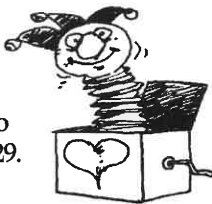
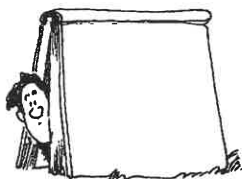


29. $\frac{3}{4} : 3 = (\frac{4}{3} \times \frac{4}{3} \times \frac{3}{4}) : (\frac{4}{3} \times \frac{4}{3} \times 3) = \frac{4}{3} : \frac{16}{3}$ . A) $\frac{9}{4}$ B) $\frac{16}{3}$ C) 4 D) 12	29. B
30. The product of a number and its additive inverse is 0 or negative. A) 0 B) -1 C) 1 D) -4	30. C
31. 15 crows nested either alone or paired with 1 other. To use all 8 nests, 14 paired crows occupied 7 nests, and 1 crow nested alone. A) 0 B) 1 C) 2 D) 3	31. B
32. For the smallest possible difference, use the numbers 1, 2, 3, 4, and 5. Their sum is 15, the largest of them is 5, and $15 - 5 = 10$ . A) 0 B) 2 C) 5 D) 10	32. D
33. $2^2 \times 2^4 = (2 \times 2) \times 2^4 = 2 \times (2 \times 2^4) = 2 \times 2^5$ . A) $2^5$ B) $2^6$ C) $2^7$ D) $2^8$	33. A
34. At 90 pages/hr, I can read one 270-page book in 3 hrs and 2 such books in 6 hrs. A) 2 B) 3 C) 15 D) 18	34. A
35. $2 \times 4 \times 6 \times 8 \times 10 = 2^8 \times 3 \times 5$ . The perfect squares have even exponents: $2^8 = 16^2$ , $2^6 = 8^2$ , $2^4 = 4^2$ , $2^2 = 2^2$ , and $2^0 = 1^2$ . A) 5 B) 4 C) 3 D) 2	35. A
36. $2\pi(4/2\pi) = 4$ , so radius = $4/2\pi = 2/\pi$ . Area = $\pi(4/\pi^2) = 4/\pi$ . A) $\frac{4}{\pi}$ B) $\frac{16}{\pi}$ C) $4\pi$ D) $16\pi$	36. A
37. Since $3^2 + 4^2 = 5^2$ , if two sides of a right $\triangle$ are 3 and 5, the 3rd side could be 4. A) 10 B) 11 C) 12 D) 13	37. C
38. Each face of a cube has a perimeter of 36, so each edge is $36 \div 4 = 9$ . The volume = $9^3 = 729$ . A) 36 B) 81 C) 216 D) 729	38. D
39. $2.7 \times 10^{28} = 27 \times 10^{27} = 3^3 \times (10^9)^3 = (3 \times 10^9)^3 = n^3$ . A) $2.7 \times 10^{27}$ B) $2.7 \times 10^{28}$ C) $2.7 \times 10^{29}$ D) $2.7 \times 10^{30}$	39. B
40. Least possible sum = $1 + 2 + \dots + 999 + 1000$ . Avg. # = exact middle = avg of 500 & 501 = 500.5. Thus, least sum = $500.5 \times 1000 = 500,500$ . A) 499,000 B) 499,500 C) 500,000 D) 500,500	40. D



Information & Solutions

Tuesday, February 18 or 25, 2003

Contest Information

8

- 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** Turn to page 144 for the letter answers to each question and the rating scale for this contest.



The end of the contest 8

1.	D	A) 0.0401 B) 0.040 C) 0.041 D) 0.04
2.	D	A) 0 B) 1 C) 2 D) 2.5
3.	A	A) 1 B) 2 C) 7 D) 10 In the product 2 000 000 × 5 000 000, the first digit is a 1. Since every other digit is a 0, I ate only 1 doughnut.
4.	B	A) 2 B) 1 C) 0 D) -2 Since $1^2 = 1$ , and since $1 > 2(1) = 2$ , the answer is 1.
5.	C	$25 \times \left(\frac{4}{1} + \frac{4}{1} + \frac{4}{1} + \frac{4}{1}\right) = 25 \times 1 = 25$ . A) 0.25 B) 1 C) 25 D) 100
6.	C	A) 21 B) 63 C) 105 D) 209 Since $210 \div 2 = 105$ is odd, 105 is the largest odd factor of 210.
7.	D	A) 10 B) 11 C) 100 D) 1000 111 - 11 = 100. Answer = 1111 - 111 = 1000.
8.	C	A) Thurs. B) Fri. C) Sat. D) Sun. 31 days = 28 days + 3 days; 28 days before Tues. is Tues., and 3 days before Tues. is Sat.
9.	A	A) 0.12 - 0.34 B) 0.12 + 0.34 C) 0.1234 D) 12 × 34 Since $0.12 - 0.34$ is negative, it's less than $0.12 \times 0.34$ .
10.	B	A) $(7+8) \times 7 + 8$ B) $7 + (8 \times 7) + 8$ C) $7 + 8 \times (7 + 8)$ D) $(7 + 8) \times (7 + 8)$ B gives the correct order of operations: first multiply, then add.
11.	B	A) 3 sides B) 2 sides C) 1 side D) 0 sides Both legs can be 5, but the hypotenuse must be the longest side.
12.	A	A) 100 dollars + 100 quarters + 100 dimes + 100 nickels = \$100 + \$25 + \$10 + \$5 = \$140. B) \$145 C) \$175 D) \$400
13.	C	A) 1 B) 6 C) 9 D) 27 Since quotient is tripled, divisor must be tripled.
14.	A	A) $\left(\frac{4}{1}\right)^2$ B) $\frac{120}{60}$ C) 0.5 D) $\sqrt{\frac{4}{1}}$ $(1/4)^2 = (1/4) \times (1/4) = 1/16$ .



15.	C	$\frac{5}{1} \times 9 \times \frac{6}{1} \times 6 \times \frac{9}{1} \times 3 = \frac{9}{1} \times 9 \times \frac{6}{1} \times 6 \times \frac{9}{1} \times 3 = 1$ . A) 9 B) 3 C) 1 D) $\frac{6}{1}$
16.	A	Their average = sum $\div 4 = (1/2) \div 4 = 1/8$ . A) one-eighth B) one-fourth C) one-half D) 2
17.	C	The sides cannot be 12, 12, 24 since the sum of any two sides must exceed the third. The sides are 12, 24, 24. A) 36 B) 42 C) 60 D) 72
18.	D	A) $2^6 \times 3^6$ B) $2^7 \times 3^6$ C) $2^6 \times 3^5$ D) $2^7 \times 3^5$ $6 \times 12 \times 18 \times 24 = (2 \times 3)(2^2 \times 3)(2 \times 3^2)(2^3 \times 3) = 2^7 \times 3^5$ .
19.	B	$0.20 \times 30 = 6.00 = 0.30 \times 20$ . A) 0.2 B) 20 C) 2% D) 200%
20.	B	$7 \times 0.25 = 7 \times \frac{1}{4} = 7 \div 4$ . A) 0.25 B) 4 C) 25 D) 100
21.	C	2 divides all evens. 1, not a prime, is odd, whole, and positive. A) whole B) odd C) even D) positive
22.	D	Both Sue and Dan are older than Ann, who is older than Bob. Sue and Dan could be the same age. A) Bob & Sue B) Dan & Bob C) Ann & Bob D) Sue & Dan
23.	D	$(0.1)_{10} = (1/10)_{10} = 1/10_{10} = 1/10_{10}$ . A) 1 B) $\frac{10}{1}$ C) $\frac{100}{1}$ D) $\frac{10}{1}$
24.	B	139 min. = 120 min. + 19 min. = 2 hr. + 19 min. A) 10:39 P.M. B) 10:49 P.M. C) 10:59 P.M. D) 11:19 P.M.
25.	A	$\frac{2}{2} + \frac{4}{2} = \left(\frac{4}{2}\right)^2 + \left(\frac{4}{2}\right)^2 = \left(\frac{2}{1}\right)^2 + 2^2$ . A) $\frac{2}{1}$ B) 0 C) $2^2$ D) $4^2$
26.	A	10% = 0.1 = $1/10 = 1 \div 10$ . A) 1 B) 10 C) 100 D) 10 000
27.	C	(24 kittens) = (4 kittens) = (3 puppies) = (32 kittens) = (24 puppies). A) 18 B) 24 C) 32 D) 36
28.	A	If my phone's extension number has 3 digits, the sum of its digits can be at most $3 \times 9 = 27$ . A) 3 B) 4 C) 5 D) 7

