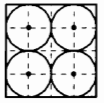
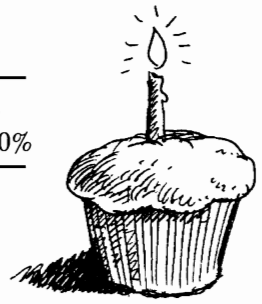
29. The 1st 12 won $12\times\$80 = \$960$. The next 20 won $20\times\$70 = \$1400$. The 32 contestants won an average of $\$2360\div32 = \$73.75$.
A) \$73.75 B) \$74.75 C) \$75.00 D) \$75.75 — **29. A**

30. $4^3\times4^3 = 4^{3+3} = 4^6$. A) 16^9 B) 16^6 C) 4^9 D) 4^6 — **30. D**

31. 4 such circles fit inside a square of side-length 4.

A) 1 B) 4 C) 5 D) 16 — **31. B**

32. Just as $1 - 0.9 = 0.1$, $0.1\% = 1.0\% - 0.9\%$.
A) 0.009% B) 0.09% C) 0.9% D) 10% — **32. C**

33. Change each answer choice to months. Since 6 years = 72 months, and 5 years ago I was 1 year old, choice A is correct.

A) 6 B) 7 C) 8 D) 12 — **33. A**

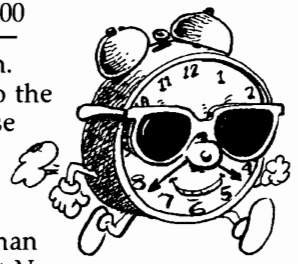
34. $\sqrt{81\times81\times81\times81} = \sqrt{81^4} = 81^2$, so $\sqrt{\sqrt{81\times81\times81\times81}} = \sqrt{81^2} = 81$.
A) 3 B) 9 C) 27 D) 81 — **34. D**

35. If a product is even, *at least* 1 factor must be even.
A) 2005 B) 2004 C) 1 D) 0 — **35. B**

36. 1/2 is one-fourth of 2, its reciprocal, so choice A is correct.
A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) 2 D) 4 — **36. A**

37. $21 = 3\times7$; $51 = 3\times17$; $81 = 3\times27$; $91 = 7\times13$. Other 5 are prime.
A) 4 B) 5 C) 6 D) 7 — **37. B**

38. $(301-1) + (302-2) + \ldots + (325-25) = (300)\times25 = 7500$.
A) 25 B) 2500 C) 5000 D) 7500 — **38. D**

39. Angle at 4:30 is 45°. Each min., the min. hand moves 6°, hr. hand moves 0.5°, so the angle increases 5.5°. The 8-min. increase is 44°, so the angle at 4:38 is only 89°.

A) 4:36 B) 4:37 C) 4:38 D) 4:39 — **39. D**

40. If $H+K+L+N = 2005$, then H is less than $2005\div4 = 501.25$. If $H = 498$, $H+K+L+N = 498+501+502+504 = 2005$. Since M and N are the middle of the alphabet, the average of all 26 letters is $(503+504)\div2 = 503.5$.
A) 491 B) 498 C) 503.5 D) 505.5 — **40. C**

The end of the contest **7**

Visit our Web site at http://www.mathleague.com

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

Information & Solutions

2004-2005 Annual 7th Grade Contest

Tuesday, February 22 (alternate date: February 15), 2005

7

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?** Call 1-201-568-6328.
- **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, *should be commended!*
- **Awards & Results** The original contest package contained 5 *Certificates of Merit*—1 each for the highest scoring student on each grade level, 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 (**2 stamps required**) large enough to hold certificates.* Only score reports postmarked by Fri., Feb. 25, 2005 , and received by Tues., Mar. 9, 2005 can be used in our *Summary of Contest Results* newsletter, which you'll receive no later than Tues., May 10, 2005.
- **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.

1. 84 players can split into $84\div6 = 14$ teams of 6 players and $84\div4 = 21$ teams of 4 players. There are 7 more teams of 4.
A) 5 B) 6 C) 7 D) 14 — **1. C**

2. $(0\times1) + (1\times10) + (0\times0) + 1 = 0 + 10 + 0 + 1 = 11$.
A) 0 B) 1 C) 3 D) 11 — **2. D**

3. The sum is 180°. The 3rd angle must be $180°-(20°+40°) = 120°$.
A) 60° B) 80° C) 90° D) 120° — **3. D**

4. $3456\times0.001 = 3.456$. This rounds up to 3.5.
A) 0.3 B) 3.4 C) 3.5 D) 34.6 — **4. C**

5. Since 720 minutes = $(720\div60)$ hours = 12 hours, my bad hair day began at 7:20 A.M.
A) 1:20 A.M. B) 7:20 A.M.
C) 12:00 P.M. D) 7:08 P.M. — **5. B**

6. The sum $= 5\times500 = 2500 = 10\times250$.
A) 25 B) 50 C) 250 D) 2000 — **6. C**

7. Since every number on the list is greater than the sum of its digits, all 90 numbers are greater than the sum of their digits.
A) 88 B) 89 C) 90 D) 99 — **7. C**

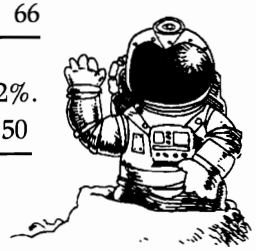
8. $1^3+2^4 = 17 = 1^3+4^2$. A) 1^4+3^2 B) 1^3+4^2 C) 1^2+4^3 D) 1^1+3^4 — **8. B**

9. There are 11 prime days in May: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, and 31.
A) 10 B) 11 C) 12 D) 13 — **9. B**

10. $(\frac{2}{3}\times\frac{3}{2})\times(\frac{4}{5}\times\frac{5}{4})\times(\frac{6}{7}\times\frac{7}{6}) = 1\times1\times1 = 1$. A) 1 B) 3 C) 6 D) 12 — **10. A**

11. Since 5 nickels = 1 quarter, 500 nickels = 100 quarters.
A) 100 B) 250 C) 500 D) 2500 — **11. A**

12. All side-lengths are equal, so the perimeter is divisible by 4.
A) 33 B) 44 C) 55 D) 66 — **12. B**



13. 3 of every 150 is the same as 1 of every 50. That's the same as 2 of every 100, which is 2%.
A) 2 B) 3 C) 5 D) 50 — **13. A**

14. $\frac{33}{50}$ cannot be reduced.
A) $\frac{9}{15}$ B) $\frac{21}{35}$ C) $\frac{24}{40}$ D) $\frac{33}{50}$ — **14. D**

15. $\sqrt{100} = \sqrt{36}+\sqrt{?} \Leftrightarrow 10 = 6+\sqrt{?}$, so $4 = \sqrt{?} = \sqrt{16}$.
A) 2 B) 4 C) 16 D) 64 — **15. C**

Go on to the next page ➠ 7

16. As shown, 2 squares with a common side form a rectangle. ☐☐
A) An octagon B) A hexagon C) A rectangle D) A triangle — **16. C**

17. Each of the 9 numbers in the first sum is 1 more than the number in the same position in the second sum.
A) 9 B) 10 C) 90 D) 100 — **17. A**

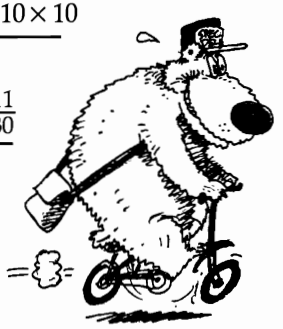
18. Uncle Bookworm eats 2 books a week, or 104 a year. Aunt Bookworm eats 1 book every 2 months, or 6 a year. Uncle eats $104-6 = 98$ more books than Aunt.
A) 20 B) 40 C) 80 D) 98 — **18. D**

19. The largest odd factor of 81 is 81.
A) 3 B) 9 C) 27 D) 81 — **19. D**

20. $\left(\frac{2}{3}\right)^3 = \frac{2\times2\times2}{3\times3\times3} = \frac{8}{27}$. A) 2 B) $\frac{6}{9}$ C) $\frac{8}{3}$ D) $\frac{8}{27}$ — **20. D**

21. To seat the most students, put the students in seats 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, and 25. That's 13 seated students.
A) 11 B) 12 C) 13 D) 24 — **21. C**

22. The smallest multiple of 10 that's greater than $9\times9 = 81$ is 90.
A) $9\times9+10$ B) 9.1×9.1 C) 9×10 D) 10×10 — **22. C**



23. $\frac{6}{5} - \frac{5}{6} = \frac{36}{30} - \frac{25}{30} = \frac{11}{30}$.
A) $\frac{1}{5}$ B) $\frac{1}{6}$ C) $\frac{1}{30}$ D) $\frac{11}{30}$ — **23. D**

24. The rear wheel's diameter is 6 cm more than the front wheel's. The rear wheel's circumference is $(d+6)\times\pi$ cm, which is 6π cm more than the front wheel's.
A) 3π B) 6π C) 9π D) 36π — **24. B**

25. All sides of a regular polygon have equal lengths.
A) square B) equilateral C) scalene D) isosceles — **25. B**

26. My age could be 8 and yours could be 16. When you divide 16 by 5, the remainder is 1.
A) 1 B) 2 C) 3 D) 4 — **26. A**

27. If a rectangle's perimeter is 30 cm, and its area is 56 cm^2, then the longer side's length is 8 cm, and the shorter side's length is 7 cm.
A) 1 B) 5 C) 20 D) 26 — **27. A**

28. Try some numbers. One set that works is 12 and 13. (The sum always exceeds the difference by twice the smaller number.)
A) 0 B) 6 C) 12 D) 48 — **28. C**

Go on to the next page ➠ 7