
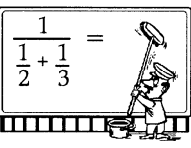
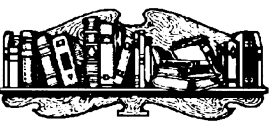




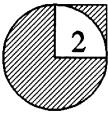
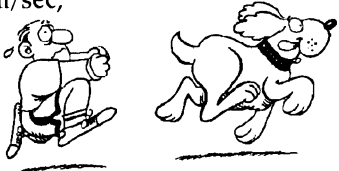

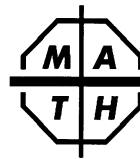


1. $11111 = 10101 + ?$ means that $? = 11111 - 10101 = 1010$. A) 101 B) 110 C) 1010 D) 110	1. C
2. Numbers and their reciprocals always have the same sign. A) negative B) positive C) prime D) 1	2. A
3. $3 \times \left(\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}\right) = 3 \times 1 = 3$. A) 0.6 B) 0.12 C) 3 D) 15	3. C
4. The area is a perfect square; so it cannot be a prime. A) even B) odd C) prime D) 1	4. C
5. $(1995 - 1994) \times (1994 - 1995) = 1 \times (-1) = -1$. A) -1 B) 1 C) -3990 D) 3990	5. A
6. $(1000 \times 0.01) + (100 \times 0.001) + (10 \times 0.0001) = 10 + 0.1 + 0.001$. A) 1.0101 B) 10.101 C) 11.1 D) 1.11	6. B
7. 1000 days is nearly $2\frac{3}{4}$ years = 2 years, 9 months.  A) October B) November C) December D) January	7. B
8. One-half of 1 thousandth = $\frac{1}{2} \times 0.0010 = 0.0005$. A) 0.5 B) 0.05 C) 0.005 D) 0.0005	8. D
9. Convert each to a decimal; or note that $\frac{17}{64} - \frac{16}{64} = \frac{1}{64}$. A) $\frac{3}{8}$ B) $\frac{5}{16}$ C) $\frac{9}{32}$ D) $\frac{17}{64}$	9. D
10.  $\frac{1}{\frac{1}{2} + \frac{1}{3}} =$ $\frac{1}{\frac{2}{3} + \frac{1}{3}} = \frac{1}{1} = 1$. Take the reciprocal to get $\frac{6}{5}$. A) $\frac{6}{5}$ B) $\frac{5}{6}$ C) 6 D) 5	10. A
11. If 20° is the vertex angle, the others are each 80° . If 20° is a base angle, the vertex angle is 140° . Choice B is not a possible angle. A) 20° B) 40° C) 80° D) 140°	11. B
12. $(10 \div 2) + (20 \div 4) + (40 \div 8) = 5 + 5 + 5 = 15 = 60 \div 4$. A) 15 B) 12 C) 5 D) 4	12. D
13. Bob has 12 books. Jane has half as many, so Jane has 6 books. This is 3 times as many as Sue has, so Sue has 2 books.  A) 2 B) 6 C) 8 D) 18	13. A
14. $(2+9)^2 = 11^2 = 121 = 2^2+9^2+? = 85+?$, so $? = 36 = 6^2$. A) 0^2 B) 6^2 C) 7^2 D) 11^2	14. B
15. $\frac{11+22}{22+44} = \frac{33}{66} = \frac{1}{2} = \frac{11}{22} + 0$. A) 0 B) $\frac{22}{44}$ C) $\frac{11}{44}$ D) 1	15. A

16. If I first increase five by one hundredth, and next I subtract one thousandth, I'll get $5 + 0.01 - 0.001 = 5.009$. A) 4.999 B) 4.099 C) 5.099 D) 5.009	16. D
17. Multiply first: $1+(1 \times 1)+(1 \times 2 \times 1)+(1 \times 1)+1 = 1+1+2+1+1 = 6$. A) 6 B) 8 C) 16 D) 32	17. A
18. If 40ℓ of maple sap are needed to make 1ℓ of maple syrup, then $\frac{1}{40} = 0.025 = 2.5$ percent of the sap is syrup. A) 0.025 B) 2.5 C) 25 D) 39	18. B
19. $100 \times 70 \times 50 = 10 \times 10 \times 70 \times 50 = (10 \times 70) \times (10 \times 50) = 700 \times 500$. A) 7000×5000 B) 700×5000 C) 700×500 D) 7000×500	19. C
20. Of 30 students, two-tenths got A's, so $0.2 \times 30 = 6$ got A's. A) 5 B) 6 C) 10 D) 20	20. B
21. 25 pennies + 50 nickels + 100 dimes = $\$0.25 + \$2.50 + \$10.00 = \$12.75 = 51$ quarters.  A) 7 B) 16 C) 46 D) 51	21. D
22. The least possible perimeter is $2+3+4 = 9$. Notice that you cannot make a triangle whose sides are 1, 2, and 3. A) 3 B) 6 C) 9 D) 12	22. C
23. 10% is $\frac{1}{5}$ of 50%, and $\frac{1}{5} = 20\%$, so 10% is 20% of 50%. A) 0.2 B) 5 C) 10 D) 20	23. D
24. The product of a positive number and its reciprocal is always 1. A) prime B) even C) 0 D) 1	24. D
25. The 1st area is $\frac{1}{2}(4)(1\text{st base}) = 2(1\text{st base})$. The total is $2(1\text{st base}) + 2(2\text{nd base}) + 2(3\text{rd base}) + 2(4\text{th base}) = 2(AD) = 20$.  A) 5 B) 10 C) 20 D) 40	25. C
26. If the average of 6 numbers is 7, these 6 have a sum of 42. If the average of all 7 numbers is 0, the 7th number is -42. A) -42 B) -7 C) -6 D) 0	26. A
27. The product is positive and has 50 factors of 7 in the numerator. A) 50×7 B) 7^2 C) 50×7^2 D) $(-7)^{50}$	27. D
28. Reducing, $\frac{88}{888} = \frac{11}{111}$, which does not reduce.  A) $\frac{1}{8}$ B) $\frac{1}{11}$ C) $\frac{11}{111}$ D) $\frac{1}{800}$	28. C

29. There are 8 such factors. They are 1, 2, 3, 5, 6, 10, 15, and 30. A) 6 B) 7 C) 8 D) 9	29. C
30. $2^4 + 4^2 + 2^4 + 4^2 = 16 + 16 + 16 + 16 = 64 = 8^2$. A) 8^2 B) 8^{12} C) 12^{12} D) 12^{64}	30. A
31. $17\% = 17/100 = 5/100 \times 17/5 = 5\% \times 17/5$. A) $\frac{5}{17}$ B) $\frac{5}{17}\%$ C) $\frac{17}{5}$ D) $\frac{17}{5}\%$	31. C
32. $2 \text{ hr } 59 \text{ min} - 1 \text{ hr } 31 \text{ min} = 1 \text{ hr } 28 \text{ min}$; and $1:41 \text{ P.M.} + 1 \text{ hr } 28 \text{ min} = 2:69 \text{ P.M.} = 3:09 \text{ P.M.}$ A) 3:09 P.M. B) 3:19 P.M. C) 12:12 P.M. D) 2:09 P.M. 	32. A
33. Only 0 is its own additive inverse, so there's one such integer. A) none B) one C) two D) three	33. B
34. The shaded region consists of ($\frac{3}{4}$ of the circle) + (square - $\frac{1}{4}$ of the circle). This is $\frac{3}{4}(4\pi) + (4 - \frac{1}{4} \times 4\pi) = 3\pi + 4 - \pi = 2\pi + 4$. A) $4\pi - 4$ B) $2\pi + 4$ C) $3\pi - 4$ D) π 	34. B
35. Take products: $(0.5 \times 1) < xy \leq (1 \times 2)$, or $0.5 < xy \leq 2$, so $xy \neq 0.5$. A) 2 B) 1.5 C) 1 D) 0.5	35. D
36. Pattern: square roots of 18-digit integers have 9-digit integer parts. A) 999 999 999 B) 99 999 999 C) 9 999 999 D) 999 999	36. A
37. The average is the integer midway between 1 and 1995: it's 998. A) 997.5 B) 998 C) 998.5 D) 999	37. B
38. When running at J m/sec, John needs x/J secs to run x m. In the same time, at D m/sec, the dog can run $(D)(x/J) = Dx/J$ m. A) $\frac{Dx}{J}$ m B) $\frac{Jx}{D}$ m C) $\frac{DJ}{x}$ m D) $\frac{D}{xj}$ m 	38. A
39. Since $a^2 + b^2 = c^2$, $a^2 + b^2 + c^2 = c^2 + c^2 = 2c^2 = 800$, so $c^2 = 400$ and $c = 20$. A) $\sqrt{800}$ B) $\frac{1}{2}\sqrt{800}$ C) 25 D) 20	39. D
40. The lcm of the first 40 positive integers contains, as <i>additional</i> factors, only primes or powers of primes <i>not already</i> present in the first 30: 31, 37, and the fifth 2 which is a factor of 32; and $2 \times 31 \times 37 = 2294$. A) 1147 B) 2294 C) 36 704 D) 89 466	40. B

The end of the contest  **8**



Information & Solutions

Tuesday, February 7, 1995

Contest Information

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- **Solutions** Turn the page for detailed contest solutions (written in the question boxes) and letter answers (written in the *Answers* column to the right of each question).
- **Scores** Please remember that *this is a contest, not a test*—and there is no “passing” or “failing” score. Few students score as high as 30 points (75% correct). Students with half that, 15 points, *deserve commendation!*
- **Answers & Rating Scale** Math League’s contest problem books come complete with difficulty rating scales for each contest.
- **About Math League Contests** Each year the Math League sponsors math contests for grades 4, 5, 6, 7, 8, Algebra Course 1, and High School. Twelve books of past contests, *Grades 4, 5, & 6 (Volumes 1, 2, 3, & 4)*, *Grades 7 & 8 (Volumes 1, 2, 3, & 4)* and *High School, (Volumes 1, 2, 3, & 4)* are available, for \$12.95 each volume (\$19.95 Canadian), from Math League Press, P.O. Box 17, Tenafly, N.J. 07670-0017. Visit us on the web at <http://www.MathLeague.com/> or call (201) 568-6328 for more information on our books, software, and math contests.

