



**Overview** Each of the five rounds consists of seven questions drawn from a variety of non-calculus topics in high school mathematics. The questions are listed more or less in order of increasing difficulty and are worth a total of fourteen points. Students write their answers in the space provided next to each question. Contestants are allowed 40 minutes to complete the contest, during which time they may not collaborate or use any outside aids such as calculators, texts, graph paper, ruler, or compass.

**Two levels** The Mandelbrot Competition is offered at both a regional and a national level, the latter being significantly more difficult than the former. Coordinators that have enrolled their schools in both levels will need to decide at the outset of the year which students will participate at which levels. In general, the national level is intended for students who expect to qualify for the AIME; it is designed to challenge even the strongest contestants. Keep in mind that once the first round has been completed, students may move down from the national to regional level tests (keeping their cumulative scores), but not vice-versa.

**Preparation** The morning of the competition (or no sooner than a day or two in advance) the school coordinator should remove the appropriate original from the manilla envelope and make a sufficient number of copies of the contest for all participants. Any number of students may take part, as long as all students take the contest on the same day (preferably at the same time) under the supervision of a proctor. At the conclusion of the time period proctors should collect all test papers and scrap work; these should be retained until Friday afternoon at the end of the official contest week. Students should also refrain from discussing the problems until this point.

**Contest procedure** Distribute plain white scrap paper and copies of the contest, face down. On your signal, have students fill in their names and begin work. At the conclusion of the 40 minute time period announce "Pencils down" and collect the papers. Please wait until after the students have departed to score the papers, then update the score sheet(s) with students' scores for that round. Schools with many students participating should make sufficient copies of the score sheet prior to the first round. In addition, schools competing at both levels should track regional and national contestants on different score sheets. To report scores, visit [www.mandelbrot.org](http://www.mandelbrot.org) and select the **Enter scores** link on the left sidebar. *Do not mail in individual tests or scores.* At the end of the official contest week you may return papers, distribute solutions, and discuss questions with students.

**Scoring** The questions are worth either 1, 2, or 3 points, depending on their difficulty. Responses which are clearly equivalent to the answer in the key, such as 3.25 for  $13/4$ , or  $1/\sqrt{2}$  for  $\sqrt{2}/2$ , should be accepted. Otherwise no credit is to be awarded. Any appeals, such as an alternate interpretation of a problem or a disagreement with the solution in the key, should be made in writing and sent via US mail or email to Greater Testing Concepts. We will make judgments and corrections as quickly as possible and notify all coaches by email of any appeals that are granted. We welcome alternate solutions or other feedback on the tests; we publish these notes in our newsletter, The Mandelbrot Memo.