2020 SigmaTournament Rules

General Format

The SigmaTournament takes place over 5 days. On Monday through Thursday it is from 4-5pm EST, and on Friday, the Grand Unification day, it is from 2-3pm EST.

The first four days have a different format than the last day and the points are divided so that days 1-4 combined are worth the same as day 5. This is to ensure that even if a team doesn't do too well during the first four days, they always have a chance of redemption.

On regular tournament days, which are Monday through Thursday, teams are divided into pairs that compete against each other to solve problems.
Days 1-4 are divided by subject like this:
- Monday: Math and Linguistics
- Tuesday: Biology and Chemistry
- Wednesday: Math Games
- Thursday: Physics and Computer Science

Days 1, 2, and 4

On these three days, the tournament will have a problem solving portion followed by a presentation portion. In the problem-solving portion, teams will have **25 minutes to solve 5 problems**. They will be submitting *answers* as they go, but points won't be awarded until the presentation portion when *solutions* to each problem will be presented.

During the solving portion, the two teams are racing against each other and trying to claim each problem before the other team. A "claim" in this case is the submission of an answer on the tournament website, which will be demonstrated during the Quest so you can get familiar with it. When you submit a claim, it will come with a timestamp so the judges know which team claimed each problem first. The teams, however, will be kept in the dark about what the other team solved until the presentation portion.

During the 25 minute round, teams can withdraw previous claims **up to 2 times (**and submit new answers afterward) before time runs out, but the timestamp will always be updated to the time of the latest submission. The ability to withdraw and resubmit claims is important because if a presented solution does not match the claimed answer, it will receive **zero points**. Even if the solution is completely correct but the answer is wrong, judges can't give partial credit because that creates an incentive to claim all the problems in the first minute with random answers and then actually solve them later on.

At the end of 25 minutes the website will be closed to new submissions and judges will have a final table with all of the claims. Now the presentation portion begins.

In the presentation portion, problems will be discussed one at a time and the team that gets to present each problem is the team that claimed it first. If neither team claimed a problem, it is skipped and not presented by either team.

Protocol for presenting a solution
1. While a solution is being presented, everyone will be muted except for the judges, one member of the team that is presenting (the presenter), and one member of the opposing team (the opponent)
2. The presenter presents their solution to the problem. They can use any medium they want to, including sharing their screen, writing on a virtual whiteboard, or even holding up their notebook to the camera and explaining what they wrote. They shouldn't be interrupted during the presentation.
3. After the presenter confirms that they're finished, the judges ask the opponent the following questions: first, **does the opponent have any clarifying questions?** There is no opportunity for the opponent to earn points at this stage, this is just to ask the presenter to repeat a part of the solution or to decipher their handwriting, for example. Then the judges ask, **does the opponent have any critiques of the presenter's solution?** It is at this point that the opponent can earn points if they noticed a hole or inaccuracy in the solution.
4. After the opponent has said everything they wanted to say, the judges can ask the presenter some clarifying questions and then they make a decision. There are 2 possibilities:
   a. The judges decide that a majority of the correct solution was presented. Then they award **the presenter up to 2 points** for their solution (zero if the answer was wrong) and **the opponent can get up to 1 point** for making valid critiques. After points are awarded, everyone moves on to the next problem.
   b. The judges decide that the full correct solution was not shown by the presenter. In this case, the problem is scored as before (here the presenter usually gets zero points, in rare cases one) and then a **transfer** occurs. This means that roles are reversed and the opponent becomes the presenter and vice versa. The new presenter is still tied to the answer that their team claimed during the 25 minute problem solving portion. **If their team did not claim the problem, the new presenter can either decline to present the problem or come up with an answer on the spot in under 15 seconds** (and then they will be tied to that answer when presenting, getting zero points if it's wrong). If the presenter chooses to present the problem, the procedure is exactly the same as before, only if they get the solution wrong a second transfer isn't possible.

Day 3: Math Games

The math games day is similar to days 1, 2, and 4 in that two teams compete against each other, but that's where the similarity ends. Instead of four problems there will just be one game, which will be a two player game where players take turns and it won't involve luck or chance.

First, the rules will be explained and several example games will be played. Teams will go into breakout rooms with their teams for a few minutes to discuss any initial thoughts or observations. Then, campers will be put into new breakout rooms to play 1v1 against a member of the opposing team. Each pair will play two games, so each player goes first once and second once. A win is worth 1 point, a loss is 0 points towards the final score.

After the 1v1 games, teams will go back into breakout rooms as a group where they will have 10 minutes to discuss the strategy more in depth and to pick a team captain.

Finally, two games will be played with one entire team versus the other. Teams will get up to 60 seconds before each move to decide what to do, and the final decision will be up to the captain. Each of these games is worth 12 points

Small technicality: every team has 11 members so the 1v1 round should have 11 matchups. If one camper from a team doesn't come, that'll be forgiven and there will just be 10 matchups. However, for every additional camper that doesn't show up it will count as a forfeit for those two matches and the opposing team gets two free points. (Obviously extenuating circumstances will be forgiven.)

Day 5: Grand Unification

The Grand Unification is the last day of the tournament. Instead of 1v1 matches, all the teams will be on the same scoreboard and racing against the clock, not each other. The number of points a team receives will depend on whether the team solved a problem correctly and how fast they were able to do it.

The exact mechanism for submitting answers and the formula for how many points a team receives is TBD, you will be notified closer to the event. However, you should know that the points from the GU will be scaled so that it is worth the same as the first four days combined.

Technology

Zoom and Discord

Tournament meetings will take place on Zoom, with both teams and judges on the same call. You will be asked to change your Zoom nickname to your team's Greek letter and then your full name (ex. α John Doe) so the judges can easily put teams in breakout rooms.

On Discord, teams have been provided with 1 text channel and 5 voice channels specifically for the tournament. This way, each problem can be discussed in a separate voice channel to make things easier to organize. Just in case, one counselor who is not judging will be allowed to stay with their team to help with any technology-related or logistical issues that come up.

For problem presentations, as mentioned above, there are many many ways to do it. The simplest way is to share your screen, open a whiteboard, and write the solution down from scratch. If possible, we recommend doing something more efficient, such as sharing a screen with a jamboard, document, or photo where the solution is already written down, so Problem of the Month-style. Another way is to get on the zoom call from another device such as a smartphone and pointing the smartphone camera on a notebook or piece of paper that you write on. If you have any spare time during the tournament, try to make a plan for how you will present to help things run as smoothly as possible.

Website
There will be a website for the tournament where problems will be displayed and answers can be submitted. Each team will get a login and password to use when submitting answers. Claims can be withdrawn and resubmitted up to 2 times. The table with scores will be on the website as well.

"Can we use online resources like Google, textbooks, calculators, etc?"
Yes.

Final Standing Calculation

The final standing is based on who has the most **tournament points** (TP's). Up to 50 TP's can be earned from the first 4 days combined, and another 50 can be earned in the GU.

For days 1-4, teams get 20 for a win, 10 for a tie, and 0 for a loss. Then we add the total points they earned in each matchup (except from day 3) multiplied by some small coefficient. Finally, we scale everything so that the highest placed team gets 50.

For example, suppose team alpha won all four days, and each one with a score of 6-0, and we decided that the coefficient would be 0.5. Alpha would have 20*4 + 6*3*0.5 = 89 points. If 90 is the highest total, to scale everything down to 50 everyone would get their points multiplied by 50/89. So alpha would get 50 tournament points, and beta who let's say had a total of 75 will end up with 42.13 tournament points.

The same scaling is done for the Grand Unification. This way the maximum possible total is 100, which can be achieved by being the highest ranked team after the 4 regular days and then placing highest in the GU.