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.

■ Error on 2017-2018 Contest Application: Please note that an application for the next year of contests is included in the envelope for the fifth contest this year. Unfortunately, the application was erroneously marked as being for the current 2016-2017 year. Please do not hesitate to use this application! Simply cross off "2016-17" in the upper left corner and change it to "2017-18."

■ 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 7 (February 14) and March 14 (March 21). 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.*

■ 2017-2018 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 17 (Oct. 24), November 14 (Nov. 21), December 12 (Dec. 19), January 9 (Jan. 16), February 13 (Feb. 20), and March 20 (Mar. 27). 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.

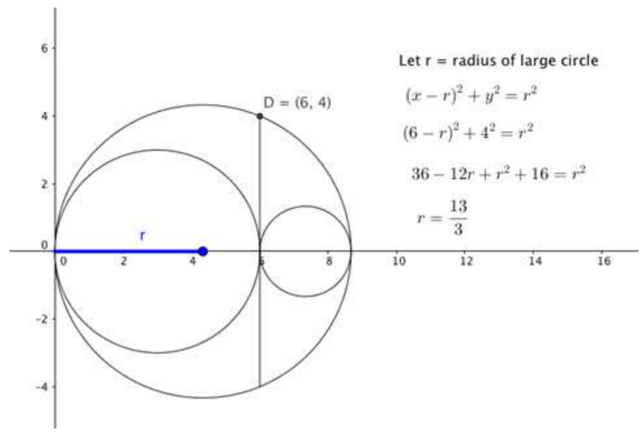
■ T-Shirts Anyone? We're often asked, "are T-shirts available? The logo lets us recognize fellow competitors!" Good news — we have MATH T-shirts in a variety of sizes at a **very** low price. Use them as prizes for high or even perfect scores, or just to foster a sense of team spirit! The shirts are 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 2016-2017 school year may now register at http://online.mathleague.com for the 2016-2017 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 Comments About Contest #4: Matthew Vea said, "My students have been thoroughly enjoying The Math League competition so far this year...In general, the quality and variety of this year's competition has been excellent, and my students are looking forward to the last two rounds."

■ Question 4-4: Alternate Solutions: Ed Groth presented an alternative solution in which he inscribed a right triangle in the largest, circumscribed circle. He drew the diameter through the centers of the two inscribed circles as the hypotenuse, and located the right-angle vertex where the chord intersects the top of the circumscribed circle. Using d as the diameter of the small circle, the Pythagorean theorem dictated that $(52) + (d^2 + 16) = (6 + d)^2$. Chip Rollinson had two students solve using the Pythagorean theorem in a coordinate geometry context (see diagram below), by locating at the origin the point at which the larger inscribed circle is tangent to the circumscribed circle. Calling the radius of the circumscribed circle r, a right triangle is formed such that $(6 - r)^2 + 4^2 = r^2$.



■ Question 4-5: Comment: Chip Rollinson said, "I love how the log in #5 didn't matter and can quickly reduce to an easier problem."

■ Question 4-6: Comment and Alternative Solution Mathew Vea said, "My students found the sixth problem from January's competition (4-6) to be daunting to solve by hand. Some students noticed that certain calculators, legal under The Math League rules, have a summation function that will calculate the summation given in the problem. My students feel that students with access to such a function have a distinct advantage over other students." Chip Rollinson said, "I felt this one was particularly difficult... especially without a calculator. My strongest student (who has qualified for the USAMO and USJAMO the last two years) spent about 24 of the 30 minutes on it. He got it but not without a lot of effort. Since it's not arithmetic, I didn't think of pairing up the terms. It makes sense <u>after</u> seeing the solution." Chip Rollinson also submitted an alternative solution, saying "For #6, a few students got it by playing around with their calculator and stumbling upon the pairings. One student, however, used his calculator in a very smart way. It was a TI-Nspire in 'Press-to-Test' mode so the sigma sum function was turned off. He noticed that the pi product function wasn't so he converted the sum to a product.

$$\sum_{n=1}^{1999} \frac{4^{\frac{n}{2000}}}{4^{\frac{n}{2000}}+2} = \ln\left(\prod_{n=1}^{1999} e^{\left(\frac{4^{\frac{n}{2000}}}{4^{\frac{n}{2000}}+2}\right)}\right)$$

What he didn't know was that TI-Nspires cannot process this particular sum BUT it can process the product! He actually calculated the product first and then took the natural log of the result. Very clever."

Statistics / Contest #4

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

4-1	64%	4-4	17%
4-2	70%	4-5	23%
4-3	82%	4-6	28%