
MATHCOUNTS®

2006

■ Chapter Competition ■
Target Round
Problems 1 and 2

Name _____

**DO NOT BEGIN UNTIL YOU ARE
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This section of the competition consists of eight problems, which will be presented in pairs. Work on one pair of problems will be completed and answers will be collected before the next pair is distributed. The time limit for each pair of problems is six minutes. The first pair of problems is on the other side of this sheet. When told to do so, turn the page over and begin working. Record only final answers in the designated blanks on the problem sheet. All answers must be complete, legible and simplified to lowest terms. This round assumes the use of calculators, and calculations may also be done on scratch paper, but no other aids are allowed. If you complete the problems before time is called, use the time remaining to check your answers.

Total Correct	Scorer's Initials

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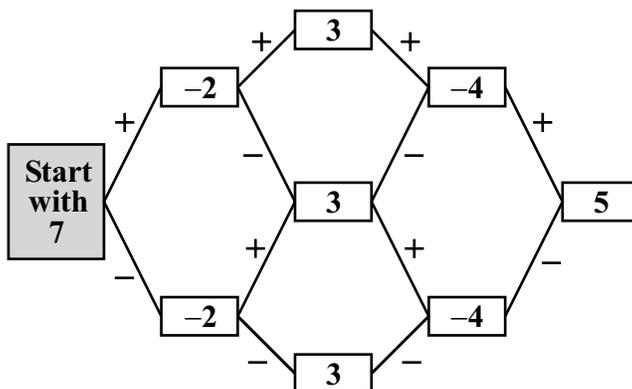


1. Brass is an alloy created using 80% copper and 20% zinc. If Henri's brass trumpet contains 48 ounces of copper, how many ounces of zinc are in the trumpet?

1. _____ ounces

2. In the maze below, a player may only move toward the right. At each junction the player chooses a path that includes an operation (+ or -) and then a number. The player keeps a running total of her score throughout her journey, starting with 7, and she may only choose among paths that keep her score between 2 and 14 points at all times. After performing four operations and ending at the 5, what is the lowest score with which she can finish?

2. _____ points



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■ Chapter Competition ■
Target Round
Problems 3 and 4

Name _____

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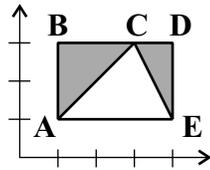
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3. In the figure below, side AE of rectangle ABDE is parallel to the x -axis, and side BD contains the point C. The vertices of triangle ACE are A(1, 1), C(3, 3) and E(4, 1). What is the ratio of the area of triangle ACE to the area of rectangle ABDE? Express your answer as a common fraction.



3. _____

4. The European equivalent of $8\frac{1}{2}$ " by 11" paper is called A4 paper, and its dimensions are 0.21 meters by 0.297 meters. What is the greatest total area, in square meters, that can be covered by 21 sheets of rectangular A4 paper? Express your answer as a decimal to the nearest tenth.

4. _____ sq meters

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■ Chapter Competition ■
Target Round
Problems 5 and 6

Name _____

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5. The arithmetic mean (or average) of A, B and C is 10. The value of A is six less than the value of B, and the value of C is three more than the value of B. What is the value of C?

5. _____

6. A value is assigned to each letter of the alphabet such that $A = 1, B = 2, C = 3, \dots, Z = 26$. A nine-digit code is then created for each letter using the prime factorization of its assigned value. The first digit of a letter's code is the number of times 2 is used as a factor, the second digit is the number of times 3 is used as a factor, the third digit is the number of times 5 is used as a factor, and so on. For example, since N is the 14th letter of the alphabet and $N = 14 = 2^1 \times 7^1$, the code for the letter N is 100100000 with 1s in the *first* and *fourth* positions because its prime factorization has one 2 (the *first* prime number) and one 7 (the *fourth* prime number). What 6-letter word does the following sequence of six codes represent? The first row is the code for the first letter of the word, the second row is the code for the second letter of the word, and so on.

6. _____

0	0	1	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0
0	1	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0
2	1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	0

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■ Chapter Competition ■

Target Round

Problems 7 and 8

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7. On a particular quiz, there are 15 easy questions and 15 hard questions. The easy questions are worth 4 points each, and the hard questions are worth 10 points each. No partial credit is possible. Sam earns a total of 92 points on the quiz. What is the greatest number of hard questions that he could have answered correctly?

7. hard questions

8. Eli throws five darts at a circular target, and each one lands within one of the four regions. The point-value of a dart landing in each region is indicated. What is the least score greater than five points that is *not* possible when the point-values of the five darts are added together?

8. points

