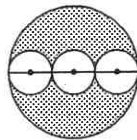
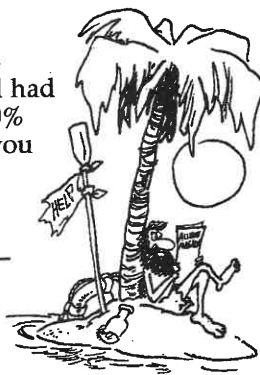


<p>30. The least common multiple of 2, 3, 4, and 5 is 60. Since 60 goes into 1000 exactly $16\frac{2}{3}$ times, there are 16 such numbers. A) 8 B) 9 C) 16 D) 17</p>	<p>30. C</p>
<p>31. For choice A: $-5 \times 25 = -125$; for choice B: $-1 \times 21 = -21$; for choice C: $1 \times 19 = 19$; the answer is D. A) -125 B) -21 C) 19 D) 60</p>	<p>31. D</p>
<p>32. Ratio of the # of secs in 45 mins to the # of secs in one hour is $(45 \times 60) : (60 \times 60) = 45:60 = 3:4$. A) 1:2 B) 1:4 C) 3:4 D) 4:3</p>	<p>32. C</p>
<p>33. $50\% + 50\% = 100\% = 1 = 0.02 \times 50 = 2\%$ of 50. A) 1% B) 2% C) 50% D) 100%</p>	<p>33. B</p>
<p>34. The difference between 1 and its reciprocal, 1, is 0. This is the smallest possible difference. A) 0 B) $\frac{1}{5}$ C) $\frac{7}{12}$ D) $\frac{3}{2}$</p>	<p>34. A</p>
<p>35. Examine a special case. Suppose my island had 100 people. Then 40%, or 40, represents 50% of the # shipwrecked on your island; so you have 80 people. The ratio of the numbers of shipwrecked people is $100:80 = 125\%$. A) 80% B) 90% C) 120% D) 125%</p>	<p>35. D</p>
<p>36. The average of all 32 grades was $(80 \times 12 + 70 \times 20) \div 32 = (960 + 1400) \div 32 = 2360 \div 32 = 73.75$. A) 72.25 B) 73.75 C) 74.75 D) 75.00</p>	<p>36. B</p>
<p>37. $(\sqrt{\sqrt{x}})^4 = (\sqrt{x})^2 = x$. A) \sqrt{x} B) x C) x^2 D) x^4</p>	<p>37. B</p>
<p>38. Area = $72 \text{ cm}^2 = (8 \text{ cm}) \times (9 \text{ cm})$, and perimeter = $34 \text{ cm} = 2 \times (8 \text{ cm} + 9 \text{ cm})$. The difference is $9 \text{ cm} - 8 \text{ cm} = 1 \text{ cm}$. A) 1 cm B) 6 cm C) 18 cm D) 38 cm</p>	<p>38. A</p>
<p>39. Let's guess and check. If the small circle has $r = 1$, then the large circle has $R = 3$, and $\pi R^2 - 3\pi r^2 = 9\pi - 3\pi = 6\pi$. If $r = 2$, then $R = 6$, and $\pi R^2 - 3\pi r^2 = 36\pi - 12\pi = 24\pi$. Thus, $r = 2$ and $\pi r^2 = 4\pi$.</p>	<p>39. C</p>
<p>40. $\frac{2^{49}}{2^{50}} + \frac{2^{48}}{2^{50}} + \frac{2^{47}}{2^{50}} + \dots + \frac{1}{2^{50}} = \frac{(2^{49} + 2^{48} + 2^{47} + \dots + 2^1) + 1}{2^{50}}$. A) 0 B) 1 C) 2^{50} D) $1 + 2^{50}$</p>	<p>40. B</p>



Information & Solutions

Tuesday, February 19 or 26, 2002

Contest Information

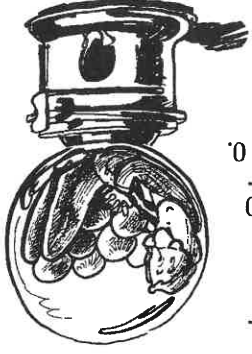
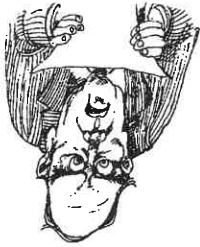
8

- 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 143 for the letter answers to each question and the rating scale for this contest.



The end of the contest 8

1. Add 100 to each # on the rt to get #s on the left. Total added = 300.
 A) 100 B) 200 C) 300 D) 600
2. My test grade was a product of two consecutive integers. Since $56 = 7 \times 8$, choice D is correct.
 A) 45 B) 48 C) 54 D) 56
3. Rewrite all #s with 4 places; B is greatest.
 A) 0.0110 B) 0.0111 C) 0.0101 D) 0.0100
4. (One-tenth of ten) dollars = \$1 = 100 pennies.
 A) 1 B) 10 C) 100 D) 1000
5. 125 days of rain per yr \Rightarrow it rains either $(125/365)$ or $(125/366)$ of the days. To the nearest 1%, both equal 34%.
 A) 34 B) 33 C) 13 D) 3
6. $444\ 444\ 444 = 4 \times 111\ 111\ 111 = 111 \times 4\ 004\ 004 = 444 \times 1\ 001\ 001$.
 A) 4 B) 11 C) 111 D) 444
7. The 3 consecutive integers are 2001, 2002, and 2003.
 A) 1999 B) 2000 C) 2001 D) 2005
8. Both sides have 2 decimal places, so only multiply by 1.
 A) 0.01 B) 0.1 C) 1 D) 10
9. The reciprocal of a positive prime number is between 0 and 1.
 A) odd B) even C) prime D) positive
10. Since $175 \div 7 = 25$ is the only whole number, choice D is correct.
 A) $\frac{7}{135}$ B) $\frac{9}{145}$ C) $\frac{11}{155}$ D) $\frac{7}{175}$
11. *Work backwards.* An equilateral \triangle with side 12 has perimeter $3 \times 12 = 36$. A square with perimeter 36 has side $36 \div 4 = 9$.
 A) 3 B) 9 C) 16 D) 36
12. $1 + 2 \times 3 + 4 = 1 + 6 + 4 = 1 + 10 = 1 + 2 \times 5 = 1 + 2 \times (3 + 2)$.
 A) 2 B) 4 C) 5 D) 7
13. The cost of 100 gumdrops is $100 \times 2¢ = 200¢$. The cost of 50 gumballs is $50 \times 1¢ = 50¢$. The difference is $150¢ = \$1.50$.
 A) \$1.00 B) \$1.50 C) \$2.00 D) \$3.50
14. $\frac{7+8}{7+8} = \frac{(7+8)}{(7+8)} = \frac{7}{1} = \frac{7}{1} + 0$.
 A) 0 B) $\frac{1}{1}$ C) $\frac{8}{1}$ D) 1
15. $4^2 \times 5^2 \times 6^2 = (4 \times 5 \times 6)^2 = (120)^2$.
 A) 15 B) 25 C) 77 D) 120



16. Average angle measure = $\text{sum}/3 = 180^\circ/3 = 60^\circ$.
 A) 30° B) 45° C) 60° D) 90°
17. $10^5 \times 10^5 = 10^{10} = 10\ 000\ 000\ 000$; $99\ 999 \times 99\ 999$ is slightly less.
 A) 11 B) 10 C) 8 D) 5
18. Order of operations: $9 \times 9 + 9 \div 9 - 9 = 81 + 1 - 9 = 73$.
 A) 73 B) 45 C) 9 D) 1
19. Saturday is 6 days after Sunday and 3 days before Tuesday.
 A) Mon. B) Wed. C) Thurs. D) Sat.
20. 0.2% of 2% of 20 = $0.002 \times 0.02 \times 20 = 0.0008$.
 A) 0.0008 B) 0.008 C) 0.08 D) 8.0
21. #s could be $\frac{1}{2}$ & $\frac{1}{4}$, or $-\frac{1}{2}$ & $-\frac{1}{4}$, or any two #s with same sign.
 A) positive B) negative C) 0 D) a fraction
22. $3^9 \div 9^3 = 3^9 \div (3^2)^3 = 3^9 \div 3^6 = 3^3$, so the remainder is 0.
 A) $3 - 3$ B) 3×3 C) $3 + 9$ D) 3×9
23. Since 1-10 uses 10 digits, while 11-20, 21-30, 31-40, 41-50 all use 19 digits, the total number of digits used is $10 + (4 \times 19) = 86$.
 A) 90 B) 86 C) 50 D) 45
24. If 3 out of 4 people are into hot soup, then $\frac{3}{4} \times 700 = 525$ of 700 are into hot soup.
 A) 475 B) 500 C) 525 D) 550
25. In D, 3006 is about half of 6003;
 D is the only such choice.
-
26. $(\frac{1}{4})^2 = \frac{1}{16} < \frac{1}{4}$.
 A) $\sqrt{\frac{1}{4}} = \frac{1}{2}$ B) $\frac{1}{4} \div \frac{1}{4} = 1$ C) $(\frac{1}{4})^2 = \frac{1}{16}$ D) $1 \div \frac{1}{4} = 4$
27. If $a \star b = a \times b + b^2$, then $8 \star 6 = 8 \times 6 + 6^2 = 48 + 36 = 84$.
 A) 100 B) 84 C) 54 D) 48
28. The additive inverse is negative, and (pos.)(neg.) = neg.
 A) greater than 1 B) 1 C) 0 D) less than 0
29. Since each straight line side contains only two vertices, only two points lie on the same line right now. If 4 people move to that line, then all 6 people could stand in a straight line.
 A) 5 B) 4 C) 3 D) 2