
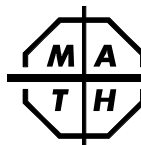


26. The average of any two integers whose sum is 144 is 72. Any two integers equidistant from 72 add up to 144. My favorite integer is 72. A) 31 B) 36 C) 48 D) 72	26. D
27. Last year I spent \$180 for 80 pairs of shades. That is \$2.25 per pair. This year I spent \$180 for 75 pairs. That is \$2.40 per pair or a price increase of 15¢ per pair. A) 15¢ B) 72¢ C) 96¢ D) 120¢	27. A
28. It took $318/60 = 5$ hrs. 18 mins. to drive. Working backwards, 5 hrs. before 5 p.m. was 12 p.m.; 18 mins. before 12 p.m. was 11:42 a.m. A) 10:42 a.m. B) 11:42 a.m. C) 12:42 p.m. D) 1:42 p.m.	28. B
29. I added three of the numbers 11111, 22222, 33333, 44444, 55555, 66666, 77777, 88888, and 99999. My sum was 66666, 77777, 88888, or 99999. Possible remainders when dividing by 11 are 6, 7, 8, or 9. A) 5 B) 6 C) 7 D) 8	29. A
30. I wrote numbers 1 to 9 using 9 digits. I wrote 10 through 53 (44 numbers) using 88 more digits, for a total of 97. I then wrote 54 and 55. A) 11 B) 17 C) 19 D) 21	30. C
31. The product of all the factors of 12 is $(1 \times 12) \times (2 \times 6) \times (3 \times 4) = 12 \times 12 \times 12 = 12^3$. A) 24 B) 18 C) 12 D) 8	31. C
32. Since 8 students got an A and 15 got a C or higher, the number getting Bs and Cs is 7. Since 10 got a B or lower, and 7 got Bs and Cs, and one got a D, there are 2 students who got an F. A) 1 B) 2 C) 3 D) 5	32. B
33. Since $2^2 \div 2^1 = 2$, $2^4 \div 2^3 = 2$, \dots , $2^{100} \div 2^{99} = 2$, the quotient is 2^{50} . A) 2 B) 2^{49} C) 2^{50} D) 2^{100}	33. C
34. The l.c.m. of 15 and 18 is 90, so every 90 seconds balls were rolled at the same time. There are 2640 seconds in 44 minutes, and $2640 \div 90 = 29R30$. Counting the balls rolled at 1:00 p.m., there were 30 times balls were rolled at the same time. A) 29 B) 30 C) 40 D) 44	34. B
35. The largest multiple of 8 less than 2018 is 2016. Subtract 8 49 times from 2016 to get 1624. From 2018 to 1624 is 395 numbers counted. A) 252 B) 395 C) 400 D) 1618	35. B

The end of the contest  6

Information & Solutions

Tuesday, February 19 (alternate date: February 26), 2019

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Directions for Grading


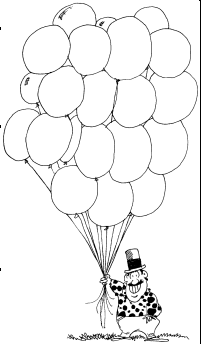
- Security and Solutions** Do not look at these solutions until after the contest. Detailed solutions appear in each question box, and letter answers are in the *Answers* columns on the right. You may copy this solution key and give a copy to every student who took this contest.
- Urgent Questions?** For appeals or answers to urgent questions, write to comments@mathleague.com or call 1-201-568-6328.
- Scores** Please remember that *this is a contest, and not a test*— there is no “passing” or “failing” score. Few students score as high as 28 points (80% correct). Students with half that, 14 points, should be commended.
- Awards & Results** The original contest package contained 5 *Certificates of Merit*—1 each for the 3 highest scoring students on the contest, plus extras for ties. **Do you need more Certificates of Merit?** If so, include your name, school, and school mailing address in a letter to: **Math Certificates, P.O. Box 17, Tenafly, NJ 07670-0017**, and include a self-addressed, stamped envelope (**three 1st Class stamps req’d.**) large enough to hold certificates. Only scores submitted to our Internet Score Report Center by Fri., March 8, 2019 can be used in our *Summary of Contest Results* newsletter, which will be posted online no later than Fri., April 12, 2019.
- Return of Student Papers** *Originals* of contest papers with scores of 30 or more *must* be held until June 1. *Copies* of these papers, and originals of all other papers, should be returned to students after grading. Students scoring 30 points or more must confirm an *understanding* of the contest rules by signing the *Selected Math League Rules* (on the colored sheet of information and rules that accompanied the contests). Keep this signed sheet with the original contests until June 1. Please do not mail these to the League unless we ask you to do so.

Twenty-one books of past contests, *Grades 4, 5, & 6 (Vols. 1, 2, 3, 4, 5, 6, 7)*, *Grades 7 & 8 (Vols. 1, 2, 3, 4, 5, 6, 7)*, and *High School (Vols. 1, 2, 3, 4, 5, 6, 7)* are available, for \$12.95 per volume, from Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.

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Steven R. Conrad, Daniel Flegler, Adam Raichel, and Jeannine Kolbush, contest authors

1. $(2018 - 20 - 18) + 2019 - 20 - 19 = 1980 + 1980 = 3960$. A) 0 B) 2000 C) 3960 D) 4000	1. C		
2. The number of red hats is half the number that are not red. A) 18 B) 54 C) 72 D) 108	2. B		
3. If the measures of the 2 smallest angles of a triangle were 30 and 31 degrees, the largest angle would be 119 degrees. A) 151 degrees B) 135 degrees C) 121 degrees D) 61 degrees	3. D		
4. $2000 + 18 = 20 \times 100 + 18 \times 1$. A) 1 B) 10 C) 18 D) 100	4. D		
5. If every English letter except A appeared exactly once, then A would appear $2018 - 25 = 1993$ times. A) 77 B) 78 C) 1992 D) 1993	5. D		
6. The product of 2 consecutive integers is even, and $182 = 13 \times 14$. A) 182 B) 195 C) 208 D) 221	6. A		
7. The number 6 has two prime factors, 2 and 3. A) 6 B) 8 C) 12 D) 15	7. A		
8. I have 5 coins consisting of pennies, nickels, and dimes. The least possible value is formed with 3 pennies, 1 nickel, and 1 dime. A) 5¢ B) 15¢ C) 16¢ D) 18¢	8. D		
9. The 3-digit area codes that can be made are 223, 232, 233, 322, 323, and 332. There are 6 in all. A) 4 B) 6 C) 9 D) 12	9. B		
10. The multiples of 10 that are factors of 100 are 10, 20, 50, and 100. A) 1 B) 2 C) 3 D) 4	10. D		
11. My team had to win a certain number of games to make it to the finals, and we won every 6th game we played. If my team qualified for the finals after our 96th game, we needed to win $96 \div 6 = 16$ games. A) 12 B) 16 C) 18 D) 90	11. B		
12. The common factors are 1, 3, 5, and 15. The greatest is 15. A) 1 B) 3 C) 5 D) 15	12. D		
13. Since $2^{400} = 16^{100}$, it is the product of exactly 100 sixteens. A) 25 B) 50 C) 100 D) 200	13. C		

14. If the play is 90 mins., the 2nd act is 30 mins. That leaves 60 mins. for the 1st and 3rd acts. The 1st act would be 40 mins. and the 3rd act 20 mins. or 20/90 of the play. A) 1/9 B) 2/9 C) 3/9 D) 4/9	14. B	
15. If I double my speed of 12000 m/hr., my new speed will be 24000 m/hr. Divide by 60 to get 400 m/min. A) 200 m/min. B) 400 m/min. C) 600 m/min. D) 2400 m/min.	15. B	
16. The perimeter of an equilateral triangle with integral side-lengths must be divisible by 3. Only choice C is divisible by 3. A) 2017 B) 2018 C) 2019 D) 2020	16. C	
17. The greatest of 10 consecutive positive integers is a prime number, so it could be 11. The sum of $2 + 3 + 4 + \dots + 10 + 11$ is 65. A) 65 B) 77 C) 127 D) 129	17. A	
18. If 2 balloons popped every 3 minutes, then 40 balloons popped in an hour. Since one-fourth is 40, three-fourths is 120. A) 40 B) 80 C) 120 D) 160	18. C	
19. The g.c.f. of $2^8 \times 3^8$ and 2^{18} is $2^8 = 4^4$. A) 2^2 B) 4^4 C) 6^6 D) 8^8	19. B	
20. The expression 100^{2018} can be written as the product $2^{2018} \times 5^{2018} \times 2^{2018} \times 5^{2018}$, a product of 4×2018 primes. A) 5×2018 B) 4×2018 C) 2×2018 D) 2018	20. B	
21. This is the number of integers between 15^2 and 16^2 . The number of integers between 225 and 256 is 30. A) 0 B) 1 C) 29 D) 30	21. D	
22. $\sqrt{9} + \sqrt{81} = 3 + 9 = 12 = \sqrt{144} = \sqrt{9+81+54}$. A) 0 B) 54 C) 90 D) 144	22. B	
23. Sully woke up at 6:50 a.m. on a Monday. For Sully to wake up 30 minutes earlier, it must be 6 days after Monday. The day 6 days after Monday is Sunday. A) Sunday B) Monday C) Tuesday D) Wednesday	23. A	
24. The product of all such factors of 21 is $(1 \times 21) \times (3 \times 7) = 21 \times 21$. A) 1 B) 2 C) 3 D) 21	24. D	
25. $(1234 \times 5 + 10) \div 5 = 1234 + 2$. A) 1234 B) $1234 + 1$ C) $1234 + 2$ D) $1234 + 3$	25. C	