

26. Each chemical can be paired with 6 other chemicals for a total of  $6 \times 7 = 42$  pairs. However, each pair has been counted twice. So divide by 2:  $42 \div 2 = 21$ .

A) 14    B) 21    C) 42    D) 49

27. The sum of the digits is 100, which is not divisible by 3 or any multiple of 3.

A) 4    B) 6    C) 8    D) 20

28. Multiply the three smallest primes:  $2 \times 3 \times 5 = 30$ , whose 8 divisors are 1, 2, 3, 5, 6, 10, 15, and 30.

A) 3    B) 5    C) 6    D) 8

$$29. (2^{2000} + 2^{2000}) + (3^{3000} + 3^{3000} + 3^{3000}) = 2 \times 2^{2000} + 3 \times 3^{3000} = 2^{2001} + 3^{3001}.$$

A)  $4^{2000} + 9^{3000}$     B)  $2^{4000} + 3^{9000}$     C)  $4^{2001} + 9^{3002}$     D)  $2^{2001} + 3^{3001}$

30. I drop my nickels at 0 m, 5 m, 10 m, ..., 90 m, 95 m, and 100 m. In all, I drop 21 nickels. Finally, the value of all 21 of these nickels is  $21 \times 5\text{¢} = \$1.05$ .

A) \$0.95    B) \$1.00    C) \$1.05    D) \$1.10

31. Since  $31^2 = 961 < 1000 < 32^2 = 1024$ , the squares of 1, 2, 3, ..., 31 are less than 1000. Of these 31 squares, 16 are odd and 15 are even.

A) 15    B) 16    C) 30    D) 31

32. One-half of one-quarter is one-eighth. The area of one-eighth of a square is 8; so the total area is 64, the side-length is 8, and the perimeter is 32.

A) 16    B) 32    C) 48    D) 64

$$33. (4+8+12+\dots+400)-(3+6+9+\dots+300) = (4-3)+(8-6)+(12-9)+\dots+(400-300) = 1+2+3+\dots+100 = (1+100)+(2+99)+\dots+(50+51) = 50 \times 101 = 5050.$$

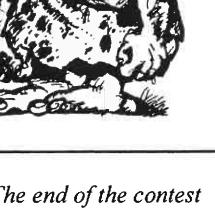
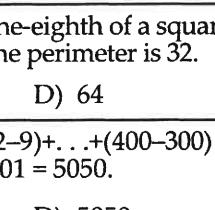
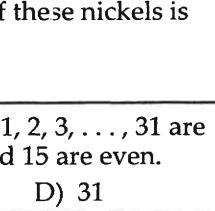
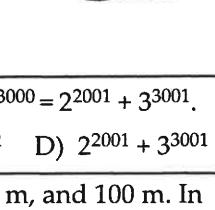
A) 100    B) 400    C) 1200    D) 5050

34. Write ratios equivalent to 5:3 until a trade yields an 8:7 ratio;  $5:3 = 10:6 = 15:9 = 20:12$ . With 20 clubs and 12 skins, a trade of 4 clubs for 2 skins leaves 16 clubs and 14 skins, which is a 16:14 = 8:7 ratio.

A) 8    B) 9    C) 10    D) 12

35. The 1st 9 remainders are 1, 2, 3, ..., 8, 0. They repeat 100 times until reaching 999. That's a total of  $100 \times 36$ . Add 1 for 1000.

A) 3600    B) 3601    C) 4500    D) 4501



26.

B

27.

B

28.

D

29.

D

30.

C

31.

A

32.

B

33.

D

34.

A

35.

B

The end of the contest 6



## Information & Solutions

Tuesday, February 21 or 28, 2012

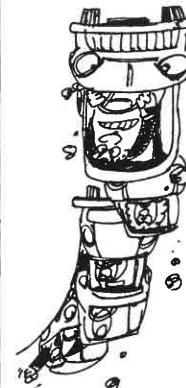
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### Contest Information

- **Solutions** Turn the page for detailed contest solutions (written in the question boxes) and letter answers (written in the *Answer Column* to the right of each question).
- **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, deserve commendation!
- **Answers and Rating Scales** Turn to page 148 for the letter answers to each question and the rating scale for this contest.



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14. Terry backwards and use inverse operations:  $30/2 =$   
A) 50    B) 40    C) 30    D) 20
15. A rectangle has a perimeter of 48. If its width is 6 and its length is 18, then its perimeter is  $6 + 6 + 18 + 18 = 48$ .  
A) 6    B) 8    C) 12    D) 16
16. Since 50 quarters =  $\$12.50$ , and 50 pennies + 50 nickels + 50 dimes =  $\$0.50 + \$2.50 + \$5.00 = \$8.00$ , I owe her  $\$12.50 - \$8.00 = \$4.50$ .  
A)  $\$4.50$     B)  $\$5.50$     C)  $\$6.50$     D)  $\$7.50$
17.  $8.5 \times 750 = 63750$ .  
A) 63 000    B) 63 450    C) 63750    D) 64 005
18. Since there are 3 boys for every 4 girls, the total number of students must be a multiple of  $3 + 4 = 7$ , so the answer is 70.  
A) 120    B) 70    C) 40    D) 30
19. If the average is \$10, the sum is  $5 \times \$10 = \$50$ . Without the fifth friend, the friends had \$4 all together. The fifth friend has  $\$50 - \$4 = \$46$ .  
A) \$9    B) \$19    C) \$46    D) \$49
20. The largest divisor of 180 that is the square of an integer is 1,  $36 - 1 = 35$ .  
A) 5    B) 27    C) 32    D) 35
21. Let's try 14 (or any other number that's 3 more than a multiple of 11). When I divide 14 by 11, the remainder is 3. When I divide  $4 \times 14 = 56$  by 11, the remainder is 1.  
A) 1    B) 3    C) 7    D) 12
22.  $99 \times 88 \times 77 \times 66 \times 55 \div (9 \times 8 \times 7 \times 6 \times 5) = 115$ .  
A) 11    B) 114    C) 115    D) 116
23. Since  $3:5 = 12:20$ , the largest whole number for which  $3:5 < 12:?$  is true is 19.  
A) 19    B) 20    C) 21    D) 24
24.  $99 \div 9 = 11$ , so the middle number is 11. Numbers are 7, 8, 9, ..., 14, 15.  
A) 9    B) 11    C) 13    D) 15
25. If my house is between my sister's house and school, and it is all three are on a straight line, I could be 5 km from school, but no closer than that.  
A) 4 km    B) 5 km    C) 8 km    D) 10 km  
A)

1. Terry played an odd number of notes.  
Odd numbers have a ones digit of 1, 3, 5, 7, or 9, so 2211 is an odd number.  
A) 2012    B) 2211    C) 3456    D) 4664
2. The average is 10, so the sum is 20:  $20 - 8 = 12$ .  
The tens digit of 345 is 4 and the hundreds digit of 456 is 4. Their sum is 8.  
A) 6    B) 9    C) 12    D) 18
3. The tens digit of 345 is 4 and the hundreds digit of 456 is 4. Their sum is 8.  
A) 8    B) 9    C) 10    D) 11
4. My vacation starts on May 10 and ends on May 20. Subtract 9 from each—it's the same number of days as from May 1 through May 11.  
A) 9    B) 10    C) 11    D) 12
5. 2 days = 48 hours =  $(60 \times 48)$  minutes = 2880 minutes.  
A) 1440    B) 1660    C) 2000    D) 2880
6. Multiples of 45 are 45, 90, 135, 180, ..., 180 is also a multiple of 12.  
A) 57    B) 90    C) 180    D) 540
7. 72 erasers =  $72 \div 12 = 6$  dozen erasers; 6 dozen cost Dina  $6 \times 50¢ = \$3$ .  
A) \$1.50    B) \$3.00    C) \$30.00    D) \$36.00
8. The only even prime number is 2, so the odd prime number must be 7.  
A) 1    B) 5    C) 6    D) 7
9. The sum of the largest and smallest whole-number divisors of 36 is  $36 + 1$ .  
A) 12    B) 15    C) 20    D) 37
10. If 160 of 400 drivers are late, then  $160 \div 400 = 0.40 = 40\%$  are late for work.  
A) 20%    B) 40%    C) 60%    D) 80%
11. Since 220 is divisible by both 4 and 5, there are 220 multiples of 4 between 1 and 22, and  $220 \div 4 = 55$  multiples of 5. Finally,  $55 - 44 = 11$ .  
A) 11    B) 22    C) 33    D) 44
12. 1000 mins = 16 hrs 40 mins. The time is 2:40 A.M.  
A) 4:40 P.M.    B) 10:00 P.M.    C) 2:40 A.M.    D) 10:00 A.M.
13. Gili flies 400 km at 800 km/hour. It will take him  $(400 \div 800)$  hours = 0.5 hours to complete his trip.  
A) 4    B) 4.5    C) 5    D) 5.5