

## The Growing Purple Comet!

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During the week of April 14–16, 2008, over 7000 middle and high school students from around the world logged onto the web site at <http://purplecomet.org> to participate in the Purple Comet! Math Meet, a free, online, team mathematics competition. This was the sixth running of the contest now co-sponsored by the University of Wisconsin–Whitewater and the University of Texas at Dallas.

Each participating team of one to six students had an adult sponsor who logged onto the Purple Comet! web site and registered the team. Then at any time during the contest week, the sponsor started the team's clock, which allowed the team to view the contest problems and submit answers. For the middle school contest, teams had 60 minutes to work on 15 problems, and for the high school contest, teams had 90 minutes to work on 25 problems.

All problems have non-negative integer answers. Some are fairly routine, such as:

*Find the greatest prime factor of the sum of the two largest two-digit prime numbers.*

Others are extremely challenging:

*Circle B, which has radius 2008, is tangent to horizontal line A at point P. Circle  $C_1$  has radius 1 and is tangent both to circle B and to line A at a point to the right of point P. Circle  $C_2$  has radius larger than 1 and is tangent to line A and both circles B and  $C_1$ . For  $n > 1$ , circle  $C_n$  is tangent to line A and both circles B and  $C_{n-1}$ . Find the largest value of  $n$  such that this sequence of circles can be constructed through circle  $C_n$  where the  $n$  circles are all tangent to line A at points to the right of P.*



Each contest contains several problems specifically designed to be worked by teams of students as they easily break up into sub-problems, which can be assigned to different students.

The contest is the brainchild of three collaborators: Titu Andreescu, former coach of the USA International Mathematical Olympiad team and current director of AwesomeMath, Jonathan Kane, regular contributor to the American Invitational Mathematics Exam, and Bennette Harris, web development expert. The contest originated in 2003-2004 when Andreescu spent a year in Whitewater as a visiting scholar. For each contest Andreescu and Kane write the problems and Harris maintains the web engine that handles team registrations, presents the contest, collects, scores, and displays the results.

The contest's team format, online delivery, round-the-clock availability, ease of registration, and zero cost make the Purple Comet! Math Meet stand out as unique among academic competitions. Because the competition is free, many teachers register multiple teams; some even arrange for all of their students to participate. The team format encourages students to discuss problem-solving strategies and time management, which makes the contest more appealing to groups of students traditionally less interested in individual competitions. The full 24-hour availability of the contest during the contest week allows teams to participate before, during, or after school or during math circle activities on the weekend. This also allows for international participation, and students from 13 countries participated in the 2008 contest.

Plans for the future of the contest include providing translations of the contest problems into several languages, providing automated award certificates and certificates of participation to the students, expanding the contest week to include weekend days, and allowing teams of students (or adults, for that matter) to practice by working old contests under normal competition conditions. The next contest is scheduled for a full week starting at midnight UTC (Greenwich time) on Monday morning April 27 and running through midnight UTC on Sunday night May 3, 2009. 🌐

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