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.

■ Our Internet Score Center All students whose scores you report must have been tested at exactly the same time. Don't list students from any later class period. Instructions for submitting scores appear on each contest envelope. Scores you enter may be reviewed at any time by returning to the Internet Score Center. About 3 weeks after a contest, scores appear on our Web site, *www.mathleague.com.* Late scores must be accompanied by a brief explanation of the reason for lateness.

■ Send Your Comments to comments@mathleague.com

■ Contest Dates Future HS contest dates (and alternate dates), all Tuesdays, are Nov 16 (9), Dec 14 (7), Jan 11 (4), Feb 22 (15), & Mar 22 (15). (Each alternate date is the preceding Tuesday.) For vacations, special testing days, or other *known* disruptions of the normal school day, please *give the contest on an earlier date.* If your scores are late, please submit a brief explanation. We reserve the right to refuse late scores lacking an explanation. We sponsor an *Algebra Course I Contest* in April, as well as contests for grades 4, 5, 6, 7, & 8. See *www.mathleague.com* for information.

■ Not Yet Received Your HS Contest Package? Phone 1-201-568-6328 so we can reship. If you just recently got the contests, *please take Contest #1 as soon as possible, even if it's late!*

■ Carefully Check Your Contest Package Without opening any contest envelope, please check that the remaining envelopes are numbered 2, 3, 4, 5, and 6. If you're missing a contest envelope, e-mail *dan@mathleague.com* with your name, the school's name, the full school address, and the number of the contest envelope you're missing. We'll mail you another set of contests right away.

■ Eligibility Rules Only students officially registered as students at your school may participate. That's our rule.

■ Authentication of Scores To give credibility to our results, we authenticate scores high enough to win recognition. Awards indicate compliance with our rules. Please have students read the *Selected Math League Rules* on the back of this sheet and then sign a sheet to confirm knowledge of the rules. *Keep* the signed copies. Do *not* send them to us unless we request authentication from you.

■ General Comments About the Contest Marsha Platnick said, "My little group of mathletes and I love doing these contests. ... We all agree that we are learning material that cannot be taught at this level in high school classes." Stephen Raff said, "Keep up the good work!!" Garrett Hageman said, "I don't know if this is just the students being rusty at the start of a new year, but this first test seemed quite difficult!" Bo Jackson said, "Math League is awesome!!!" Denes Jakob said, "We have enjoyed Contest #1; the questions were excellent, and they have generated some good mathematical discussions." Erik Berkowitz said, "Thank you — I thought this was a nice assortment of problems!" Robert Morewood said, "Thanks for anther thought provoking contest." Maria Gale said, "Great test as usual." Ginny Magid said, "We thought this was an excellent first contest — something for everyone from the entering 9th grader to the graduating 12th grader. Thanks!" Timothy Baumgartner said, "Thanks for a fun contest." Mark Luce said, "Looking forward to future contests!"

■ Question 1-1: Comments This was one of the lowest ever percentages correct for Question 1-1, and many advisors reported on the probable reason. Robert Morewood said, "It is amazing how many students forget that 1 is not prime!" Jill Chittendon echoed the same point, saying "Many thought 1 was prime ... tricky for a first question!" Timothy Baumgartner said, "I can't believe how many students thought that 1 is a prime number. D'oh!!" Mark Luce said, "I was disappointed at the number of students who were counting 1 as a prime number!" On the other hand, Jon Mormino said, "This strikes me largely as a vocabulary issue: most students who missed this problem did so because they did the question properly but with a wrong assumption. Not a huge deal, but students were disappointed. Thanks for an otherwise great contest."

■ Question 1-2: Appeal (Denied) Donald Brown said, "The definition of a 'Perfect Square' in our Algebra I Textbook (Glencoe) is any number with a rational square root. This definition would make 1000.1 squared or 1000.001 squared, etc. valid answers for Question 2." While that is one possible definition of the term 'perfect square,' in this case the use of that definition would result in a question with no answer, as there would be no single smallest perfect square greater than 1 million.

■ Question 1-4: Comments and Appeal (Accepted) Jeff Marsh said, "What if I wanted to buy one candy from the candy store in Question #4? That would not be possible, since you say the cost of each candy is 3.5 cents. Must one only buy candies in even numbers?!" Trudy Thompson made the same point, saying, "Most students thought this was a trick question because it didn't make sense to have a piece of candy costing 3.5 cents." Eric Berkowitz asked, "Based on the wording of question 1-4, should I assume that '\$.49' or '\$0.49' are NOT acceptable?" Keith Calkins raised a similar point, saying, "[these answers] do answer the question 'how many cents?' since a cent is a hundredth part of a dollar and units were given." We are granting credit for either of those responses, which we read as "49 cents."

■ Question 1-5: Comment and Alternate Solution Eric Berkowitz said, "I especially liked the simplicity of the solution to 1-5." Robert Morewood had a student who, "started counting sequences beginning '123,' then '124,' then '125,' ... and got 6+5+4+3+2+1 for all sequences beginning '12.' Proceeding to sequences beginning '13,' she got 5+4+3+2+1. Sequences beginning '14' give 4+3+2+1, et cetera. All sequences beginning with '1' total: (6+5+4+3+2+1)+(5+4+3+2+1)+(4+3+2+1)+(3+2+1)+(2+1)+1. Moving on to sequences beginning with '2' produces something similar: +(5+4+3+2+1)+(4+3+2+1)+(3+2+1)+(2+1)+1. Continuing: +(4+3+2+1)+(3+2+1)+(2+1)+1 +(3+2+1)+(2+1)+1 +(2+1)+(1) +(1) =6(1)+5(3)+4(6)+3(10)+2(15)+1(21)=126 (Students who have seen Pascal's triangle should notice the connection ...)."

■ Question 1-6: Comments, Appeal (Accepted), and Alternate Solutions George Reuter said, "I was especially grateful for a problem that COULD be solved using technology but didn't HAVE to be solved with technology. Since the problem could be solved by trigonometry or by geometry, it allows us to show how there are often multiple ways to solve a problem. Thanks!" Warren Tucker had a similar reaction, saying, "I liked that my Geometry students could use their newly learned triangle congruence knowledge and that my Calculus students could recall SOH-CAH-TOA." Mark Luce said, "As always, I love the clever geometry problems, and was pleasantly surprised at the number of my students who solved Problem 1-6." Marcia Roth said, "I thought the last problem was also solved somewhat easily using the right triangle trigonometry." Several advisors, including Liz Quinn, Steve Lifer, Sean Kaiser, and Corinne Saxanoff, asked whether decimal responses were acceptable. We will accept 23.32 since it has 4 significant digits and is correctly rounded. Similarly, we accept 23.324 since this is correctly rounded to 5 significant digits. Our general policy is to allow approximate answers provided they have at least 4 significant digits and are correctly rounded. There were quite a few alternative solutions put forth by various advisors. Richard Wright said that, "My successful students on this problem all used the laws of sines and cosines"; Sharon Roberts also had a student take this approach. Mary Wands, Eric Berkowitz, Margaret Hoffert, Denes Jakob, Jack E. Josey, Christine Benson, Sharon Roberts, Cecilia H. Doody, Ed Groth, and Joel Patterson (and in many cases their students) all suggested finding half the supplement of arctan (15/8), then using the sine or other trigonometric functions to get the final answer.

Statistics / Contest #1

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

1-1	64%	1-4	46%
1-2	85%	1-5	22%
1-3	57%	1-6	24%