MSJ Math Club

MMT Round-Specific Rules

MMT 2015

1 Individual Round: Day 1 and Day 2

These two rounds are factored into determining placement for Mission Math Teams for the Stanford Math Tournament and Berkeley Math Tournament in the Spring of 2016. There are a number of questions every day split evenly among algebra, geometry, and advanced topics (combinatorics and number theory). All answers must be expressed in accordance with the answer conventions in the *Answer Conventions and General Rules* pdf.

There will be 12 problems on Day 1 and 6 problems on Day 2. Note that problems on Day 2 are weighted twice as the problems on Day 1. Your placing is determined first by your score, then by the hardest problem solved (determined by the number of contestants who submit a correct answer to the problem). Further ties will be broken by timed tiebreakers.

2 Estimathon

Rules in the Answers Conventions section do not apply. For each question, teams submit a closed range $[n, m]$, representing a lower bound n and an upper bound m for the answer. The range must be a subset of the positive reals. A correct answer means that the actual answer is within the range given. Your score is determined by the following formula, (where n_i is the lower bound given for correctly-answered question i, m_i is the upper bound given for question i, x is the number of incorrect answers, k is the number of correctly-answered questions, and $[x]$ is the greatest integer function)

$$\text{Score} = 2^x \left(10 + \sum_{i=0}^{k} \left[\frac{m_i}{n_i} \right] \right)$$

Note that if you submit a huge range (with $\frac{m_i}{n_i}$ greater than, say 5000) then your score may increase instead of decrease (which is bad). Groups submit answers in real time (on slips of paper) and are given live feedback on their answers. Each group has a limited number of total submits, which will be announced just before the round starts. Only the last submit counts. If you do not submit for a question it will be counted as incorrectly answered. All actual answers will be positive real numbers. Lowest score wins.

3 Team

Similarly to the regular rounds, the team round will consist of 9 short-answer questions. These questions will be solved as a team, where you get to discuss with your teammates about the questions. Team placing is determined by number of correct answers, then hardest problem solved (as above).

4 Individual Fun Round

Special rules for this round will be announced right before the administration of this round. All you need to know is that it will be fun.

5 Power Round

The Power Round is a 60-minute exam with a series of proof-based questions on a single topic that is revealed and briefly described at the beginning of the round. As with the team round, you will be able to work with your team members in solving these problems. Each question will have a specified point value next to it, and team placing is determined by the total number of points. You may use the any result of a previous problem to solve a problem. All correct, rigorous proofs will get full points. Semi-rigorous proofs and progress may be given partial credit. All decisions of the judges are final.

6 Scoring and Awards

For placement onto Mission San Jose High School's Stanford/Berkeley Math Tournament teams, only the individual rounds (Day 1 & 2) matter. Your individual placement score is calculated as

$$(\text{Day 1 Score}) + 2 \cdot (\text{Day 2 Score})$$

where ties are broken by the hardest problem solved (where hardest is defined by a problem solved by the fewest number of people).

For those of you taking the entire tournament, your individual score is the sum of your two individual rounds and the fun round, where each day is weighted equally. The top individual scorers will be awarded.

In addition, there will be an award for the highest-scoring underclassman (freshmen; sorry sophomores).

For team scoring, the total team score is calculated as:

$$\Big(\sum_{\text{members}} \text{individual scores}\Big) + (\text{Team Round Score}) + (\text{Power Round Score}) + (\text{Estimathon Bonus})$$

In short, we will sum all the individual scores of your team members, scale that out of 100, and then add that to your team-round/power-round scores (also scaled out of 100). Finally, we will add an estimathon bonus, where first, second, and third receive 15 point, 10 point, and 5 point bonuses, respectively. The top teams will also be awarded.