

2001-2002 ALGEBRA COURSE 1 CONTEST

Answer  
Column

22. The reciprocal of 4 equals the average of the reciprocals of 3 and

- A) 5    B) 6    C)  $\frac{1}{5}$     D)  $\frac{1}{6}$

23. When each letter in the phrase “my huge taco” is replaced by a different digit, the value of  $m+y+h+u+g+e+t+a+c+o$  will be

- A) 9    B) 10    C) 45    D) 55



24. If  $x \geq 100$ , then  $\sqrt{x+16}$  is between

- A)  $\sqrt{x}$  and  $\sqrt{x}+1$     B)  $\sqrt{x}+1$  and  $\sqrt{x}+2$   
C)  $\sqrt{x}+2$  and  $\sqrt{x}+3$     D)  $\sqrt{x}+3$  and  $\sqrt{x}+4$

25.  $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{2000 \times 2001} + \frac{1}{2001 \times 2002} =$

- A)  $\frac{1}{2002}$     B)  $\frac{1999}{2002}$     C)  $\frac{2001}{2002}$     D) 1

26. Add all 100 roots of  $(x+1)(x-2)(x+3)\dots(x-98)(x+99)(x-100) = 0$ .

- A) 100    B) 50    C) -50    D) -100

27. If  $|x| = -y$ , then it is *always* true that  $|y| =$

- A)  $x$     B)  $-x$     C)  $y$     D)  $-y$

28. No matter what two integers I choose, their squares *cannot* differ by

- A) 2002    B) 2003    C) 2004    D) 2005

29. If I run my first 60 km lap at a rate 25% faster than my usual 12 km/hr, and my second 60 km lap at a rate ?% slower than 12 km/hr, then my overall average speed will be my usual speed.

- A)  $\frac{50}{3}$     B) 20    C) 25    D)  $\frac{250}{3}$



30. To get a year's *digit-product*, multiply the year's digits. For example, between 1900 and 2000, the 2 years 1913 and 1931 each have a digit-product of 27. What is the largest integer  $n$  for which  $n$  of the years from 1900–2000 have the same non-zero digit-product?

- A) 2    B) 3    C) 4    D) 6

The end of the contest **A**

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ALGEBRA COURSE 1 CONTEST

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2001-2002 Annual Algebra Course 1 Contest

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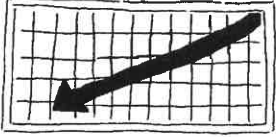


Instructions


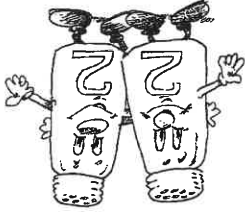
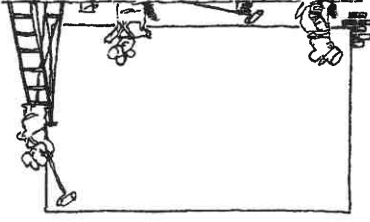
**A**

- **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.



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11.	A) -6 B) -36 C) 6 D) 36	11. If $(x-1)(x-2) = 6$ , then $(1-x)(2-x) =$
12.	A) $(-a,b)$ B) $(a,-b)$ C) $(-a,-b)$ D) $(a^2,b^2)$	12. A straight line through the origin and $(a,b)$ also passes through 
13.	A) 38400 <sup>2</sup> B) 384 <sup>2</sup> C) 384 D) 0	13. What is the product of all the even numbers that are both greater than -10 and less than +10?
14.	A) 0 B) 1 C) -1 D) undefined	14. If a line whose $x$ - and $y$ -intercepts are equal does <i>not</i> pass through the origin, then its slope must be
15.	A) $2x^4$ B) $12x^6$ C) $12x^{12}$ D) $24x^{24}$	15. The least common multiple of $4x^4$ and $6x^6$ is
16.	A) 0 B) $\pi^3$ C) $2\pi^3$ D) $2\pi^3+2\pi^2$	16. $\pi(x^2+\pi) + \pi(x^2-\pi) =$
17.	A) 2 and 3 B) 6 and 9 C) 18 and 27 D) -2 and -3	17. If the roots of $ax^2+bx+c = 0$ are 6 and 9, then the roots of $3ax^2+3bx+3c = 0$ are
18.	A) (1/2)% B) 20% C) 50% D) 200%	18. What percent of 0.5p is p? 
19.	A) twelve B) eight C) six D) four	19. Exactly 2 different pairs of integers $(x,y)$ represent points on the circle $x^2+y^2 = 25$ .
20.	A) 788.3 B) 78.83 C) 7.883 D) 0.7883	20. If $(17.6x)^3 = 7883$ , then $(1.76x)^3 =$ 
21.	A) none B) one C) two D) three	21. For how many different positive integers $n$ will $n$ , $n+2$ , and $n+4$ represent three different prime numbers?

1.	A) -1 B) 1 C) -2003 D) 2003	1. If $x+202 = 2001$ , then $x =$
2.	A) $0.5x$ B) $\frac{x}{2}$ C) $1.5x$ D) $150x$	2. Which number is 50% greater than $x$ ?
3.	A) 1 B) 2 C) 3 D) 4	3. I watched 1000 ants build an anthill in 5 hours. Working at the same rate, 2500 ants could have built the anthill in $\frac{1}{2}$ hours. 
4.	A) $n+1$ B) $n+2$ C) $n+3$ D) $n+4$	4. If $n$ is the number of primes less than 50, then $\frac{1}{2}$ is the number of primes less than 60.
5.	A) 6 B) 18 C) 36 D) 54	5. If the average (arithmetic mean) of $x$ , $y$ , and $z$ is 18, then $x+y+z =$
6.	A) none B) one C) two D) four	6. The result of adding a number to itself is usually <i>unequal</i> to the result of multiplying the number by itself. For how many different numbers are these results equal? 
7.	A) 2 B) -2 C) $4x$ D) $-4x$	7. $(x+1)^2 - (x-1)^2 =$
8.	A) 2 B) 4 C) 8 D) 12	8. If $\sqrt{4+\sqrt{x}} = \sqrt{16}$ , then $x =$
9.	A) 2002 B) 2003 C) 2004 D) 2005	9. The side-lengths of quadrilateral Q are consecutive integers. If Q's perimeter is 8014, how long is Q's longest side? 
10.	A) 3 B) 4 C) 9 D) 16	10. The square roots of Pat's and Lee's ages have a sum of 7 and a difference of 1. If Pat is older than Lee, how old is Pat?