Math League News

■ **Use the Internet to View Scores or Send Comments** to comments@mathleague.com. You can see your results at *www.mathleague.com*!

■ **Dates of Final HS Contest and Algebra Contest** Our final contest of this school year is March 12 (with an alternate date of March 19). In addition, this year happens to be the 31st year of our annual April *Algebra Course I* contest. There's still time for your school to register! Go to **www.mathleague.com**.

■ **2024-2025 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. 14), December 10 (Dec. 17), January 14 (Jan. 21), February 11 (Feb. 18), and March 11 (Mar. 18). Have a testing or other conflict? Now is a good time to put an alternate date on 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 after the regularly scheduled date. 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 April 1st. 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 Match 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.

■ **Misspelled Student Name?** An advisor wrote to us to request that the spelling of a student's name, which he had entered incorrectly for previous contests, be changed. We do not make such corrections, because you can! Any advisor in this position should return to the Score Report Center and click on "Late Submissions" for whichever contest has a name or score that needs correcting.

■ **General Comment About Contest #5** Lisa Borenstein said, "the last problem seemed extremely hard but many students scored a 5 at our school." Robert Morewood said, "Thanks for another inspiring contest, with not just one, but two trig-related problems for my senior students!"

■ **Question 5-1: Comment** Robert Morewood said, "Reading is still a problem! One student successfully found the number of integers which were the AREA of such a square."

■ **Question 5-3: Comment** Robert Morewood said, "Some students specialized to a SQUARE with the given property, allowing for fewer unknowns. (Since such a square IS a rhombus.)"

■ **Question 5-4: Comment** Robert Morewood said, "One student delightedly presented her solution featuring a partial Eratosthenes Sieve - very visual and convincing for the other students."

■ **Question 5-5: Comment** Robert Morewood said, "Curious that those who don't notice the reversal of sine/cosine from the usual, getting k = 55 instead of 35, still get the correct answer!"

■ **Question 5-6: Comments, Appeals (Rejected), and Alternate Solution** Olivia Rea said, "The whole team gave a collective groan when they saw the answer to #6. Even though none of them got it right, we loved the question." Sam Koski said, "What a diabolical problem! Very understandable (after you see solution) yet only a few students got it right. We have a saying in geometry 'I gave up without drawing a line' IGUWDAL We have a new saying 'I gave up without rotating a triangle' IGUWRAT." Jon Graetz said, "#6 was incredible! I wish I had written that one!" Deanna Abromowitz said, "Clever problem 6. My students did not see the shorter solution. Many used trig and it took lots of time." One advisor said, "I noticed in problem 5-6, there are no degree symbols on the problem. The degree symbols are present in problem number 5 and on the answer key for problem 6, but I'm wondering if some students were confused and used radians since there were no degree symbols." In Question #5-6 we use the "*m*" notation before the name of each angle, which by convention indicates that what follows is the measure of the named angle in degrees. The degree symbol would be redundant in this context. For question #5, the degree symbol is included since we did not specify "measure" through the use of the "*m*" notation.

There were several appeals on behalf of students who responded to the question with a trigonometric expression, some of which were quite baroque. These appeals included from explicitly "half-hearted" to extremely zealous advocacy. Advisors submitting such appeals include Chris van Benthuysen, Theresa Blaisdell, Travis Bower, Brett Goodrich, Jon Graetz, Peter Knapp, Kevin Raney, After careful consideration, the final decision of the review panel is that such responses will NOT be given credit.

The key provision in our appeals philosophy that underlies this ruling is: "Since the goal of the problem writer is to clarify the problem intended, it is incumbent on the solver to both solve the (non-trivial) problem presented and to make all reasonable simplifications where failure to do so would indicate possible lack of knowledge. Many appeals attempt to circumvent one or both of the solver's responsibilities. If asked to find the positive square root of 225, the answer 'the positive square root of 225' is unacceptable since it is not an answer to the intended problem. The question could have been 'Express, as a base ten Arabic numeral, the positive square root of the number whose base ten Arabic numeral representation is 225.' The first wording is preferred, and it is incumbent on solvers to understand the intent. Answers such as $30\sin 30°$, $15 + \log (1)$, $15(1^3)$, $15(-1)^2$, $-1^2 + 16$, and $(-1)^3 + 16$ leave similar doubts about the solver's knowledge, doubts that do not accompany answers such as 15 or 30/2." We recognize that there is a debate to be had over whether a student can be considered to have made "all reasonable simplifications" in this case when leaving trig functions in an answer (that is numerically equivalent to the correct answer), or whether leaving the trig functions "indicates a possible lack of knowledge." Some compelling arguments in favor of acceptance were made, but the appeals committee has decided that the relative ease of simplifying $\sin 30°$ (the example given explicitly as unacceptable in our policy) vs $\sin 10°$ (one of the trig expressions in students' submitted answers) does not render the two situations qualitatively different enough to justify a different outcome.

Several different alternative solutions involving trigonometry were submitted. One student used a combination of the law of sines and Heron's formula. Other reported approaches included the use of the law of cosines or of the difference identities.

Statistics / Contest #5

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

Prob #	% Correct	Prob #	% Correct
5-1	71%	5-4	63%
5-2	67%	5-5	31%
5-3	56%	5-6	8%