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*!

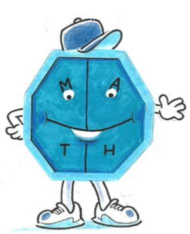
■ **Dates of Final HS Contest and Algebra Contest** Our final contest of this school year is March 19 (with an alternate date of March 26). In addition, this year happens to be the 26th year of our annual April *Algebra Course I* contest. There's still time for your school to register! Go to **www.mathleague.com**.

■ **2020-2021 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 13 (Oct. 20), November 10 (Nov. 17), December 8 (Dec. 15), January 5 (Jan. 12), February 9 (Feb. 16), and March 16 (Mar. 23). Have a testing or other conflict? Now is a good time to put an alternate date on calendar!

■ **Rescheduling a Contest and Submitting Results** Do you have a scheduling problem? If school closings **or testing days** mandate contest rescheduling, our rules permit you to use an alternate contest date. Try to give the contest the week after the regularly scheduled date. If scores are late, attach a brief explanation. Late scores unaccompanied by such an explanation will not be accepted.

■ **End-of-Year Awards** Engraving of awards begins March 27th. We give plaques to the highest-scoring school in each region and to the 2 schools and the 2 students with the highest totals in the entire League. *Winning schools must submit their results to our Internet Score Report Center by Match 31st.* Results submitted later *cannot* be used to determine winners. A teacher once asked, "*Has there been any thought to using enrollment figures to divide the schools into two divisions? Personally, I don't care whether we ever receive any team recognition, as my students enjoy the mathematical challenges provided.*" Our groupings are not organized to "even out" the competition. Competition is one feature of our academic enrichment activity, but enrichment should be the main goal. Only a few schools can expect to win, but all schools can profit.

■ **General Comments About Contest #5:** Denes Jakob said, "Thanks again for a fine contest; as always, it has generated some good math discussions."



■ **And the winner is...Mathscot!!** We here at Math League were thrilled by all the submissions to our contest to name our mascot. Thank you all. There were definitely some creative suggestions submitted! It wasn't an easy decision given the embarrassment of riches provided by all those submissions, but we felt that our little friend just looked like a Mathscot! The student who first submitted the winning idea has been notified.

■ **Question 5-2: Appeal (Denied)** Michael Oberle appealed on behalf of a student who answered 1010 on Question 5-2. Using this number as n would create a degenerate triangle with sides of 1010, 2020, and 3030. Unfortunately, that answer cannot be accepted. Our philosophy when it comes to the contests is that no one is out to trick anyone; math is not trickery. Where there is a non-trivial alternate interpretation, appeals are accepted. We do not, however, grant appeals based on trivialization without consideration of the non-trivial interpretation. Had the student answered each situation, degenerate and non-degenerate, he would have been given credit. The appeal has been denied.

■ **Question 5-4: Alternate Solution** Denes Jakob submitted an alternate solution to this question produced by one of her students using basic trigonometric functions. Let $2x$ be the vertex angle at the top of the figure and $180\text{-}2x$ be the supplementary vertex angle and let the base be $2b$. Draw the altitude. $\text{Sin}(x) = b/12$ and $\sin(90\text{-}x) = b/5$, or $b = 12\sin(x)$ and $b = \sin(90\text{-}x)$ So, $12\sin(x) = 5\sin(90\text{-}x)$ Because $\sin(90\text{-}x) = \cos(x)$. Therefore, $12\sin(x) = 5\cos(x)$. Or, $\sin(x)/\cos(x) = 5/12$, that is $\tan(x) = 5/12$. The altitudes are $H = 12\cos(x)$ and $h = 5\cos(90\text{-x})$, respectively. $H+h = 12\cos(x)+5\cos(90\text{-}x) = 12\cos x+5\sin x$, as $\cos(90\text{-}x) = \sin(x)$. Since $\tan(x) = 5/12$, then $\sin(x) = 5/13$ and $\cos(x) = 12/13$. Substituting, $H+h = 12\cos(x)+5\sin(x) = 12(12/13)+5(5/13) = 13$. This approach is quite clever and has the added bonus that it doesn't require the visualization of an altered version of the figure.

■ **Question 5-5: Comment and Alternate Solution** Benjamin Dillon said, "I didn't care for this problem. It favored students who had a number-factoring program on their calculator." Robert Moorewood submitted an alternate solution in which his student started from the prime factorization of the given product, finding that 92565 can be factored as 3x3x5x11x11x17. Those prime factors can be grouped to make pairs of 3-digit factors in only five ways: 121×765, 153×605, 165×561, 187×495, and 255×363. Of those, only 165x561 is the requested product of reversals. That is certainly another great way to look at it!

Statistics / Contest #5

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

5-1	77%	5-4	24%
5-2	51%	5-5	73%
5-3	52%	5-6	5%