

2003-2004 ALGEBRA COURSE 1 CONTEST

Answer  
Column

<p>22. If <math>x = ?</math>, then <math>x(x+1)(x+2) \times \dots \times (x+99)(x+100) \neq 0</math>. A) -98      B) -99      C) -100      D) -101</p>	22.
<p>23. What is the coefficient of <math>x^1</math> in the complete expansion of <math>(x+1)^{20}</math>? A) 400      B) 20      C) 19      D) 1</p>	23.
<p>24. <math>\frac{1}{x - \frac{1}{x}}</math> is undefined for ? values of <math>x</math>. A) 1      B) 2      C) 3      D) 4</p>	24.
<p>25. If <math>x+2 = y+4</math>, then <math>x^2+4x+4 =</math> A) <math>y^2+16</math>      B) <math>y^2+8y+16</math> C) <math>y^2+4y+20</math>      D) <math>y^2+4y+6</math></p>	25.
<p>26. If <math>a, b</math>, and <math>\sqrt{ab+b}</math> are integers, then ? must also be an integer. A) <math>\sqrt{b(a+1)^0}</math>      B) <math>\sqrt{b(a+1)^2}</math>      C) <math>\sqrt{b(a+1)^3}</math>      D) <math>\sqrt{b(a+1)^4}</math></p>	26.
<p>27. Line <math>\ell</math> is perpendicular to line <math>k</math>. If the slope of <math>\ell</math> is a non-zero integer, then the slope of <math>\ell</math> divided by the slope of <math>k</math> could equal A) <math>\frac{1}{4}</math>      B) <math>-\frac{1}{4}</math>      C) 4      D) -4</p>	27.
<p>28. My phone number has 7 digits. Their product is an even perfect square. The greatest possible value of their sum is A) 28      B) 58      C) 61      D) 63</p>	28.
<p>29. Our square bulletin board has area <math>A</math> and perimeter <math>P</math>. If <math>A/P</math> is an integer, then the length of one of the board's sides could be A) 456      B) 567 C) 678      D) 789</p>	29.
<p>30. In a sequence of <math>2n</math> positive numbers whose first term is <math>k</math>, each successive term is the reciprocal of the term that came before it. The sum of all <math>2n</math> terms is A) <math>\frac{nk^2+n}{k}</math>      B) <math>\frac{nk^2+n}{2k}</math>      C) <math>\frac{k^2+1}{kn}</math>      D) <math>\frac{n+k}{k^2}</math></p>	30.



ALGEBRA COURSE 1 CONTEST

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2003-2004 Annual Algebra Course 1 Contest

Spring, 2004

Instructions

A

- **Time** You will have only 30 minutes working time for this contest. You might be *unable* to finish all 30 questions in the time allowed.
- **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 24 points (80% correct). Students with half that, 12 points, *deserve commendation!*
- **Format and Point Value** This is a multiple-choice contest. Each answer is an A, B, C, or D. Write each answer in the *Answer Column* to the right of each question. A correct answer is worth 1 point. Unanswered questions get no credit. You **may** use a calculator.



The end of the contest A

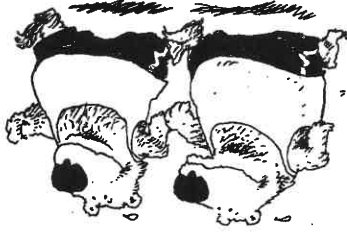
12.	12. If $x+3$ is a factor of $x^2+a$ , then $a$ must equal A) -9 B) -3 C) 3 D) 9
13.	13. If $x^2 = 5$ , then $(x+1)(x-1) =$ A) -24 B) 24 C) -4 D) 4
14.	14. When $x(x(x+2)+2)+2$ is multiplied out and like terms are combined, the result has exactly <u>2</u> terms. A) 4 B) 5 C) 6 D) 8
15.	15. $\frac{1}{x} + \frac{1}{y} = \frac{x^2y^2}{z}$ A) 1 B) 2 C) $x^2y^2$ D) $x^2+y^2$
16.	16. Square $S$ has side-length $x$ . The sum of the numerical value of the area of $S$ and the numerical value of the perimeter of $S$ is A) $x(x+4)$ B) $(x+2)(x+2)$ C) $(x+4)^2$ D) $4x^3$
17.	17. Two values of $x$ satisfy $(x-9)^2 = 1$ . These values differ by A) 0 B) 2 C) 9 D) 18
18.	18. Which of the following is the square of a binomial? A) $x^2+x+9$ B) $x^2+4x+9$ C) $x^2+6x+9$ D) $x^2+9x+9$
19.	19. Which of the following are the coordinates of a point that is equidistant from the coordinate axes? A) (100,-100) B) (0,100) C) (-100,0) D) (0,-100)
20.	20. $(x^2-1)(x^2-4)(x^2-9)(x^2-16) = 0$ is satisfied by <u>2</u> different integers. A) 0 B) 4 C) 8 D) 16
21.	21. The roots of the equation $x^2+bx+c = 0$ are 4 and 5. If the winning lottery number is $b+c$ , then the winning lottery number is A) 9 B) 11 C) 19 D) 21

And the winning number.



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1.	1. $(2^2)(2^0)(2^0)(2^4) =$ A) 0 B) $2^6$ C) $2^8$ D) $2^{2004}$
2.	2. Hairy and Bearly ran home. Hairy took $x$ minutes. Bearly took 1 minute longer. The product of the number of minutes they took is A) $2x^2+1$ B) $2x+1$ C) $x^2+1$ D) $x^2+x$
3.	3. $-100 - (-10) = \frac{?}{?} + 10$ A) -110 B) -100 C) -90 D) 100
4.	4. $100 \div 10 \times 10 + 10 \times 10 =$ A) 101 B) 110 C) 200 D) 1100
5.	5. $(-1)^2 + (-1)^0 + (-1)^0 + (-1)^4 =$ A) 2 B) 4 C) 6 D) 8
6.	6. If $p$ is prime, then $p^2$ has exactly <u>2</u> different positive divisors. A) 1 B) 2 C) 3 D) 4
7.	7. $(234+567)^2 = 234^2 + 567^2 + \frac{?}{?}$ A) 0 B) $234+567$ C) $234 \times 567$ D) $468 \times 567$
8.	8. $\frac{x^2+1}{1} =$ A) $1 + \frac{x}{x^2}$ B) $1+x^2$ C) $x^2 + \frac{1}{x^2}$ D) $\frac{1}{x^2}$
9.	9. Al bought 12 DVDs. Ali bought 15 CDs. Each DVD cost 1.5 times as much as each CD. The ratio of Ali's total cost to Al's was A) 4:5 B) 5:4 C) 5:6 D) 6:5
10.	10. Mary resisted dunking her doughnut for $\frac{b}{a}$ of a minutes. For how many minutes did Mary resist dunking her doughnut? A) $ab$ B) $\frac{10}{ab}$ C) $\frac{100}{ab}$ D) $\frac{1000}{ab}$
11.	11. $\sqrt{2^2} + \sqrt{2^4} + \sqrt{2^6} =$ A) $2+4+8$ B) $2 \times 4 \times 8$ C) $2+4+6$ D) $2 \times 4 \times 6$



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