



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.

■ **Send Your Comments** to comments@mathleague.com.

■ **Contest Dates** Future HS contest dates (and alternate dates), all Tuesdays, are 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.

■ **Regional Groupings** Within guidelines, we try, when possible, to honor regional grouping requests for the next school year.

■ **What Do We Print in the Newsletter?** Space permitting, we print every solution and comment we receive. We prepare the newsletter early, so we can use only what we have at that time.

■ **How Do I Change the Spelling of a Student Name?** Please note that an advisor can always return to the Score Report Center to change the spelling of a student's name or to correct a score. Accordingly, we try to stay out of the loop on such changes. Any advisor noticing a need for such changes should feel free to make them directly.

■ **Can I Add Additional Names and Scores to an Earlier Contest?** One advisor asks, "Since some students did very well in the second contest, can we add their names (with the scores) to the Contest 1 report?" We always allow adding additional names and scores to an earlier contest as long as the additions do not affect the team total previously submitted for the earlier contest.

■ **General Comments About the Contest** Martin McMulkin said, "I really appreciate you running these contests ... my stronger math students really enjoy them." Mark Luce said, "My students, as a group, thought this second contest was substantially more challenging than the first. ... As their teacher, I say thank you for a challenging contest!" Ted Heavenrich said, "Keep up the good work. The consensus was that this contest was easier than most." Wes Carroll said, "As always, thanks for a great competition!" Fred Harwood said, "Students sure found this one harder. I enjoyed it personally." Dr. Peter S. Simon said, "Thanks for a very interesting contest, as usual!" Robert White said, "I believe this is the best set of problems overall that I've seen from your group." Joel Patterson said, "Tough stuff!" Matt Beeken said, "Thanks for another fun contest." Christiana Weiner said, "We still love the questions!" Carol Baldwin said, "You have made the questions this year much more difficult. It is turning off my 9th graders." We would like all of our advisors to know that we attempt to provide at least two questions on each contest that ninth graders should be able to solve, while still presenting all students with a variety of topics that will enrich their mathematics education. Along the same lines, another advisor asked, "Do you have any other contests that are formatted the same, but are easier? My students are only getting 2 problems correct currently. Any suggestions? This would still be at the high school level." While it is not in the same format, we do offer an annual algebra contest consisting of 30 multiple-choice questions. Students might enjoy the change of pace of this contest.

■ **Question 2-1: Comment and Appeal (Denied)** Bain Cameron said, "I had two students provide the answer ' $x = -50$,' rather than the simple '-50.' Unless you judge otherwise, I will not award credit for the response. My reasoning is two-fold. First, any response providing the value of x is wrong because the value of x itself is not requested. (Thus, $x = -1$ and $x = -5$ do not receive credit, nor does $x = -50$.) Secondly, -50, while the correct value for the expression in question, is not the correct value for x ; substituting -50 for x in the intended expression (which we would never do in the determination of credit for an answer!) gives an incorrect result (22,000)." Bain's analysis of the situation is exactly right, and for both of the reasons he mentions an answer of " $x = -50$ " cannot be counted as correct.

■ **Question 2-3: Appeal (Denied)** Kimberly Foltz and Paul Kustos each appealed on behalf of students who gave answers expressing the perimeter in terms of x . Unless a question such as this explicitly asks for a perimeter in terms of x , the solver must assume that a numerical answer is required, so no credit should be given.

■ **Question 2-4: Alternative Solutions, Comment and Appeal (Denied)** Robert Morewood said, "this question can be answered by solving a system of 3 linear equations in 4 unknowns, which most graphing calculators can do in a single (row reduction) command ... however, I would be surprised (and impressed) if any student actually entered in their calculator: RREF([[5, 7, 3, 0, 4.41] [6, 2, 1, 0, 2.37] [3, 17, 7, -1, 0]])." He also noted that one of the teachers at his school particularly enjoyed this question and after answering it proceeded to find all integer cent solutions for the prices. Matt Beeken appealed on behalf of a student who answered 8.49002 without mentioning units or using a dollar sign. Matt appropriately marked the answer as incorrect. Although only 4 significant digits are required for an answer to be correct, an answer with 6 significant digits must be correctly rounded to that number of digits. This answer is not correct in its final digit, which would have to be 0. The lack of a dollar sign also invalidates the response since there is no way of knowing what "8.49" represents.

■ **Question 2-5: Calculator Use on Future Contests (We Request Your Input), Alternative Solution, and Appeals (Denied and Accepted)** Edward Groth found the answer by setting up the equation $(ax^2 + bx + c)(dx^2 + ex + f) = x^4 + 4$. He noted that since all values must be integers, a and d must be 1 (or -1, changing the signs of all the coefficients in the final answer) and created a system of 4 equations with 4 variables. Fred Harwood appealed on behalf of a student who answered with the negations of the two polynomials listed in the official key; that answer would be acceptable. Patricia Langevin and Martin McMulkin each appealed on behalf of students who listed $(x^2 - 2i)$ and $(x^2 + 2i)$ as factors. Since the question asked that the factors be quadratic polynomials with integral coefficients (and the definition of the coefficients of a polynomial includes the constant term), that answer is incorrect. Complex numbers are not integers, so while the factorization is correct over the field of complex numbers, it is not correct in this context. Of course, the issue is rendered moot in that we have awarded credit for this question to every participant in the contest. Many of our advisors were concerned that this question unfairly favored students with access to calculators such as the TI-89, which can automatically do the factoring in seconds. This issue was raised by Mark Daubenmier, Ted Heavenrich, Wes Carroll, Benjamin Dillon, Kimberly Foltz, William Gottschalk, and Rachel Lawrence. This issue of calculator use is a tough one. On the one hand, pro-calculator people have pointed out that students are generally allowed to use calculators in math classes, that tests such as the SAT and ACT now allow calculator use, and that banning the use of calculators might discourage certain students from participating. On the other hand, anti-calculator people point out that in the context of a math contest prohibiting the use of calculators might make philosophical sense, that there is no way to control for disparity in calculator access, and that certain other tests and contests now prohibit calculator use. We note that the MAA contest committee disallowed calculators on the AMC exam three years ago. Among the reasons they gave for this decision were the difficulty in preventing students from using calculators as communication devices and the disparities among the different types of calculators students had available. The GMAT and GRE tests also do not allow the use of calculators. So? What do you think?! We welcome any and all comments about calculator use on future contests. Please let us know how you feel about this issue by emailing us at comments@mathleague.com. We will make a decision about future use of calculators before the end of this school year.

Statistics / Contest #2

Prob #, % Correct (all reported scores)

2-1	87%	2-4	27%
2-2	78%	2-5	NA%
2-3	42%	2-6	11%