

23. Each of the  $p$  pigs in my truck wore a different integer from 1 to  $p$ . What is the sum of the numbers worn by all  $p$  pigs?

- A)  $\frac{1}{2}p(1+p)$     B)  $p(1+p)$   
C)  $\frac{1}{2}(1+p)$     D)  $\frac{1}{2}p(p-1)$



23.

24.  $2\sqrt{8} + 8\sqrt{2} =$

- A)  $\sqrt{256}$     B)  $\sqrt{288}$   
C)  $\sqrt{384}$     D)  $\sqrt{512}$

24.

25. How many ordered pairs of integers  $(x,y)$  satisfy  $x^2+y^2 = 2$ ?

- A) 2    B) 4    C) 6    D) 8

25.

26. For every even integer  $x > 0$ , the sum  $-x^x + (-x)^x$  is

- A) positive    B) negative    C) zero    D) undefined

26.

27. If  $x+\pi = 2$ , then  $x^2+3\pi x+2\pi^2 =$

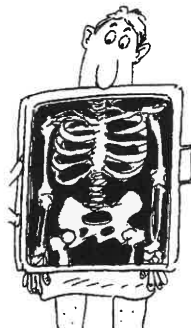
- A)  $2+2\pi$     B)  $4+\pi$     C)  $2+\pi$     D)  $4+2\pi$

27.

28. I saw my bones on an x-ray machine's rectangular screen. The sides of that screen had integral lengths, and the ratio of its length to its width was 5:4. The area of the screen could be

- A) 200    B) 600    C) 4000    D) 8000

28.



29. I averaged  $\frac{1}{k}$  km/hr on a 2 km run. If I ran the 1st km at  $k$  km/hr, then I must have run the 2nd km at  $?$  km/hr.

- A)  $\frac{k^2-2}{k}$     B)  $\frac{2-k^2}{k}$     C)  $\frac{k}{2k^2-1}$     D)  $\frac{k^2+1}{2k}$

29.

30. What is the 2008th term of the sequence  $\frac{\sqrt{2}}{2}, \frac{\sqrt{4}}{4}, \frac{\sqrt{8}}{8}, \dots, \frac{\sqrt{2^n}}{2^n}$ ?

- A)  $\frac{1}{2^{1004}}$     B)  $\frac{1}{1004}$     C)  $\frac{1}{2^{2008}}$     D)  $\frac{1}{2008}$

30.

The end of the contest **A**

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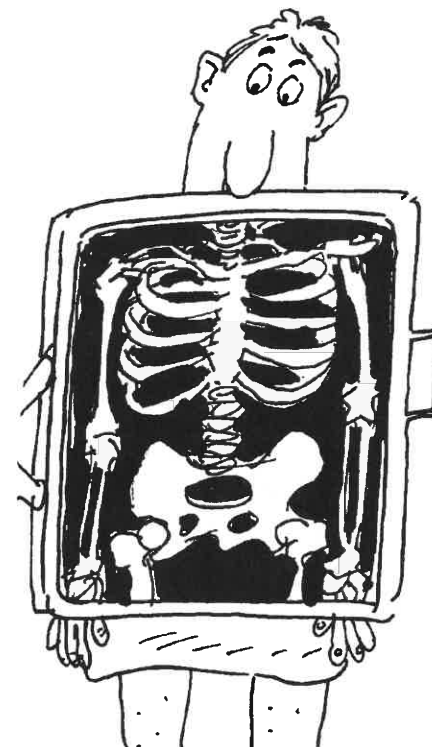
## 2007-2008 Annual Algebra Course 1 Contest

Spring, 2008

### 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.



12.	12. What is the smallest of 16 consecutive integers whose sum is 8?	A) -6 B) -7 C) -8 D) -16
13.	13. The y-intercept of $y = x + 1$ equals the x-intercept of	A) $y = x - 1$ B) $y = x$ C) $y = x + 1$ D) $y = x^2$
14.	14. If $(x-1)(x+1)(x-2)(x+2)$ is expanded, and like terms are then combined, the result has exactly $\frac{1}{2}$ terms.	A) 3 B) 6 C) 9 D) 12
15.	15. $x[x(x^2)^2]^2 =$	A) $x^8$ B) $x^9$ C) $x^{10}$ D) $x^{11}$
16.	16. For how many different integers $b$ is $x^2 + bx + 12$ factorable?	A) 6 B) 5 C) 4 D) 3
17.	17. The line $\frac{1}{2}$ passes through <i>neither</i> quadrant I nor quadrant III.	A) $y = 2x + 4$ B) $y = -2x + 4$ C) $y = 4x$ D) $y = -4x$
18.	18. What are all real values of $x$ for which $\frac{1}{4x^4 - 4}$ is undefined?	A) 0 B) $\pm 1$ C) $\pm 2$ D) $\pm 4$
19.	19. $999\,999\,6x \div 999\,999\,3x =$	A) $999\,999\,2$ B) $999\,999\,2x$ C) $999\,999\,3x$ D) $999\,999\,3$
20.	20. Of the following lines, which has the greatest slope?	A) $x + y = 2$ B) $x - y = 2$ C) $2x + y = 2$ D) $2x - y = 2$
21.	21. When we played them, our score was $\frac{3.3+4.4}{2.2} + 1.1$ . If we tied them, then their score would have been $\frac{33+44}{22} + \frac{1}{2}$ .	A) 0.011 B) 0.11 C) 1.1 D) 11
22.	22. If $-1 < x < 0$ , then	A) $x > x^2$ B) $x > x^3$ C) $x^2 > x^3$ D) $x^3 > x^2$

Go on to the next page **A**



1.	1. $(2 + 0 + 0 + 8)^0$	A) 0 B) 1 C) 4 D) 9
2.	2. If $x^2 = 10$ , then $(x+1)(x-1) =$	A) 99 B) 11 C) 9 D) -1
3.	3. Joe painted 50% more houses in 2007 than in 2006. Joe painted 36 houses in 2007. How many houses did Joe paint in 2006?	A) 12 B) 18 C) 24 D) 27
4.	4. Of the following fractions, which one is reducible?	A) $\frac{x^2-1}{x+1}$ B) $\frac{x^2-2}{x+2}$ C) $\frac{x^2-3}{x+3}$ D) $\frac{x^2-4}{x+4}$
5.	5. How many positive integers are factors of $2^{2008}$ ?	A) 1 B) 2007 C) 2008 D) 2009
6.	6. If $100x + 100y = (x+y)^2$ , and $x+y \neq 0$ , what is the value of $x+y$ ?	A) 10 B) 100 C) $100+100$ D) $100^2$
7.	7. $(x+1)^2 - (x-1)^2 =$	A) 0 B) $-2x^2$ C) $2x$ D) $4x$
8.	8. If $a \geq b > 0$ , then $\frac{1}{2}$ different pairs of integers $(a,b)$ satisfy $\frac{a}{b} = \frac{b}{a}$ .	A) 7 B) 6 C) 4 D) 3
9.	9. If $50 < x < 150$ and $\sqrt{x}$ is prime, then the sum of the digits of $x$ is	A) 2 B) 4 C) 11 D) 121
10.	10. $x^2 + 5x - 6$ is divisible by	A) $x - 6$ B) $x - 3$ C) $x - 2$ D) $x - 1$
11.	11. If $ x-y  > x-y$ , which of the following <i>must</i> be true?	A) $y > x$ B) $x > y$ C) $y < 0$ D) $x > 0$



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