Math League News

■ **Use the Internet to View Scores or Send Comments** to comments@mathleague.com.

■ **Contest Registration and Books of Past Contests** Register for next year by mail or on the internet right now! Renew now so you don't forget later! *You may ask us to bill you this fall.* We sponsor an *Algebra Course I Contest* and contests for grades 4, 5, 6, 7, and 8. Use the enclosed form to register for contests or to **Order Books of Past Contests**. Also, keep an eye on our website, as we plan to roll out new products for next year, including new contest offerings!

■ **2013-2014 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 October 15 (Oct. 22), November 12 (Nov. 19), December 3 (Dec. 10), January 14 (Jan. 21), February 11 (Feb. 18), and March 11 (Mar. 18). *Do you have a testing or other conflict?* If so, right now is a good time to put the alternate date on your calendar!

■ **Test Security Procedures** Students are expected to sign the honor pledge posted on our website, affirming that they "will neither give nor receive help with any of the Math League Contest questions either before or during any of the Math League Contests." Of course, in the end contest security is really a cooperative effort. Schools should do whatever they can to prevent premature disclosure of questions and/or answers. For our part, we are always monitoring the results for any suspicious outcomes, which we then investigate thoroughly.

■ **End-of-Year Awards and Certificates** Symbols identify winners. We ship plaques to the advisors. Errors? Write to *Math Plaques, P.O. Box 17, Tenafly, NJ 07670-0017.* Identify the award, contest level, your name, and the school's name and address. The envelope for Contest #5 contained Certificates of Merit for the highest scoring students overall and in each grade for the year. Do you need extra certificates for ties? If so, send a **self-addressed, stamped envelope large enough to hold certificates (you need to use *TRIPLE* postage)** to *Certificates, P.O. Box 17, Tenafly, NJ 07670-0017.* (Please allow one week.)

■ **General Comments About the Contest (and the Year)** Timothy Smith said, "Thanks for a great year." Dave Ollar said, "These 6 tests were all high quality. Thanks." Mark Luce said, "Very nice final contest." Dick Gibbs said, "I like Contest 6." Benjamin Dillon said, "Thank you again for such great enrichment through the year. Excellent questions."

■ **Question 6-1: Comment** Dave Ollar points out, "On #1 the difference between the squares of 2 consecutive whole numbers is always the sum of the 2 numbers."

■ **Question 6-2: Appeal (Denied)** Justin DeRosa appealed on behalf of a student who did not write parentheses around the pair of numbers in the answer. Unfortunately, without parentheses the answer cannot be given credit.

■ **Question 6-3: Comments** Margaret Hoffert said, "One of our students commented that the wording for Question 6-3 was confusing. We're used to tournaments in which all the teams (in this case 4) would play in one round. The question sounded like 28 games were played." Mark Luce said, "As someone who has run many chess tournaments, I particularly liked the third problem!"

■ **Question 6-4: Comments** Benjamin Dillon said, "I really wanted to award a point to the student who noticed that 'isosceles' was misspelled in 6-4." Fair comment, Benjamin. We do our best to avoid such errors, but let's face it. That's a really hard word.

■ **Question 6-5: Comment and Appeals (Denied)** Dick Gibbs said, "#5 is a great problem!" Justin DeRosa appealed once again on behalf of a student who did not write parentheses around the pair of numbers in the answer. As was the case for Question 2, without parentheses the answer cannot be given credit. Another advisor asked, "Unless I am misreading the question aren't (7,7) and (3,1) correct answers to the question? There may be other solutions as well. I had students give each of these answers and did not check for others because the question specified only one other answer was possible. I marked both students wrong and told them I would contact you." Those additional answers must be based on a misreading of the question, as 21/7 and 21/3 are not in lowest terms as required explicitly by the terms of the question.

■ **Question 6-6: Comments** Fred Harwood said, "I like the concept of providing a proof for #6 to create a problem-solving 'blog' community. 5 and 6 pushed me hard. I didn't finish 6 in the time frame although I did remember the $4\times18 = 6\times12$ secant rule." Professor Mel Hochster of the University of Michigan proved the Method II solution the following way when he was a student at Stuyvesant HS in New York City many years ago: draw the perpendicular chords. Label their intersection P. Let $AP = 4$ and $PB = 18$. Let $CP = 6$ and $DP = 12$. Draw AC and BD. Clearly $AC = \sqrt{4^2+6^2}$ and $BD = \sqrt{12^2+18^2}$. Arc AC + arc $BD = 180°$; slide arc AC around the circle until A falls on D. Now BC is a diameter and CAB (or CDB) is a semicircle, and the diameter is the hypotenuse of a right triangle whose legs are AC and DB. This clearly generalizes. Deborah Ott sent in a solution from one of her students, David Xu, that is virtually identical in its approach. Dick Gibbs sent in another proof of the Method II solution to this question using, "the not-well-enough-known fact that, if angle A subtends a chord of length C in a circle of diameter D, then $\sin(A) = C/D$. Let chord XY meet chord WZ (at right angles) at P, with X, Z, Y, and W arranged clockwise around the circle. Let $XP = a$, $PY = b$, $WP = c$, $PZ = d$, and let X' be the point diametrically opposite X...Angles XYW and YWZ are complementary. By our not-well-enough-known fact, $\sin(XYW) = WX/D$ and $\cos(XYW) = \sin(YWZ) = YZ/D$. So we have $(WX/D)^2 + (YZ/D)^2 = 1$. The result follows because $WX = \sqrt{a^2+ c^2}$ and $YZ = \sqrt{b^2+d^2}$." Interesting proofs were also submitted by David Robert Etler, student of Michele Colon; by Joshua Palmer, student of Chris DeVeau; and by Philip Weiss, student of Ricardo Alonso. All three of these students used the idea of plotting the circle on the coordinate plane.

Statistics / Contest #6

Prob #, % Correct (*all reported scores*)

6-1	74%	6-4	31%
6-2	70%	6-5	33%
6-3	69%	6-6	8%