



# Math League News

■ **Our Calculator Rule** Our contests allow both the TI-89 and HP-48. You may use any calculator without a QWERTY keyboard.

■ **Use the Internet to View Scores or Send Comments** to [comments@mathleague.com](mailto:comments@mathleague.com). At [www.mathleague.com](http://www.mathleague.com) you can view scores before they arrive in the mail!

■ **Dates of Final HS Contest and Algebra Contest** Our final contest of this school year is March 24 (with an alternate date of March 17). In addition, this year happens to be the 15th year of our annual April *Algebra Course I* contest. There's still time for your school to register! Go to [www.mathleague.com](http://www.mathleague.com).

■ **2009-2010 Contest Dates** We schedule the six contests to be held four weeks apart (mostly) and to end in March. Next year's contest (and alternate) dates, all Tuesdays, are Oct. 20(13), Nov. 17(10), Dec. 15(8), Jan. 12(5), Feb. 23(16), and Mar. 23(16). If you have a testing or other conflict, right now is a good time to put an alternate date on your calendar!

■ **Rescheduling a Contest and Submitting Results** Do you have a scheduling problem? If school closings or testing days mandate contest rescheduling, our rules permit you to use an alternate contest date. Try to give the contest the week prior to the regularly scheduled date, so the results can still be submitted on time. Report your scores by Friday of the official contest week. If scores are late, attach a brief explanation. Late scores unaccompanied by such an explanation will not be accepted.

■ **End-of-Year Awards** Engraving of awards begins March 31st. We give plaques to the highest-scoring school in each region and to the 2 schools and the 2 students with the highest totals in the entire League. *Winning schools must submit their results to our Internet Score Report Center by March 31st.* Results submitted later cannot be used to determine winners. A teacher once asked, "Has there been any thought to using enrollment figures to divide the schools into two divisions? Personally, I don't care whether we ever receive any team recognition, as my students enjoy the mathematical challenges provided." Our groupings are not organized to "even out" the competition. Competition is one feature of our academic enrichment activity, but enrichment should be the main goal. Only a few schools can expect to win, but all schools can profit.

■ **General Comments About the Contest** Jeff Irwin said, "Excellent contest! Lots of fun and discussion had by all." Richard Serrao said, "Another job well done!" Cyndee Hudson said, "Everyone was able to get satisfaction from this test – from 9th through 12th graders. Thanks for another great selection." Jennifer Chan said, "Thanks for the interesting questions." Rita Singh said, "My students love writing the contests ... thanks for putting them together." Dr. Jesse W. Nash said, "Great set of questions – they left many of my best students scratching their heads." JoAnn Roesch said, "Thank you! Both my students and I enjoyed the contest." Dr. Peter S. Simon said, "Thanks for another very interesting contest." And, finally, Kathy Erickson forwarded this comment from her students, an homage to Kunio Kato: *Thank you, my pencil. Thank you, Math League. Thank you, calculation. ... Domo arigato, Mr. Roboto.* We think that just about says it all.

■ **Question 5-1: Comment** Many of our advisors thought that the wording of Question 5-1 was confusing. Jonathan Clapp said, "Two members of my team read the first question as requiring two folds of the paper, rather than simply one. A cursory reading might lead to this interpretation, but a thorough examination of the problem should lead to a clear conclusion. Isn't this often the issue with problem-solving?" Kathy Erickson had at least one student who made the same mistake, and she asks, "Why mention the crease? Was this a reference to an origami activity? Is an understanding of paper-folding terminology expected of students?" Brian Meermans said, "The intention was to fold the paper in half once, but the vernacular of crease versus fold can be taken both ways."

■ **Question 5-4: Comment** Jennifer Chan said, "Students learn how to do #4 in grade 12, so our grade 9-11 students didn't know how to solve this question ... Hope you could give questions that are applicable to students in general." Expressing a similar sentiment, Rita Singh said, "On this one, my grade 9s, 10s and 11s couldn't do #4 since they haven't studied logs."

■ **Question 5-5: Comment, Appeal (accepted), and Alternate Solution** Mark Luce said, "As is usual with me, I loved [this] geometry problem." Barbara Kurdziel asked, "Some of my students wrote 0.7854. Is this answer acceptable?" We accept any answer correct to 4 significant digits, so yes, this answer is acceptable. Brian Meermans suggests an alternate solution in which trigonometry is used to find the radii of the two circles, so that the areas of the circles can be calculated. He used the knowledge that cutting the central angle formed by radii going to adjacent vertices in half results in an angle measuring  $180/2009$  degrees.

■ **Question 5-6: Alternate Solutions** Dr. Peter S. Simon proposes a solution using a Venn diagram. He creates two overlapping circles, representing the numbers of students with A's in music and math respectively. Assigning variables to each of the three sub regions thus created, he sets up equations to take advantage of the numerical probabilities given in the question to find the answer. Student Jenny Shen submitted a similar Venn diagram solution in which she assigns a value of  $12x$  to the universe of students to make the calculations more straightforward. Robert Melczarek, Scott Lambert, and Benjamin Dillon all submitted variations on an alternate solution taking advantage of the laws of probability. Using the notation that  $P(A|B)$  represents the conditional probability of event A given event B, as Benjamin Dillon puts it, "Let event X = 'student has an A in math' and Y = 'student has an A in music.' We are given  $P(X) = 1/6$ ,  $P(Y) = 5/12$ , and  $P(X|Y) + P(Y|X) = 7/10$ . We are looking to find  $P(X \text{ and } Y)$ . Since the laws of probability state that  $P(X|Y) = P(X \text{ and } Y)/P(Y)$  and  $P(Y|X) = P(X \text{ and } Y)/P(X)$ , we can substitute to get  $P(X \text{ and } Y)/(5/12) + P(X \text{ and } Y)/(1/6) = 7/10$ . Once we solve this,  $P(X \text{ and } Y) = 1/12$ ."

## Statistics / Contest #5

Prob #, % Correct (all reported scores)

|     |     |     |     |
|-----|-----|-----|-----|
| 5-1 | 82% | 5-4 | 71% |
| 5-2 | 79% | 5-5 | 18% |
| 5-3 | 57% | 5-6 | 14% |