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 December 9 (Dec. 16), January 13 (Jan. 20), February 10 (Feb. 17), & March 17 (Mar. 24). (Each alternate date is the Tuesday following the official date.) The alternate date for March 17 is March 24, and not March 25 as erroneously printed. For vacations, special testing days, or other *known* disruptions of the normal school day, please *give the contest on the following Tuesday.* 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.

■ **Carefully Check Your Contest Package—Disregard Incorrect "2013-2014" Designation** Without opening any contest envelope, please check that the remaining envelopes are numbered 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. Please note that the envelopes containing the six contests have the year's schedule printed on them. **While the schedule is correct, the heading has the wrong year.** Please disregard the "2013-2014" heading.

■ **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. We 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.

■ **Administer This Year's Contests Online** Any school that is registered for any of our contests for the 2014-2015 school year may now register at **www.online.mathleague.com** for the 2014-2015 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 will administer each contest at least one day in advance of the actual contest date.

■ **International Mathematics Competition at SUNY-Stony Brook** On August 2, 2015, students from North America and China will compete for individual honors. The event will begin in the morning with the competition, held from 9 AM to 12 Noon. The competition will consist of 10 individual questions and a 60-question, 45-minute speed round. This will be followed by lunch at the university, an awards ceremony, and a tour of the campus. Any student in grades 9 through 12 is eligible to participate. The cost to each participant is $185. Any student interested in participating in this event should send an email to dan@mathleague.com.

■ **General Comments About the Contest** Wes Loewer said, "Thanks for a good contest."

■ **Question 2-2: Appeal (Denied)** Margaret Hoffert appealed on behalf of a student who answered 2014! to this question. Since the question asks for the value of n, giving the value of $n!$ instead is incorrect, and the appeal was denied.

■ **Question 2-3: Appeal (Denied)** One advisor appealed on behalf of a student whose answer to this question was –4, saying "it doesn't say x and y are positive integers - are quotients and remainders (and long division and mod) only defined for positive integers? One student gave $x = -4$. If $y = -11/3$, then couldn't y/x have a quotient 47/12 with remainder 12?" In #2-3, the terms "quotient" and "remainder" have no meaning except when referring to integers. Since the quotient and remainder by definition must both be integers, the answer the student gave is incorrect and the appeal was denied.

■ **Question 2-6: Comments and Alternate Solutions** Michael D'Alessio said, "The problem does not reflect the solution in the answer key enough for me to feel this was a valid question. If we are looking for less than 5% of students to answer this correctly, you have succeeded." Edward Groth said, "I knew there would be a pattern somewhere. When I started seeing triangle numbers pop up in my early pencil-paper trials, I thought about Pascal's Triangle, so I wrote out the first 15 rows until I found where the pattern was - the diagonal starting with 1 - 10 - 55 - 220, until I got to the 6th one in that diagonal –5005. Sometimes math is brutally ugly, even when the 'best' solution is more simple and elegant. But, like trash collecting, sometimes you gotta get dirty to get the job done." Wes Loewer said, "Let a, b, c, d, e, and f be the six selected positive integers. Since the order doesn't matter, we can assume that $a < b < c < d < e < f$. The smallest values possible are $a = 1$, $b = 3$, $c = 5$, $d = 7$, $e = 9$, $f = 11$, while the largest possible values are $a = 10$, $b = 12$, $c = 14$, $d = 16$, $e = 18$, $f = 20$. Each variable must be at least 2 larger than the previous variable. To determine how many ways this can happen, just count them all up using nested summations, adding 1 for each time it occurs.

$$\sum_{a=1}^{10}\sum_{b=a+2}^{12}\sum_{c=b+2}^{14}\sum_{d=c+2}^{16}\sum_{e=d+2}^{18}\sum_{f=e+2}^{20} 1 = 5005$$

or in notation used by the TI-Nspire and HP-Prime:

∑(∑(∑(∑(∑(∑(1,*f*,*e*+2,20),*e*,*d*+2,18),*d*,*c*+2,16),*c*,*b*+2,14),*b*,*a*+2,12),*a*,1,10)

This method works fine on TI-Nspire, TI-Nspire CAS, HP-Prime, and HP-50g. Unfortunately, nested summations are not allowed on the TI-84+.

Statistics / Contest #2

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

2-1	92%	2-4	50%
2-2	62%	2-5	68%
2-3	43%	2-6	3%