

Rules for the Mental Calculation League

- A. Overview: The Mental Calculation League (the “League”) was established by the Global Mental Calculators Association (the “Association”) for the purpose of providing a regular forum for the top calculators to compete in while increasing communication and contact within the mental calculation community and compiling calculation statistics for competitors in the League. The concept of the league is derived from the league created and maintained by memory competitors.
- B. Eligibility: Each season of the League is limited to a fixed number of competitors. Prior to each season, there will be a minimum six-week application period for the next season. Prospective competitors must apply through the application section of the Association website. Applicants may either: (1) rely on previous Mental Calculation World Cup (“MCWC”) performances; (2) rely on competition results from other competitions; or (3) perform a supervised tryout. In evaluating prior MCWC performances, an adjustment index, based on the scores in the most recent MCWC, will be implemented to reflect the increasingly competitive nature of the MCWC. One-third of the League positions will be reserved for qualifiers relying on MCWC results. If an applicant is relying on competition results from other competitions, a detailed description of the format and the competitor’s performance, as well as a contact person for verification purposes, must be submitted. Applicants who elect to engage in a tryout will be given fifteen minutes to complete a variety of sample questions that are reflective of the questions to be administered during the League

Any competitor who elects to rely on previous competition performances, whether MCWC or otherwise, but does not qualify will be promptly notified and given the option of engaging in a tryout. The Association is tasked with determining the qualified competitors.

- C. General League Format: The League will include weekly matchups between competitors. Each match-up will consist of a head-to-head portion and standard attempts. All matchups will be online, remote, and supervised by a referee. Competitors will be required to use a video call application (as determined by the Association or agreed upon by the competitors and the referee). The competitor must share video of their screen and video of the competitor during the competition; in the referee’s discretion, recording of the match-up may occur.
- D. Head-to-Head Matchup: The tasks for League matchups will be devised by the association in consultation with members of the calculation community. The list of questions formats will be posted on the League website approximately three weeks before the commencement of the season. Any competitor may object to a specific question format by lodging an objection with the Association that explains the grounds for the

objection; the Association will vote to determine whether to remove any questions to which an objection was received. The question bank for competition will be sufficiently large that only a small percentage of posted tasks will be used during any given match-up.

The tasks will involve questions displayed on the screen by the referee. There will be a thirty (30) second time limit for each question. Competitors will answer the question by typing the answer in a chat window. The first competitor to correctly answer the question will receive a point. All answers must be provided in decimal format. Any question that includes a non-integer answer will be deemed correct if the answer provided is within .001 of the correct answer. Each competitor is only permitted one answer per question – if neither competitor correctly answers the question during the time limit, no point will be awarded.

Tasks will be administered by the referee until: (a) one competitor has reached at least thirty (30) points and has at least 3 points more than the other competitor; or (b) one competitor has at least 15 more points than the other competitor.

- E. Standard Task Attempts: At the conclusion of the head-to-head component of the matchup, each competitor will receive supervised attempts in one of the four MCWC standard tasks or division. Each competitor will receive a maximum of three total attempts, with a maximum of two attempts in a specific task. The attempts will be made using Memoriad software. Any competitor may decline to participate in standard attempts.

For standard attempts other than calendar dates, a competitor will receive a score formatted as “seconds per point.” The applicable time will be determined by the Memoriad software. The applicable points will be the number of correct answers minus $\frac{1}{2} \times (\text{number of incorrect answers})$. For example, a performance of 8/10 in 200 seconds will result in a score of $(200 / (8 - (2 \times \frac{1}{2}))) = 28.71$ seconds per point. Please note that an answer that is within .00001 of the answer displayed as correct by the software will be considered a “correct” answer for the square root tasks.

For calendar dates, the competitor’s score will be calculated using the same methodology as utilized by MCWC and Memoriad except that the starting point for determination of the score will be the problem that results in the highest score. In other words, rather than the MCWC definition “[a]mong the problems a_1 through a_k there is at most one problem either not or wrongly solved.’ Then this will lead to a score of $k-1$ points,” the League will utilize the following alternative formulation: [a]mong the problems a_x through a_k there is at most one problem either not or wrongly solved.’ Then this will lead to a score of $k-x$ points. Thus, all of the following performances would result in a score of 60: (a) 60 correct, then 2 incorrect; (b) 2 incorrect, then 60 correct; and (c) 1 incorrect, 30 correct, 1 incorrect and 30 correct.

- F. Season Structure and Playoffs: Each season will consist of twelve head-to-head match-ups. At the conclusion of the season, the top twelve finishers, determined by win-loss record, will qualify for the playoffs. Any ties in the standings will be resolved by seeding competitors according to the competitors' win-loss record in total tasks during League play.

The playoffs will follow a standard bracket format with four byes and no reseeding between rounds. The playoffs will follow the same format as regular-season match-ups except: (a) the points required to win the matchup will gradually increase during each round; and (b) matches will not be terminated early if the leading competitor gains a certain advantage. During the first round of the playoffs the required point margin to win the match-up will be forty (40), in the quarterfinals it will be fifty (50), in the semifinals it will be sixty (60), and in the championship it will be one-hundred (100). Each round is expected to occur over the span of one week. During playoff weeks, after each thirty minutes of calculation time, a ten minute break will be held.

The League will have two seasons per year during years when the MCWC is not held and one season during years when the MCWC is held.

- G. Qualifying Standard Attempts and Tournaments: During the first two weeks at the conclusion of the League regular season, the Association will host "qualifying standard attempts." Any calculator who did not participate in the League may request up to ten (10) total standard attempts, with a maximum of five attempts in one category. Registration for qualifying standard will begin approximately three weeks prior to the conclusion of the League's regular season. Qualifying standard attempts will be scored and treated the same as standard attempts made by League competitors during the season. Qualifying standard attempts must be scheduled with the Association and are subject to availability.

After qualifying standard attempts are held, the League will hold five mini-tournaments – one for each MCWC surprise task as well as division. Any competitor who finishes with one of the twelve highest scores in a standard category at the conclusion of qualifying standard attempts qualifies for the mini-tournament in that task. During the mini-tournament, all competitors will receive two attempts to complete the task during each round subject to the below, with the competitor with the lowest best score being eliminated. The number of tasks will increase to three when there are only three participants remaining and five when there are only two participants remaining.

When there are only three competitors remaining in the standard tournament, a simultaneous "finals" will be scheduled with the three competitors for the purpose of determining gold-silver-bronze in that category. During earlier rounds of the standard tournament, competitors must schedule their attempts with the association. Any

competitor who is unable to schedule their tasks within a seventy-two hour period may be deemed to forfeit that round.

- H. Generation of Surprise Tasks: The referee for each match-up is responsible for generating surprise tasks through the use of a software or program approved by the Board of the Association. There are three fundamental rules governing surprises tasks: (1) all questions must be capable of being displayed and answered without knowledge of English language; (2) all questions must be capable of being solved through the use of the four basic arithmetic operations; and (3) no advanced knowledge of formulas must be required to be competitive in the task. For purposes of (3), if a task could technically be solved without knowledge of a formula, but a formula makes solving the task significantly more efficient, then the task is not an eligible task. Note that knowledge of a “process” is not the same as knowledge of a “formula.”
- I. Generation of Match-Ups and Order of Tasks: At the beginning of each season, the Association will generate weekly match-ups through a random generator. The match-ups will then be posted on the Association website.
- J. Role and Duties of Referees: Any individual is eligible to serve as a referee. Referees can volunteer for the role by contacting the Association and providing information regarding their availability. The Association is then tasked with assigning referees to matchups. If either competitor objects to a specific referee for their match-up, that competitor must either: (1) identify an alternative referee acceptable to both competitors; or (2) contact the Association with an explanation of their objection. It will be the referee’s responsibility to coordinate with the two competitors to find a mutually agreeable time to complete the weekly match-up.

The referee is responsible for documenting (1) the time and accuracy recorded in standard tasks; and (2) the points obtained in surprise tasks, and transmitting such information to the Association.
- K. Publication of Statistics: The Association will maintain on a website a list of statistics and season standings that will be updated weekly. At a minimum, such information will include: (1) a leaderboard for each standard task that displays the top performances in each standard task; (2) overall standings; and (3) week-by-week matchup results.
- L. Inability to Schedule Match-Up: In the event that the referee is unable to schedule a match-up between two competitors during a given week due to the unavailability of one or both competitors, it is the referee’s discretion to: (1) forfeit the match on behalf of the competitor who was unable to compete; or (2) award a tie if the failure to schedule the match was materially attributable to both competitors.
- M. Appeals and Misconduct: Any competitor may appeal any result or decision to the Association. Such appeal must include a detailed explanation of the complaint. The

Association will ultimately have full authority to determine appropriate responsive action.