


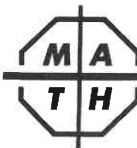


<p>23. Maria loves finding the roots of equations. If she finds all the integral roots of the equation $(x^2 - 1)^1 \times (x^2 - 2)^2 \times (x^2 - 3)^3 \times \dots \times (x^2 - 20)^{20} = 0$, how many different integers will she find?</p> <p>A) 4 B) 8 C) 20 D) 40</p>		23.
<p>24. The product of all values of x that satisfy $2011^{x^2+10x+21} = 1$ is</p> <p>A) -21 B) -10 C) 10 D) 21</p>		24.
<p>25. If n is the smallest positive integer such that $99n$ is the cube of an integer, and d is the sum of the digits of n, then d is</p> <p>A) 27 B) 18 C) 12 D) 9</p>	25.	
<p>26. The area of my rectangle is 480. If my rectangle's length is 14 greater than its width, then its perimeter is</p> <p>A) 88 B) 92 C) 116 D) 172</p>	26.	
<p>27. If $18x + 27y + 38 = 74$, then $4x + 6y - 8 =$</p> <p>A) 0 B) 12 C) 24 D) 36</p>	27.	
<p>28. Eunice always juggles as many things as she can handle. The number of things she juggles is the same as the value of $2x - 9 - 2x + 9$, where x is some real number. Of the following, which can be the number of things she juggles?</p> <p>A) 15 B) 19 C) 20 D) 22</p>		28.
<p>29. What is the ones digit in the decimal representation of s if $r = 123^{124}$ and $s = r^{456}$?</p> <p>A) 1 B) 3 C) 7 D) 9</p>		29.
<p>30. The least common multiple of all integers from 1 through 30 is divided by the product of all prime numbers between 1 and 30. The resulting quotient is</p> <p>A) 1 B) 2 C) 12 D) 360</p>	30.	

The end of the contest  **A**



2010-2011 Annual Algebra Course 1 Contest

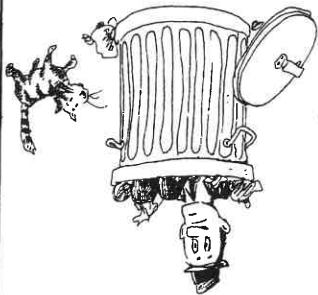
Spring, 2011

Instructions

A

- 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, 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, *should be commended!*
- 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.	A) -9 B) 9 C) 27 D) 81	12. If $n^2 + 5n = 24$ and $n^2 - 4n = -3$, then $9n =$
13.	A) $\frac{a}{1} > \frac{b}{1}$ B) $a^2 > b^2$ C) $\frac{a}{b} > \frac{a}{b}$ D) $\frac{a^2}{b^2} > \frac{b^2}{a^2}$	13. If $a < 0 < b$, then which of the following <i>cannot</i> be true?
14.	A) $x^2 + 9$ B) $x^2 + 8x + 15$ C) $x^3 - 4x^2 + 4x - 3$ D) $x^3 - 2x^2 + 3x - 4$	14. Nervous Ned must find a polynomial that is divisible by $x - 3$. Of the following polynomials, which could Ned choose?
15.	A) -2011 B) -2010 C) 2010 D) 2011	15. The sum of the solutions of $x^2 + 2011x + 2010 = 0$ is
16.	A) $3x + 4y = 5$ B) $5x - 5y = 13$ C) $6x + 6y = 19$ D) $8x - 7y = 31$	16. The line ℓ is perpendicular to the line $y = x$.
17.	A) y^2 B) $y^2 - 5$ C) $y^2 - 10y + 25$ D) $y^2 + 10y + 15$	17. If $y = x - 5$, then $x^2 - 10x + 20 =$
18.	A) 42 B) 36 C) 7 D) 0	18. If $a + b = 7$ and $a^2 + b^2 = 49$, then $ab =$
19.	A) $2x - y$ B) $\frac{x}{y} + y$ C) $\frac{y}{x} - x$ D) $\frac{x}{2} + y$	19. If x is y less than $2z$, what is the value of z in terms of x and y ?
20.	20. Rob Esch searches a trash can for his cell phone. When he starts searching, there are 5 apple cores for every 3 bottles. If 3 more bottles are thrown in, there will be 3 apple cores for every 2 bottles. How many apple cores are there when he starts? 	20. Rob Esch searches a trash can for his cell phone. When he starts searching, there are 5 apple cores for every 3 bottles. If 3 more bottles are thrown in, there will be 3 apple cores for every 2 bottles. How many apple cores are there when he starts?
21.	A) 1000% B) 900% C) 100% D) 10%	21. If $x > 0$, what percent of $0.2x$ is $2x$?
22.	A) $ -x $ B) $- x $ C) $- 5x $ D) $5 x $	22. $ 2x + -3x =$

1.	A) -2011 ² B) 2011 ⁻² C) -2011 ⁻² D) 2011 ²	1. If $xy = 2011^2$, then $(-x)(-y) =$
2.	A) $\frac{7}{w}$ B) $w + 7$ C) $7w$ D) w^7	2. There are ℓ days in w weeks.
3.	A) -8 B) -6 C) 6 D) 8	3. Edna rides d km on her scooter. If $(x+2)(x-d) = x^2 - 4x - 12$ for all real numbers x , then $d =$
4.	A) $10\sqrt{x}$ B) $10 + \sqrt{x}$ C) $10 + 3\sqrt{x}$ D) $30\sqrt{x}$	4. $\sqrt{4x} + \sqrt{9x} + \sqrt{25x} =$
5.	A) -10x B) -5x C) -2x D) 0	5. $x - 2x + 3x - 4x + 5x - 6x + 7x - 8x + 9x - 10x =$
6.	A) 31 B) 33 C) 35 D) 37	6. The sum of five consecutive integers is 165. The largest of these five integers is
7.	A) 1 B) $\frac{z}{2}$ C) $\frac{x^2}{z}$ D) x^2z^2	7. $\frac{x}{z} + \frac{z}{x} =$
8.	A) 26 B) 52 C) 26^2 D) 52^2	8. Lois and Clark are flying h m above the ground. If $(h+2)^2 = 28^2$, then $h =$
9.	A) 0 B) 50 C) $10x$ D) $20x$	9. $(x+5)^2 - (x-5)^2 =$
10.	A) $p - 10$ B) $p + 300$ C) $p + 456$ D) $p + 567$	10. If p is a prime number between 1000 and 2000, then $\frac{p}{2}$ could <i>not</i> be a prime number.
11.	A) 15 B) 16 C) 17 D) 18	11. Twice my age plus three times my sister's age is 86. Three times my age plus four times my sister's age is 120. How old am I?