S_{Obs}$$

The total rating of a team is:

$$R_{Tot} = R_1 + R_2 + (\pi - 2)R_3$$

so that the Third Round (Final) is slightly more valuable in the Total rate.

The Final rating of each team is then a non-negative real number from 0 to  $100\pi \approx 314,159265\dots$

### c. The ranking and the prizing

At the end of the Tournament, the SOC will rank the teams according to their rating. The SOC will award the following prizes according to the quality of the teams' performances and ratings:

- 1st prize, 2nd prize, 3rd prize, etc. to emphasize remarkable performances
- (very) honorable mention to reward all the (very) satisfying performances
- certificates to recognize a full participation of the Team in the Tournament



d. Evaluation grids

Reporter's written material [0;10] (coeff. 2)		
Scientific part	Depth and difficulty of the elements presented	[0;3]
	Presence, accuracy and correctness of proofs and algorithms	[0;3]
	Relevance, efficiency and elegance	[0;1]
Formal aspects	Clarity of reasoning (explanations, examples, illustrations, diagrams, etc.)	[0;2]
	Presentation (readability, compliance with the format, etc.)	[0;1]

Opponent's, Reviewer's and Observer's written reviews [0;10] (coeff. 0.9 or 0.6)		
Scientific part	Critical thinking and perspective on the proposed solution	[0,3]
	Validity of errors and positive points raised	[0,2]
	Identifying and prioritizing the most important errors and positive points	[0,3]
Formal aspects	Presentation (readability, compliance with the format, etc.)	[0,2]

Reporter's oral performance [0;10] (coeff. 3.2 - penalties)		
Oral presentation	Understanding of the material presented, knowledge and mastery of the mathematical subjects used during the presentation	[0;2]
	Relevance of choices (proofs, examples, depth in relation to the written solution)	[0;2]
	Pedagogy and clarity of speech (explanations, illustrations, etc.)	[0;1]
	Brevity and cleanliness of the presentation	[0;1]
Debates	Correct answers to the questions asked	[0;2]
	Ability to move the debate forward (explaining the limits of one's knowledge, conjectures, live research, etc.)	[0;2]
Penalty	Ethical behaviour	[-3;0]
	Correspondence to the written material	[-3;0]

Opponent's oral performance [0;10] (coeff. 2)		
Discussion	Relevance of questions (importance of the topics covered, points raised) (0-3)	[0;3]
	Questioning skills (formulation of questions, reaction to answers, articulation between questions, time management) (0-2)	[0;2]
	Ability to assess the quality of the Defender's presentation (presentation and answers to the Opponent) (0-2)	[0;2]
Understanding	Answers to the questions of the Reporter and the jury (substance and ability to move the debate forward) (0-3)	[0;3]
Penalty	Ethical behavior	[-3;0]

Reviewer's oral performance [0;10] (coeff. 1)		
Discussion	Taking the debate to a higher level (through the topics covered, the relevance of the questions asked, the points raised, time management) (0-3)	[0;3]
	Creating a constructive dialogue between the participants (formulation of questions, reaction to answers, articulation between questions, speaking time) (0-3)	[0;3]
	Ability to assess the quality of the exchanges (Defender-Opponent, and three-way) (0-2)	[0;2]
Understanding	Answers to the jury's questions (substance and ability to move the debate forward) (0-2)	[0;2]
Penalty	Ethical behavior	[-3;0]

Observer's oral performance [-10;10] (coeff. 0.5)		
Scientific part	Significance of the remarks and questions (positive mark only if the other players omitted crucial matter)	[-5;5]
Formal aspect	Relevance of the remarks and questions (positive mark only if the other players omitted crucial matter)	[-5;5]
Penalty	Ethical behavior	[-3;0]

## 2. Evaluation grids interpretation (hints for the jury)

### a. Reporter - Written material (0 to 10) (coeff. 2)

#### Scientific Part

##### **Depth and difficulty of the elements presented (0-3)**

- To what extent does the solution cover a large part of the problem? Does it deal with complex issues? Does it present special cases in the absence of results in the general case? Does it address points that go beyond the initial problem?

##### **Presence, accuracy and correctness of proofs and algorithms (0-3)**

- Does the solution present proofs? Are the arguments correct in substance and form? Do they prove the announced result? Do the results proven correspond to what is asked in the problem?

##### **Relevance, efficiency and elegance (0-1.5)**

- Is the adopted point of view appropriate? Could the results proven laboriously have been proven more simply? If tools are introduced, are they used judiciously? If definitions are introduced, are they used judiciously? If definitions deserve to be introduced, are they?

#### Form

##### **Clarity of reasoning (explanations, examples, illustrations, diagrams, etc.) (0-1.5)**

- Does the solution explain what it is trying to do? Are the why and how of this strategy described clearly?
- Does it offer examples or diagrams? Do they illustrate the key points of the reasoning or results?

##### **Presentation (readability, compliance with the format, etc.) (0-1)**

- Is the font a good size (11pt)? Is there a cover page, with the team name, an abstract and a table of contents? If the sections are numbered, are they numbered correctly? Are the pages numbered?
- Is the solution easy to read? Are the paragraphs logically arranged?

### b. Reporter – Oral performance (0-10) (coeff. $\leq 3,2$ ) $\rightarrow$ (3,2 - 0,8 x penalties)

#### Oral Presentation

##### **Understanding of the material presented, knowledge and mastery of the mathematical subjects used during the presentation (0-1,5)**

- Did the defender understand the problem? Does he/she master all the tools used during the presentation? All the results? Does he/she make any mathematical errors during his/her presentation?
- NB: This mark is intended to be given at the end of the presentation. In particular, the defender's ability to react to questions that go beyond his/her presentation is not assessed here. Nevertheless, the debates can shed light on the defender's understanding and thus allow this mark to be refined.

### **Relevance of choices (proofs, examples, depth in relation to the written solution) (0-2)**

- The typical pitfalls are the following:
- Deliberately avoiding large parts of one's solution for no good reason (or to maximize one's score on the previous item). Valid reasons are, for example, to focus on more important results, or to have already presented similar reasoning.
- Stringing together results while only staying on the surface throughout the presentation.
- Presenting a (part of) a laborious and uninteresting proof that could have been summarized, such as "We do the calculations and we get ..."
- On the contrary, a logical and fluid presentation that highlights its important elements is to be valued here.

### **Pedagogy and clarity of speech (explanations, illustrations, etc.) (0-1)**

- Does the defender provide context, rather than jumping straight into answering a particular question? Does he/she explain his/her approach before going into the details? Are his/her results clearly stated? Does he/she illustrate his/her reasoning with examples?

### **Brevity and cleanliness of the presentation (0-1)**

- Does the defender manage his/her time well during the presentation? Is the presentation support readable?
- NB: Most defenders should have 1 point on this item.

### **Debates**

#### **Correct answers to the questions asked (0-2,5)**

- Does the defender understand the questions asked? Are the mathematical statements he/she produces in response correct? Do they answer the questions well?

#### **Ability to move the debate forward (explaining the limits of one's knowledge, conjectures, live research, etc.) (0-2)**

- Does the defender simply answer the questions laconically? On the contrary, does he/she try to develop his/her answers? If he/she does not have an answer, is he/she able to explain why? Does he/she embark on a research process to try to provide one?

- In particular, if errors are pointed out to him/her, is he/she able to measure their impact, and if possible, to correct them?
- A defender who answers "I don't know" to many questions without saying more should be penalized here. On the contrary, a defender who says "I don't know because we tested this and that and it was not conclusive" or "we are stuck on this point to answer this question" should be valued.

### **Penalties**

- NB: All penalty points (including for the other roles) are decided separately by the jury, usually collegially. The rest of the grade is not supposed to be impacted by these elements, except in relevant cases (example: an disrespectful attitude is often associated with a weak ability to move the debate forward).

### **Disrespectful attitude? [-3;0]**

- NB: One of the objectives of this item is to be mentioned during the debriefing, in order to mark the defender.
- A penalty beyond -2 means a major problem that requires the intervention of the president.

### **Non-compliance of the presentation with the written material? [-3;0]**

- Does the presentation not bring anything new compared to the written material, except for possible diagrams? (small penalty) In particular, is there no new plagiarized content? (big penalty)
- NB: The objective of this item is to ensure that the defender does not present new results that would destabilize the opponent and the rapporteur.

### **c. Written Reviews (0-10) (coeff. 0.8)**

### **Scientific Part**

#### **Critical thinking and perspective on the proposed solution (0-3)**

- Is the degree of response to each question well assessed? (NB: the assessment "completely solved" is not appropriate for a question whose answer is given but is incorrect or poorly justified). Has the summary report correctly identified the level of depth of the solution? Are the general comments correct? Do they correspond well to what was important to note in the solution? Do they allow the overall assessment given to be justified?

#### **Validity of errors and positive points raised (0-2)**

- Are the points raised actually errors or positive points? Are they clearly explained? If a correction is made, is it itself correct?

#### **Identifying and prioritizing the most important errors and positive points (0-3)**

- Have the most important points been raised? Has the importance of the points raised been well assessed? Have they been well prioritized?

## **Form**

### **Presentation (readability, compliance with the format, etc.) (0-2)**

- Does the written review comply with the required format? Is the writing legible?
- NB: Most written reviews should have 2 points on this item.

#### **d. Opponent - Oral performance (0-10) (coeff. 2)**

### **Relevance of questions (importance of the topics covered, points raised) (0-3)**

- Do the opponent's questions allow the central points of the defender's solution to be addressed? In particular, if the defender has made significant errors, do they address them in order to explain them, or even correct them?

### **Questioning skills (formulation of questions, reaction to answers, articulation between questions, time management) (0-2)**

- Does the opponent simply ask questions without any logical connection? Or does he/she try to build on the defender's answers, in order to go deeper or to move logically to another point? Does he/she not hesitate to refocus the defender if he/she strays from the question, or embarks on a long and laborious argument?
- Are his/her questions presented in an interesting way? For example, rather than pointing out errors, does he/she lead the defender to realize them himself/herself, for example through an example?

### **Ability to assess the quality of the Defender's presentation (presentation and answers to the Opponent) (0-2)**

- During his/her questions, does the opponent show critical thinking towards the defender's answers?
- Above all, is his/her speech representative of the defender's performance?

### **Answers to the questions of the Reporter and the jury (substance and ability to move the debate forward) (0-3)**

- Does the opponent understand the questions asked? Are the mathematical statements he/she produces in response correct? Do they answer the questions well?
- Does he/she simply answer the questions laconically? On the contrary, does he/she try to develop his/her answers? If he/she does not have an answer, is he/she able to explain why? Does he/she embark on a research process to try to provide one?

### **Ethical behavior [-3;0]**

- NB: One of the objectives of this item is to be mentioned during the debriefing, in order to mark the opponent.
- A penalty beyond -1 means a major problem that requires the intervention of the president.

**e. Reviewer - Oral Performance (0-10) (coeff. 1.2)**

**Taking the debate to a higher level (through the topics covered, the relevance of the questions asked, the points raised, time management) (0-3)**

- If central points have not been addressed by the opponent, does the reporter do so?
- Do his/her questions build on the opponent's work? In particular, if a point has been left unresolved, do they allow it to be clarified?
- Do his/her questions lead to interesting discussions?
- Is the time spent on the different parts of the debate consistent with their importance?

**Creating a constructive dialogue between the participants (formulation of questions, reaction to answers, articulation between questions, speaking time) (0-3)**

- Does the reporter simply ask questions without any logical connection? Or does he/she try to build on the answers, in order to go deeper or to move logically to another point? Does he/she ensure that everyone has a chance to speak, including the opponent and the defender? Does he/she not hesitate to refocus the defender and the opponent if they stray from the question, or embark on a long and laborious argument?
- Are his/her questions presented in an interesting way?

**Ability to assess the quality of the exchanges (Defender-Opponent, and three-way) (0-2)**

- During his/her questions, does the reporter show critical thinking towards the answers of the defender and the opponent?
- Above all, is his/her speech representative of the exchanges that have taken place?

**Answers to the jury's questions (substance and ability to move the debate forward) (0-2)**

- Does the reporter understand the questions asked? Are the mathematical statements he/she produces in response correct? Do they answer the questions well?
- Does he/she simply answer the questions laconically? On the contrary, does he/she try to develop his/her answers? If he/she does not have an answer, is he/she able to explain why? Does he/she embark on a research process to try to provide one?

**Ethical behavior [-3;0]**

- NB: One of the objectives of this item is to be mentioned during the debriefing, in order to mark the reporter.
- A penalty beyond -1 means a major problem that requires the intervention of the president.

f. **Observer - Oral Performance [-10;10] (coeff. 0.5)**

To be written...

### 3. Model for the Written review



# ETEAM

## WRITTEN REVIEW

Round \_\_ Group \_\_ Stage \_\_

Problem \_\_ reported by the team \_\_\_\_\_

Written review of the team \_\_\_\_\_ in the role of :  Opponent  Reviewer  Observer

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General evaluation of the solution :  Excellent  Good  Sufficient  Average  Poor

### Qualitative evaluation of the solution

Give your opinion regarding the solution. In particular, highlight the positive points (important, original ideas, etc.) and specify what could have improved the solution.

### Evaluation, question by question, of the solution

Note: it is possible to tick between the boxes for an intermediate case.

Question	ER	PA	SE	NA

Question	ER	PA	SE	NA

ER : entirely resolved, nor error,  
nor mathematical lack

SE : some elements of answer

PA : partially answered

NA: not addressed

## Errors and inaccuracies

List below in descending order of importance no more than four errors and/or inaccuracies in your opinion, specifying the question concerned, the page, the paragraph and the type of remark.

1. Question \_\_\_ Page \_\_\_ Paragraph \_\_\_

Major mistake  Minor mistake  Inaccuracy  Other : \_\_\_\_\_

Description :

2. Question \_\_\_ Page \_\_\_ Paragraph \_\_\_

Major mistake  Minor mistake  Inaccuracy  Other : \_\_\_\_\_

Description :

3. Question \_\_\_ Page \_\_\_ Paragraph \_\_\_

Major mistake  Minor mistake  Inaccuracy  Other : \_\_\_\_\_

Description :

4. Question \_\_\_ Page \_\_\_ Paragraph \_\_\_

Major mistake  Minor mistake  Inaccuracy  Other : \_\_\_\_\_

Description :

## Positive aspects

Identify at most two strong points of the solution and say why (examples: relevant propositions, important ideas, relevant generalizations, significant examples, original constructions, etc.).

1. Question \_\_\_ Page \_\_\_ Paragraphe \_\_\_

Description :

2. Question \_\_\_ Page \_\_\_ Paragraphe \_\_\_

Description :

## Formal remarks (optional)

Give your opinion regarding the presentation of the solution (readability, etc.).