

23. If  $(x - 2)^2 = 1600$ , which of the following could be the value of  $x - 4$ ?  
 A) -42      B) -34      C) 34      D) 36

23.

24. If  $x$  is a positive integer, and the product of all integers from 1 to  $x$ , inclusive, is a multiple of 260, then the least possible value of  $x$  is  
 A) 10      B) 13      C) 26      D) 30

24.

25. Don Q rides at  $3r$  kph for the first 60 km of a trip, and then rides at  $6r$  kph for the next 60 km. What is his average speed for the entire trip?  
 A)  $4r$       B)  $4.5r$       C)  $5r$       D)  $5.5r$

25.

26. If I reverse the digits of a two-digit positive integer and subtract the resulting integer from the original integer, the difference is 36. The difference between the two digits is  
 A) 4      B) 6      C) 8      D) 9

26.

27. My sister has  $s$  dollars, and I have  $d$  dollars more than she has. If together we have a total of  $t$  dollars, which of the following is equivalent to  $s$ ?  
 A)  $t - 2d$       B)  $\frac{t}{2} - d$       C)  $t - \frac{d}{2}$       D)  $\frac{t-d}{2}$

27.

28. If  $x$  is an integer, which of the following must be divisible by 3?  
 A)  $x(x - 3)(x - 6)$       B)  $x(x + 3)(x - 3)$       C)  $x(x + 7)(x - 2)$       D)  $x(x + 1)(x - 1)$

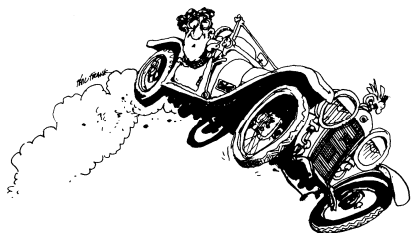
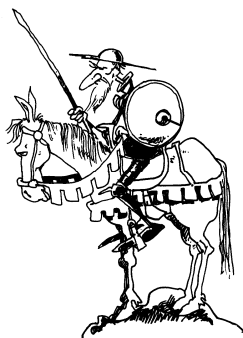
28.

29. If  $x \neq 0$  or 1, and each  $x$  in the expression  $\frac{2x+1}{3x-3}$  is replaced by  $\frac{4}{x}$ , then the resulting expression is equivalent to  
 A)  $\frac{2x+1}{3x-3}$       B)  $\frac{3x-3}{2x+1}$       C)  $\frac{8+x}{12-3x}$       D)  $\frac{12x-3}{8x+1}$

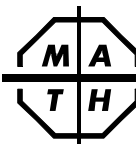
29.

30. The number of passengers in my car is the same as the number of integers less than 8 that satisfy  $\frac{(x+3)(x+4)}{x-5} \geq 0$ . My car has   ? passengers.  
 A) 2      B) 3      C) 4      D) 5

30.



The end of the contest **A**



# Sample Algebra I Contest

# A

Spring, 2013

## 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, 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 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:** \_\_\_\_\_

Eighteen books of past contests, *Grades 4, 5, & 6 (Vols. 1, 2, 3, 4, 5, 6)*, *Grades 7 & 8 (Vols. 1, 2, 3, 4, 5, 6)*, and *High School (Vols. 1, 2, 3, 4, 5, 6)*, are available, for \$12.95 per volume, from Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.

2012-2013 ALGEBRA COURSE 1 CONTEST

Answers

1. If $x = 2013$ , then $(x - 2012)^{(x - 2013)} =$ A) 0      B) 1      C) 2      D) 10	1.
2. If $a = 5$ , then $4a^3 - 3a^2 + 2a - 1 =$ A) 39      B) 125      C) 434      D) 586	2.
3. Fred and Ginger danced for $\frac{2013}{x}$ hours last year. If they danced for a whole number of hours, then $x$ cannot be A) 3      B) 11      C) 13      D) 61	3.
4. Which of the following is a factor of $x^2 - 4x - 12$ ? A) $x + 2$ B) $x - 2$ C) $x$ D) $x - 8$	4.
5. $2^{400} + 2^{400} =$ A) $2^{401}$ B) $2^{800}$ C) $4^{400}$ D) $4^{800}$	5.
6. If $\frac{p}{q} = \frac{2}{3}$ , then $\frac{-p}{-q} =$ A) $-\frac{2}{3}$ B) $\frac{-2}{3}$ C) $\frac{2}{-3}$ D) $\frac{2}{3}$	6.
7. The number of 5 kg weights and 10 kg weights I have is $4w$ and $2w$ , respectively. If my weights all together weigh 200 kg, then $w =$ A) 4      B) 5      C) 10      D) 20	7.
8. $(3x^3 - 4x^2) + (2x^2 - 3x) - (3x^3 - 4) =$ A) $2x^2 - 3x - 4$ B) $2x^2 - 3x + 4$ C) $-2x^2 - 3x - 4$ D) $-2x^2 - 3x + 4$	8.
9. If $3x - 4$ is odd, then $3x + 10$ must be A) positive      B) prime      C) odd      D) even	9.
10. Telly the dog grabs the phone when it rings. Yesterday it rang at 4 PM or later 80% of the time it rang, and it rang 50 times before 4 PM. The phone rang <u>?</u> times yesterday. A) 200      B) 250      C) 300      D) 400	10.
11. The ages of 5 sequoia trees in a forest are consecutive even integers. If the total of the trees' ages is 4440 years, the oldest tree is <u>?</u> old. A) 884 years      B) 888 years      C) 890 years      D) 892 years	11.



2012-2013 ALGEBRA COURSE 1 CONTEST

Answers

12. A straight line that passes through the points $(p, q)$ and $(2p, 3q)$ must also pass through the point A) $(3p, 4q)$ B) $(3p, 5q)$ C) $(4p, 6q)$ D) $(4p, 8q)$	12.
13. What is the product of all multiples of 3 between -9 and 12? A) -314928      B) -2916      C) 0      D) 2916	13.
14. Of children born at the maternity ward yesterday, the ratio of boys to girls was $3x:4y$ , which is also $5:6$ . The ratio $x:y$ is A) 10:9      B) 24:15      C) 15:24      D) 4:5	14.
15. $\frac{(x^{200})^{400}}{(x^{100})^{200}} =$ A) $x^4$ B) $x^6$ C) $x^{40000}$ D) $x^{60000}$	15.
16. If the average of $x, y,$ and $z$ is 16 and the average of $x$ and $y$ is 12, then $z =$ A) 4      B) 14      C) 20      D) 24	16.
17. If $n$ is a prime $> 5$ , the least common multiple of $6n^8$ and $10n^{12}$ is A) $2n^8$ B) $30n^{12}$ C) $30n^{24}$ D) $60n^{96}$	17.
18. A square is inscribed in a circle. If the perimeter of the square region is 64, what is the area of the circle? A) $16\pi$ B) $32\pi$ C) $64\pi$ D) $128\pi$	18.
19. If $x - y = 3$ and $x^2 + y^2 = 485$ then $xy =$ A) 162      B) 238      C) 482      D) 3880	19.
20. Gilda the guide has a lucky number that is the sum of all the roots of $(x-1)(x+2)(x-3) \times \dots \times (x-19)(x+20)(x-21) = 0$ . Gilda's lucky number is A) 10      B) 11      C) 21      D) 31	20.
21. $ 4x  + 4 -x  =$ A) 0      B) 8      C) $8 x $ D) $4 4x $	21.
22. $\sqrt{36^{64}} =$ A) $6^8$ B) $6^{32}$ C) $36^8$ D) $36^{32}$	22.

