

26. Since 18 km per 60 minutes = 18/60 km per 1 minute = 0.3 km per 60 seconds, and 0.3 km = 300 m, he runs 300 m in 60 seconds, or 300/60 = 5 m in 1 second.

- A) 5 B) 6 C) 10 D) 18

27. $-5 \times 30 = -150$, $5 \times 20 = 100$, and $11 \times 14 = 154$.

- A) -150 B) -30 C) 100 D) 154

28. Since $1000/20 = 50$, 50 are multiples of 4 and 5. Since $1000/60 = 16.666 \dots$, 16 are also multiples of 6; $50 - 16 = 34$.

- A) 34 B) 42 C) 50 D) 58

29. $\frac{3}{5} : 6 = (5 \times \frac{3}{5}) : (5 \times 6) = 3 : 30 = 1 : 10 = 8 : 80$.

- A) $\frac{20}{9}$ B) $\frac{9}{5}$ C) 24 D) 80

30. If the average of these integers is 5, then their sum is 15, and the greatest possible value of the sum of their squares is $1^2 + 1^2 + 13^2 = 171$.

- A) 107 B) 149 C) 171 D) 197

31. Suppose Cody walked 10 km in 2 hrs. yesterday. Then today she wants to walk 15 km in 1 hr. Since her rate yesterday was 5 km per hr. and her rate today is 15 km per hr., that's a 200% increase.

- A) 200% B) 300% C) 400% D) 500%

32. $9^{18} - 3^{32} = 3^{36} - 3^{32} = 3^{32} \times (3^4 - 1) = 3^{32} \times 80 = 3^{32} \times 2^4 \times 5$.

- A) 5 B) 17 C) 19 D) 31

33. $3 \times 6 \times 9 \times 12 \times 15 \times 18 = 2^4 \times 3^8 \times 5$; the factors that are perfect squares are $2^2, 2^4, 3^2, 3^4, 3^6, 3^8, 2^2 3^2, 2^2 3^4, 2^2 3^6, 2^2 3^8, 2^4 3^2, 2^4 3^4, 2^4 3^6$, and $2^4 3^8$.

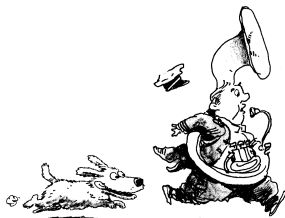
- A) 15 B) 14 C) 7 D) 6

34. Whatever box Bette checks 1st, the probs. are $\frac{2}{3}$ that she checks a different one on the 2nd form and $\frac{1}{3}$ that the 3rd form differs from the first two. So the final prob. is $\frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$.

- A) $\frac{1}{4}$ B) $\frac{1}{3}$ C) $\frac{2}{9}$ D) $\frac{3}{10}$

35. Each number in the sequence 105, 112, 119, \dots , is a multiple of 7, and each number in the sequence 107, 114, 121, \dots , is 2 more than a multiple of 7. Since 2137 is 2 more than a multiple of 7, it may appear in the sequence.

- A) 1296 B) 1648 C) 2137 D) 2818



26.

A

27.

B

28.

A

29.

D

30.

C

31.

A

32.

A

33.

B

34.

C

35.

C

Information & Solutions

2012-2013 Annual 8th Grade Contest

Tuesday, February 26 (alternate date: February 19), 2013

8

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 Tues., March 5, 2013 can be used in our *Summary of Contest Results* newsletter, which will be posted online no later than Fri., April 12, 2013.
- **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.

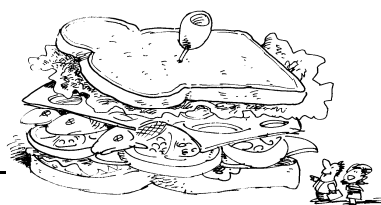
Eighteen books of past contests, *Grades 4, 5, & 6 (Vols. 1, 2, 3, 4, 5, 6)*, *Grades 7 & 8 (Vols. 1, 2, 3, 4, 5, 6)*, and *High School (Vols. 1, 2, 3, 4, 5, 6)*, are available, for \$12.95 per volume, from Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.

The end of the contest 8

2012-2013 8TH GRADE CONTEST SOLUTIONS

Answers

1. Since $1 + 4 + 1 + 4 = 10$, $(1 + 4 + 1 + 4) \times 1414 = 14140$. A) 10 B) 1010 C) 1414 D) 10000	1. C
2. Any number divisible by 2 and 5 ends in 0. Only 6660 ends in 0 and is also divisible by 3 and 4. A) 2345 B) 4567 C) 5550 D) 6660	2. D
3. $(25 + 4001) \div 2 = 2013$. A) 994 B) 1019 C) 1988 D) 4001	3. D
4. Bob rides his bicycle at 40 km per 60 minutes. In 30 minutes he rides 20 km, so in 3 minutes he rides 2 km. A) 1 km B) 2 km C) 3 km D) 4 km	4. B
5. There are 9 people in front of my brother, and there are 9 people behind me. That's 18 people. Counting my brother and me, that's a total of 20 people in line. A) 11 B) 19 C) 20 D) 21	5. C
6. Of every 5 books, 4 have hard covers. Since $60 \div 5 = 12$, there are 12 groups of 5 books each. Since $12 \times 4 = 48$, I have 48 hard covers. A) 48 B) 35 C) 15 D) 12	6. A
7. Since $111 = 1 \times 111$, the largest odd factor of 111 is 111. A) 3 B) 37 C) 109 D) 111	7. D
8. 100 pennies = \$1; 200 nickels = $200 \times 5\text{¢} = \$10$; 300 dimes = $300 \times 10\text{¢} = \30 ; and 400 quarters = $400 \times 25\text{¢} = \100 ; the coins' value is \$141. A) \$91 B) \$121 C) \$141 D) \$161	8. C
9. Multiply the last 3 digits of each: $789 \times 890 = 702210$; the hundreds digit is 2. A) 0 B) 1 C) 2 D) 3	9. C
10. Ben finds 2 eyes under 40% of the rocks. If he looks under 400 rocks, he will find $2 \times 0.4 \times 400 = 320$ eyes. A) 100 B) 160 C) 200 D) 320	10. D
11. $12 \times \frac{1}{2} \times \frac{1}{3} \times \frac{1}{4} \times \frac{1}{6} =$ A) $\frac{1}{144}$ B) $\frac{1}{12}$ C) 1 D) 12	11. B
12. If the measures of the angles of triangle T are in a 1:2:3 ratio, they must have measures 30° , 60° , and 90° . So T is a right triangle. A) acute B) obtuse C) right D) isosceles	12. C



2012-2013 8TH GRADE CONTEST SOLUTIONS

Answers

13. $(9 + 8) \times 6 - 4 \div 2 = 17 \times 6 - 2 = 100$. A) $9 + 8 \times 6 - 4 \div 2$ B) $(9 + 8) \times 6 - 4 \div 2$ C) $9 + 8 \times (6 - 4) \div 2$ D) $(9 + 8) \times (6 - 4) \div 2$	13. B
14. The least common multiple of $2 \times 3 \times 3$, $2 \times 2 \times 7$, and 2×19 is $2 \times 2 \times 3 \times 3 \times 7 \times 19 = 4788$. Thus, Alex found 4788 diamonds. A) 2 B) 84 C) 4788 D) 19152	14. C
15. $0.07 + 0.007 = 0.077 = 0.700 - 0.623$. A) 0.623 B) 0.777 C) 0.784 D) 0.854	15. A
16. $2^2 \times 2^2 \times 2^2 + 2^2 \times 2^2 + 2^2 = 4 \times 4 \times 4 + 4 \times 4 + 4 = 64 + 16 + 4 = 84 = 2^2 \times 21$. A) 16 B) 21 C) 32 D) 33	16. B
17. Multiplying any whole number by 6 results in a product divisible by 3; after adding 5, the sum can no longer be divisible by 3 or 9. A) 5 B) 7 C) 9 D) 11	17. C
18. Divide 10000 hours by 24 hours per day to find that it is 416 days, 16 hours. The princess wakes 16 hours after 6:00 P.M., at 10:00 A.M. A) 10:00 A.M. B) 4:00 P.M. C) 8:00 P.M. D) 11:00 P.M.	18. A
19. Since $40\% + 1/3 = 2/5 + 1/3 = 11/15$, the remaining $4/15$ are the 60 metamorphic rocks. Hence $4:15 = 60:?$, and $? = 225$. A) 160 B) 180 C) 200 D) 225	19. D
20. The sum of 4 consecutive even integers is 148. Their average is 37. The 4 integers are 34, 36, 38, and 40. The sum of the digits of 34 is 7. A) 6 B) 7 C) 9 D) 12	20. B
21. Since $108 \div 9 = 12$, Max has $12 \times 2 = 24$ surfboards. A) 12 B) 24 C) 48 D) 486	21. B
22. $180 + 180 \times 1.5 = 180 + 270 = 450$. A) 270 B) 330 C) 450 D) 630	22. C
23. The longest side's length is < the sum of the other 2 sides. A possible longest side-length is 20. A) 15 B) 20 C) 25 D) 29	23. B
24. If $x \square y = (x + y)^2 - 2xy$, then $5 \square 7 = (5 + 7)^2 - 2 \times 5 \times 7 = 144 - 70 = 74$. A) 12 B) 24 C) 35 D) 74	24. D
25. A square of side-length 4π has perimeter 16π ; $C = \pi d$, so $d = 16$. A) 2 B) 4 C) 8 D) 16	25. D

