**EMC2 2013 Online Tournament**

Welcome to the first annual EMC2 online tournament! The following document has important instructions for both coaches and students. Questions? E-mail us at [exetermathclub@gmail.com](mailto:exetermathclub@gmail.com).

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# General Rules

* The 2013 EMC2 Online Tournament will take place on Saturday, January 26th—the same day as the regular tournament.
* As with the on-site tournament, teams consist of up to 4 students.
* The tests will be the same as those on-site. (The only exception this year will be the Puzzle Round, an experimental round in this year’s on-site tournament that will not be factored into official rankings.)
* While all answer entry and scoring will take place online, **we still expect that all students taking the contest will be proctored in person by an adult, preferably a teacher.**
* Teams will be given a time interval during which to take the test. Please reference the website for detailed start/end times.

# Instructions for Coaches

### Before the Competition

* Register an account at [www.exeter.edu/emc2](http://www.exeter.edu/emc2). If you have done so before, you do not need to do so again.
* Register your teams online after logging into your account. You may register an unlimited number of teams for the online tournament, and teams may be added or deleted online. **Registration and team changes will close at 9AM EST on the day of the competition.**
* Please make sure that you set a team password as well as a password for each individual on your team. **Students will need access to their individual/team passwords in order to submit their answers.**
* Encourage your students to familiarize themselves with the rules and forms of answer submission. There is a sample answer form online which can accessed by clicking “Online Tournament.”
* Students may not use foreign language dictionaries during the test. **International teams should contact us before hand for an official sheet of translated words which may be distributed to students.**

### Day of the Competition

* Check that students do not have calculators or other prohibited aids. **S**tudents may have access to the test questions, answer sheets, plain scratch paper, and a copy of these instructions during the test in addition to writing utensils. No other references, dictionaries, books, notes, calculators, pocket organizers, slide-rules, abaci, calculator wrist watches, or any other kind of computational aid are allowed during the competition.
* **In particular, students may not have access to computers or laptops while taking the test.** They should write down their answers on the scratch paper and they will be submitted after the round.
* As the same tests are used both on-site and online, tests will be available in coaches’ accounts for printing at the times posted in the schedule on our website.
* Included below is a set of instructions to be read to students prior to each round. **You may not answer any questions once the round begins.**
* It is up to you to time each round. We recommend issuing time warnings to students during each round. Do not allow students to leave in the middle of rounds, although you may give them breaks between rounds.
* **For the guts rounds, note that students should be given only 1 set of 3 problems at a time (in order). Students may not receive the next set until they have submitted the previous one, and may not revisit previous sets once they submit their answers.**
* *Coaches will submit answers online after each round – each coach should confirm the answers they submit with their students.*

### After the Competition

* Sit back and relax! Full score reports for each round will be available on your accounts shortly after the conclusion of the competition.
* Protests should be lodged via email to [exetermathclub@gmail.com](mailto:exetermathclub@gmail.com) on the day of the competition. *All protests must be submitted before* ***midnight of the contest day***.

# Instructions for Students: Answer Submissions

* Check the website and the section *Grading* below for rules on acceptable answers. **All answers should be, simplified, fractions reduced, and denominators rationalized.**
* **Do not include units with your answer.**
* The system automatically assigns each team and student an ID. Coaches should use these, along with passwords they can set for each team/student, to log in and submit answers.
* When taking the tests, students can enter answers in many different forms. There is a sample answer blank online for students to familiarize themselves with answer submission before the competition begins. Here are some guidelines on entering answers:
  + To change the form of the answer, students should **click into the box that they want to change** and press the correct button to the right of the box.
  + Students should first format their answer. Once the answer is in the desired form, the student can enter the correct numbers into each box and press the “Submit Answer” button. **Note that you should only be entering numbers in by hand. All other formatting—including square roots and parentheses—should be taken care of using the buttons available.**
  + This “Submit Answer” button can be pressed as many times as desired and only the last answer will be saved.
  + Note that our program may apply slight changes to the order of pieces of your answer without changing its value—for example, 3+π may be changed to π+3. (Don’t worry—both of these will be marked correct.)
  + Note that it is possible to obtain answer forms that may not make any practical sense. If the program seems to be displaying incoherent answers/forms, it is likely because you have tried to nest too many pieces. **If all else fails, press the “Clear Answer” button, which will allow you to start over. However, note that this will also clear any answer you have previously saved.**
* Some detailed explanations on what the buttons mean:
  + “Add sum element:” for sums such as 3+π or π+1+√2.
  + “Add product element:” for products such as 3π or 2√2. Note that √8 will not be accepted in place of the latter.
  + “Add list element:” for problems with multiple answers. This will appear in the form (*entry 1)* AND (*entry 2*), etc. The order in which you enter multiple answers does not matter.
  + “Add constant:” for constants π*, e*, and *i.* Note that you should first select the constant from the drop-down, then click into the box where you wish to place it, then click the button.
  + “Add interval:” for answers involving ranges. This will appear in the form ANSWER > *(entry*), etc.
  + “-tuple:” for ordered pairs (2-tuples), ordered triplets (3-tuples), etc. such as (0,1) or (1,2,3). You will first need to enter an integer to the left, then click into the box, and then press the button.
* **After submitting answers, we recommend that you reload the answer submission page once, to guarantee that the answers in our database match those which you want to submit.**
* You answers will automatically be graded and scored by our system. Results and score reports will be release shortly after the conclusion of answer submission.
* Good luck!

# Instructions (to be read to students)

### Individual Speed Test

You are about to take the Individual Speed Round. This round is designed specifically to test your ability to answer questions quickly. You have 20 minutes to solve 20 problems by yourself. Each problem is worth 3 points each, for a total of 60 points per test per student. This round makes up 20% of the overall score.

There are no laptops, calculators, graph paper, rulers, compasses, protractors, or reference tools or materials allowed on any round of the test, except for pencils, pens, and scratch paper.

Write all of your answers on the provided answer sheet, making sure your student ID number, name, and team ID number are on the sheet. All answers must be written in the form specified: all fractions should be written as improper (not mixed) fractions in lowers terms. All denominators should be rationalized and all radicands should be divisible by the square of any prime. No decimals should be written, with the exception of answers representing money, which should be written to the nearest hundredth. Answers containing mathematical constants such as pi should not be approximated but rather written in terms of the constant. Any ordered pairs must be written as such, complete with parentheses and separated by commas. Illegible or ambiguous answers will be marked wrong.

You may not talk or leave the room during the round, including to go to the bathroom, though you may leave between rounds. If you wish to go to the bathroom, do so now. I also cannot answer any questions about the problems or the round itself.

### Individual Accuracy Test

You are about to take the Individual Accuracy Round. This round is designed more specifically to test your ability to solve problems accurately. You have 30 minutes to solve 10 problems by yourself, worth 9 points each, for a total of 90 points. This round makes up 30% of your team’s overall score.

The same rules about answer forms, talking, leaving the room during the test, and laptops/calculators etc. still apply.

### Team Test

You are about to take the Team Round. You have 45 minutes to solve 10 problems worth 30 points for a total of 300 points, 25% of your team’s overall score. You may work together and talk at a reasonable volume during the entire round.

The same rules about answer forms, talking, leaving the room during the test, and laptops/calculators etc. still apply.

**Guts Rounds (In the case that Guts Rounds not offered for online, Team Test will count as 50% of your team’s overall score)**

You are about to take the Guts Round. You have 75 minutes to solve 24 problems for a total of 300 points, 25% of your team’s overall score. You may work together and talk at a reasonable volume during the entire round. The point values of each problem increases with every round, as does the overall difficulty.

You will be handed one set of three problems at a time; upon submitting solutions to these problems, you will be given the next set of three problems. You will not be able to revise previous answers after submitting, even if you submit all eight sets before time ends.

The same rules about answer forms, talking, leaving the room during the test, and calculators etc. still apply.

# Grading

Answers must be simplified and exact unless otherwise specified. For example, 22/7 and 3.14 are not acceptable substitutes for pi. Rational numbers should be given in lowest terms. Radicals must be simplified if possible, so that the radicand contains no fractions and is not divisible by the square of any prime. Denominators should be rationalized, and correct mathematical notation must be used. There is no partial credit for problems. Ordered pairs must be written as (a,b) with parentheses. **No calculators are allowed on any round.**

# Round Formats

**Round Number of Problems Time Points per Problem**

Individual Speed Round 20 problems 20 minutes 3 points each

This round stresses the ability to solve problems quickly. 60 points are possible per individual, totaling 240 points per team.

Individual Accuracy Round 10 problems 30 minutes 9 points each

This round stresses problem solving skills. 90 points are possible per individual, totaling 360 points per team.

Team Round 10 problems 45 minutes 30 points each

During this round, each team works together on more difficult problems. 300 points are possible per team.

Guts Round 24 problems 75 minutes 6-18 points each

Problems are given in eight sets of three. Teams work together on one set at a time with no time restriction on the amount of time they can spend on each set. When the team turns in a set, they receive the next one immediately, and can no longer return to previous sets: grading at the on-site competition is done in real time and displayed on a scoreboard in front of the room. Teams have 75 minutes to complete as many problems as they wish (they can spend less time on each problem to cover more, or more time on each to ensure better accuracy). The problems each round are worth 6, 8, 10, 12, 14, 16, 16, and 18 points, respectively. There are 300 points available per team.

*The four rounds can be viewed, taken and submitted between 11 AM and 6 PM, Eastern Standard Time; a detailed schedule of when each round will be released is published on our website. Please plan your testing schedule accordingly. DO NOT DISCUSS THESE PROBLEMS BEFORE THE END OF THIS TIMEFRAME.*

# Thanks

We would like to extend special thanks to Jane Street Capital and Art of Problem Solving for helping publicize the competition and providing prizes for the competitors.

Also, we would like to thank the Exeter math faculty for their gracious assistance in problem writing, and especially Mr. Feng.