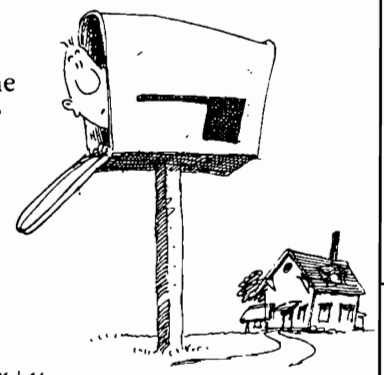
Answer Column

23. $\sqrt{16^{16}}$ =
A) 16^8 B) 16^4 C) 4^8 D) 4^4 — 23.

24. If a circle's area is 3600π, then its circumference is
A) 60 B) 60π C) 120 D) 120π — 24.

25. The cheapest way to move is by mail, so each time I move, I mail myself to my new home. I've done this as many times as the number of different *integers* that satisfy $(n^2-1)(n^2-2)(n^2-3) = 0$. How many times did I move by mail?
A) 1 B) 2 C) 3 D) 6

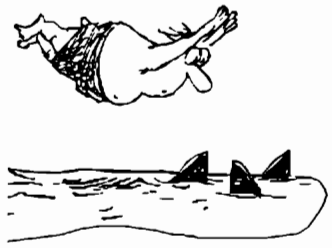
 — 25.

26. $\frac{1}{x} + \frac{1}{y} + \frac{1}{xy} = \frac{?}{xy}$
A) 2 B) 3 C) $x+y+1$ D) $x+y$ — 26.

27. If the sum of the squares of two numbers is equal to the square of their sum, then the product of these two numbers must be
A) 0 B) 1 C) 4 D) 16 — 27.

28. $[(x+1)^2+(x+2)^2+(x+3)^2] - [(x^2+1^2)+(x^2+2^2)+(x^2+3^2)]$ =
A) 0 B) $6x$ C) $9x$ D) $12x$ — 28.

29. The number of fish that swam with me is the *sum of the digits* of the largest integer x which satisfies $\frac{x}{x+1} < \frac{2004}{2005}$. How many fish swam with me?
A) 4 B) 5 C) 6 D) 7

 — 29.

30. For how many different integral values of b are both roots of $x^2+bx-16 = 0$ integers?
A) 3 B) 4 C) 5 D) 6 — 30.

The end of the contest **A**

MATH

ALGEBRA COURSE 1 CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample Algebra I Contest

Spring, 2005

A

Instructions

- **Time** Do *not* open this booklet until you are told by your teacher to begin. 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, *should be commended!*
- **Format and Point Value** This is a multiple-choice contest. Each answer will be one of the *capital letters* A, B, C, or D. Write each answer in the *Answer Column* to the right of each question. We suggest (but do not require) that you use a pencil. Each question you answer correctly is worth 1 point. Unanswered questions receive no credit. You **may** use a calculator *unless* your school does *not* allow you to use one.

Please Print

Last Name _____ First Name _____

School _____ Teacher _____ Grade Level ____

Do Not Write In The Space Below

To the Teacher:
Please enter the student's score at the right before you return this paper to the student. *Student's Score:* _____

The school's top scorer will receive the book *Math Contests—High School (Vol. 3)*. Other high scorers will receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package.

If needed, duplicate book awards may be ordered as described below.

Answer Column

1. $1^{2005} + 1^{2005} =$
   A) 1^{4010} B) 2^1 C) 2^{2005} D) 2^{4010} — 1.

2. From n piles of 12 coconuts each, I am able to make ? piles of 3 coconuts each.
   A) $n+3$ B) $n+4$ C) $3n$ D) $4n$ — 2.

3. $x^{400} \div x^{100} =$
   A) x^{500} B) x^{300} C) x^4 D) 4 — 3.

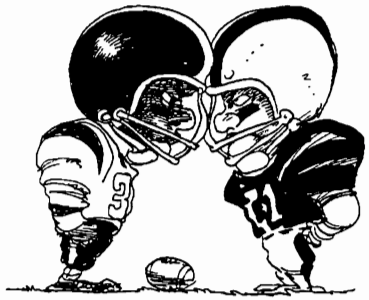
4. $(-1)^1 + (-1)^2 + (-1)^3 + \ldots + (-1)^{98} + (-1)^{99} =$
   A) 1 B) 0 C) -1 D) -99 — 4.

5. If $x^2-y^2 = 10$, and $x+y = 10$, then $x-y =$
   A) 1 B) -1 C) 10 D) -10 — 5.

6. The total value of $2x$ nickels and x dimes is 60¢ when $x =$
   A) 6 B) 4 C) 3 D) 2 — 6.

7. The least common multiple of 2, 4, and 8 is
   A) 2 B) 8 C) 16 D) 64 — 7.

8. $2 = \sqrt{8} \div$?
   A) 4 B) $\sqrt{6}$ C) $\sqrt{4}$ D) $\sqrt{2}$ — 8.



9. There are 6 more football players wearing dark helmets than wearing light ones. The ratio of dark helmets to light is 2:1. The number of light helmets is
   A) 2 B) 3 C) 6 D) 12 — 9.

10. The graph of ? is parallel to the graph of $2x+y = -3$.
    A) $2x+y = 3$ B) $2x+4y = 6$ C) $2x-y = 3$ D) $x+2y = -3$ — 10.

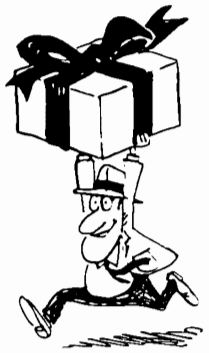
11. Of 5 consecutive integers whose average is x, the smallest is
    A) $x-2$ B) $x-3$ C) $x-4$ D) $x-5$ — 11.

Go on to the next page ➡ A

Answer Column

12. Of 5 consecutive *even* integers whose average is x, the smallest is
    A) $x-2$ B) $x-3$ C) $x-4$ D) $x-5$ — 12.

13. The greatest common factor of 2^{2004} and 2^{2005} is
    A) 1 B) 2 C) 2^{2004} D) 2^{2005} — 13.



14. I ran away with a big prize when I was the 7th caller to know that the slope of every horizontal line is
    A) 0 B) 1 C) -1 D) nonexistent — 14.

15. If 10% of a is b, then $a =$
    A) $0.1b$ B) b C) $9b$ D) $10b$ — 15.

16. For which of the following is n^n the square of an integer?
    A) $n = 3$ B) $n = 5$ C) $n = 6$ D) $n = 7$ — 16.

17. If $k =$?, then the two roots of $x^2+4x+k = 0$ are equal.
    A) 1 B) 2 C) 3 D) 4 — 17.

18. Jesse has worn the same hat for d years. If he wears it for 12 more years, he will have worn this hat for d^2 years. For how many years has Jesse worn this hat?
    A) 4 B) 6 C) 8 D) 12 — 18.

19. $|x| + |-x| =$
    A) 0 B) $|x|$ C) $|-x|$ D) $2|x|$ — 19.

20. Circle C's center is (0,0), and the length of C's radius is 5. Which of the following are the coordinates of a point on C?
    A) (0,5) B) (−5,−5) C) (−10,0) D) (5,5) — 20.

21. For primes a and b, if $a > b$, then ab has ? unequal positive factors.
    A) 4 B) 3 C) 2 D) 1 — 21.

22. The product of ? and x^{100} has the same value as $(-x)^{100}$.
    A) 100 B) 1 C) -1 D) -100 — 22.

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