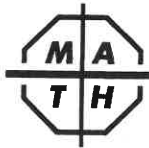


<p>22. If $x = \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \frac{1}{7} - \frac{1}{8} + \dots + \frac{1}{99} - \frac{1}{100}$, then</p> <p>A) $-\frac{1}{3} < x < -\frac{1}{12}$ B) $-\frac{1}{12} < x < 0$ C) $0 < x < \frac{1}{12}$ D) $\frac{1}{12} < x < \frac{1}{3}$</p>	<p>22.</p>
<p>23. If $x+y > x+y$ and $x > y$ then which of the following MUST be true?</p> <p>A) $x < 0$ B) $x > 0$ C) $y < 0$ D) $y > 0$</p>	<p>23.</p>
<p>24. $\frac{x^3 - 2x + 1}{1 - x} =$</p> <p>A) $-x^2 - x + 1$ B) $-x^2 + x - 1$ C) $x^2 - x - 1$ D) $x^2 + x - 1$</p>	<p>24.</p>
<p>25. What is the least integer n for which $63n$ is a perfect cube?</p> <p>A) 7 B) 83 C) 147 D) 3969</p>	<p>25.</p>
<p>26. A circle of radius r is inscribed in a square. What is the ratio of the area of the circle to the area of the square?</p> <p>A) $\frac{2}{r}$ B) $\frac{\pi}{4}$ C) $\frac{\pi r}{4}$ D) $\frac{r}{4}$</p>	<p>26.</p>
<p>27. The graph of $y = (x-2)(x-4)(x-6) + (x-2)(x-4)(x-8) + (x-2)(x-4)(x-10)$ crosses the x-axis at each of the following values of x EXCEPT</p> <p>A) 2 B) 4 C) 6 D) 8</p>	<p>27.</p>
<p>28. The average height of the 56 students in the cafeteria is 150 cm. The average height of the 21 boys in the cafeteria is 165 cm. The average height of the girls in the cafeteria must be <u>?</u> cm.</p> <p>A) 135 B) 141 C) 151 D) 155</p>	<p>28.</p>
<p>29. If $5^n + 5^n + 5^n + 5^n + 5^n = 5^{50}$, then $n =$</p> <p>A) 10 B) 21 C) 38 D) 49</p>	<p>29.</p>
<p>30. If $2x - 5y = 11$ and $3x + 4y = 7$, then $13x + 2y =$</p> <p>A) 4 B) 18 C) 43 D) 62</p>	<p>30.</p>



The end of the contest **A**



2008-2009 Annual Algebra Course 1 Contest

Spring, 2009

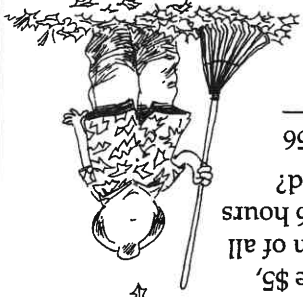
Instructions

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, and not a test*—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 receive no credit. You **may** use a calculator.



12.	12. Ben runs x m per minute. How many km does he run in y minutes? A) $\frac{1000y}{x}$ B) $\frac{1000x}{y}$ C) $\frac{1000}{xy}$ D) $\frac{1000}{xy}$
13.	13. The greatest common factor of 5^{555} and 5^{777} is A) 5 B) 5^{111} C) 5^{555} D) 5^{777}
14.	14. If $y = 2008^{2008}$, which of the following has the greatest value? A) y^{2008} B) $\sqrt[4008]{y}$ C) $(y^{2008})^8$ D) $y^2 y^{1008}$
15.	15. If the x - and y -intercepts of a line are both positive numbers, then the slope of the line must be A) positive B) negative C) 0 D) undefined
16.	16. $2^{100} \times (-2)^{101} \div 2^{202} =$ A) 2 B) -2 C) $\frac{2}{1}$ D) $-\frac{2}{1}$
17.	17. The sum of all values of x that satisfy $(x - 11)^2 - 1 = 0$ is A) -2 B) 1 C) 2 D) 22
18.	18. If $x = \sqrt{2}$, then x^3 is the square of an integer. A) 20 B) 25 C) 30 D) 35
19.	19. If line ℓ has an integral slope, then the sum of ℓ 's slope and the slope of a line perpendicular to ℓ could be A) $\frac{2}{3}$ B) $\frac{3}{7}$ C) $\frac{5}{9}$ D) $\frac{7}{8}$
20.	20. Charlie does yard work for the math teacher next door. The teacher agrees to pay Charlie \$5, plus \$ x per hour, where x is equal to the sum of all integers t for which $t^2 \leq 40$. It takes Charlie 6 hours to finish the job, so how much will he be paid? A) \$5 B) \$26 C) \$131 D) \$156
21.	21. A rectangle is drawn in the xy -plane such that one of its diagonals has endpoints at $(2,6)$ and at $(14,1)$. If a third vertex of the rectangle is at $(x,6)$, the value of x is A) 1 B) 2 C) 6 D) 14



1.	1. If $m = 2$, $a = 3$, $t = 5$, and $m + a + t + h = 22$, what is the value of h ? A) 4 B) 7 C) 9 D) 12
2.	2. The number of years in 21 centuries is the same as the number of years in $\frac{?}{?}$ decades. A) 12 B) 21 C) 210 D) 2100
3.	3. $(x + 1) + (2x + 3) + (4x + 5) + (6x + 7) =$ A) $12x + 16$ B) $13x + 16$ C) $13x + 12$ D) $16x + 13$
4.	4. The square of a certain number is greater than the cube of the number but less than the number itself. Which of the following could be the number? A) $\frac{3}{1}$ B) $-\frac{3}{1}$ C) 3 D) -3
5.	5. $(x + 1)(x - 1) - (x + 2)(x - 2) =$ A) -5 B) 3 C) $2x^2 - 5$ D) $2x^2 + 3$
6.	6. If $x^2 = 3$, then $x^4 - 3 =$ A) 0 B) 3 C) 6 D) 9
7.	7. Which is 200% greater than x^2 ? A) $x + 200$ B) $x + 300$ C) $2x$ D) $3x$
8.	8. If $x = y$, then $(x + y)(x - y) =$ A) 0 B) $x^2 - 2xy + y^2$ C) $x^2 + 2xy - y^2$ D) $x^2 + y^2$
9.	9. $ca^2 = c \div \frac{?}{?}$ A) $\frac{a}{1}$ B) $\frac{a^2}{1}$ C) $\frac{c}{a^2}$ D) $\frac{a^2}{c}$
10.	10. If p is a prime number greater than 2009, then $\frac{?}{?}$ cannot be a prime number. A) $p + 10$ B) $p - 10$ C) $10p$ D) $p + 1000$
11.	11. The addresses of the five houses in the town where Alice lives are consecutive integers that add up to 10055. What is the greatest of these five integers? A) 2009 B) 2010 C) 2012 D) 2013

