# 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. You can see your results at *www.mathleague.com.*

**■ Upcoming Contest Dates & Rescheduling Contests** Contest dates (and alternate dates), all Tuesdays, are February 10 (February 17) and March 10 (March 17). If **vacations, school closings, or special testing days** interfere, please reschedule the contest. Attach a brief explanation, or scores will be considered unofficial. We sponsor an *Algebra Course I Contest* and contests for grades 4, 5, 6, 7, and 8. Get information and sample contests at *www.mathleague.com.*

**■ 2026-2027 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 20 (Oct. 27), November 17 (Nov. 24), December 15 (Dec. 22), January 12 (Jan. 19), February 9 (Feb. 14), and March 16 (Mar. 23). Have a testing or other conflict? Now is a good time to put an alternate date on calendar!

**■ What Do We Publish?** Did we not mention your name? *We use everything we have when we write the newsletter.* But we write the newsletter early, so sometimes we're unable to include items not received early enough. We try to be efficient! Sorry to those whose solutions were too "late" to use.

**■ T-Shirts Anyone?** We're often asked, "are T-shirts available? The logo lets us recognize fellow competitors!" Good news — we have MATH T-shirts in a variety of sizes at a **very** low price. Use them as prizes for high or even perfect scores, or just to foster a sense of team spirit! The shirts are of grey material and feature a small, dark blue logo in the "alligator region." A photo of the shirt is available at our website. There's one low shipping charge per order, regardless of order size. To order, use our website, *www.mathleague.com.*

**■ Contest Books Make A Great Resource** Have you seen our contest books? Kids love to work on past contests. To order, use out website, *www.mathleague.com.*

**■ Administer This Year's Contests Online** Any school that is registered for any of our contests for the 2025-2026 school year may now register at http://online.mathleague.com for the 2025-2026 Online Contests at no cost. The advantages of administering the online versions of our contests rather than the paper and pencil ones are that you do not have to grade your students' papers and that you do not have to submit any scores at our Score Report Center ~ these tasks are done automatically for you when your students take our contests online. If you decide to use this free service, you must set up your account and set the day you are going to administer each contest at least one day in advance of the actual contest date.

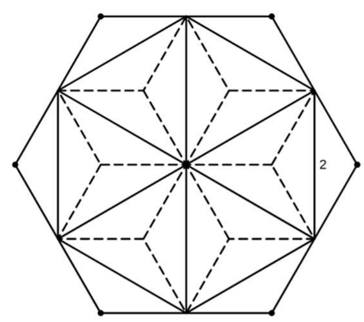
**■ General Comment About Contest #4:** Robert Morewood said, "The students found this even more challenging than I expected." Peter Knapp said, "Fun test!"

**■ Question 4-1: Comment** Robert Morewood said, "I was disappointed to see some students give answers LESS than 2026 for #1!"

**■ Question 4-3: Comment** Robert Morewood said, "The official solution states: 'Any attempt to input a 16th integer would create a sequence of 4 consecutive integers.' True for your suggested 15 integer list, but not so simple to check for all of the remaining 15503 sets of 15 positive integers less than or equal to 20. Probably better to point out that at most 3 integers can be taken from each of those 5 sets: {1,2,3,4}, {5,6,7,8}, {9,10,11,12}, {13,14,15,16}, {17,18,19,20}; for a maximum of at most 15 integers. Finish with your list of 15 integers."

**■ Question 4-4: Comment and alternate Solution** Robert Morewood said, "My calculus students liked #4: $x^2+y^2=r^2 \Rightarrow dy/dx=-x/y$ and $y=x^2-9 \Rightarrow dy/dx=2x$. So at the point of tangency: $-x/y = 2x \Rightarrow x = 0$ (with only 1 $y$-value, for only 1 point) OR $y = -\frac{1}{2} \Rightarrow x^2 = 9-\frac{1}{2}$ (with 2 $x$-values) $\Rightarrow r^2 = x^2+y^2 = 9-\frac{1}{2}+(-\frac{1}{2})^2 = 8\frac{3}{4}$."

**■ Question 4-5: Appeal (Accepted), Comment and Alternate Solution** Maria Simoes appealed on behalf of students who, "did not rationalize the denominator and therefore left an exact answer of 24/sqrt(3) instead of the rationalized answer of 8*sqrt(3)." Since the students' answer is mathematically equivalent to the correct answer (and does not trivialize the question), credit should be given. Robert Morewood said, "Many students divided the hexagon into 12 right triangles with middle side of length 2, in a variety of different ways. However, only one recognized that the angles force the short side to have length $2/\sqrt{3}$, for area $12(2/\sqrt{3}) = 8\sqrt{3} \neq 12$. One student almost gave an alternate solution for #5: The six equilateral triangles of side length 2 (each with area $\sqrt{3}$) from the official solution, plus 6 isosceles triangles, each equal one third of one of those equilateral triangles (connect the center of an equilateral triangle to all three corners making 3 congruent isosceles triangles). Hence $(6+6(\frac{1}{3}))\sqrt{3} = 8\sqrt{3}$. Alternatively, divide the figure into 24 identical congruent isosceles triangles, each with area $(\sqrt{3})/3$."




**■ Question 4-6: Comment and Alternate Solution** Nick Ponticello said, "Several of my students had clarifying questions about question 4-6. Could you help explain how the rounds in the tournament are played? Maybe provide an example of a round or two. Thank You!" Well, the first round will always be between the 7th–ranked players on each team, so let's call that round $A_7$ vs $B_7$. There are two possible outcomes: 1) If the player from team A wins, then $B_7$ has been eliminated – in that case, the second round will be $A_7$ vs $B_6$, who at that point are the lowest-ranked players on each team; OR 2) If the player from team B wins, then $A_7$ has been eliminated – in that case, the second round will be $A_6$ vs $B_7$, who at that point are the lowest-ranked players on each team. In other words, at each stage in the tournament, the player that wins a round will be playing in the next round, and they will play against the player from the other team ranked one higher than the player they just defeated. We hope that helps! Peter Knapp said, "While your solution was more elegant, I used #6 as a way to talk to my students about using 'stars & bars' for combinations with repetition. This becomes casework. If A7 wins, the 7 B team members totaled 0 victories – this becomes an $r$-combination with 7 categories and 0 selections – 6C0. As you work through each A team member winning the final match, you add 1 victory into those 7 categories (possibly re-using categories), and you add 6C0 + 7C1 + 8C2 + ... + 12C6."

## Statistics / Contest #4

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

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|---|---|---|---|
| 4-1 | 77% | 4-4 | 14% |
| 4-2 | 70% | 4-5 | 21% |
| 4-3 | 61% | 4-6 | 8% |