MATHCOUNTS®

2011
■ State Competition ■
Target Round
Problems 1 and 2

Name _____

School _____

Chapter _____

DO NOT BEGIN UNTIL YOU ARE INSTRUCTED TO DO SO.

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. This round assumes the use of calculators, and calculations also may be done on scratch paper, but no other aids are allowed. All answers must be complete, legible and simplified to lowest terms. Record only final answers in the blanks in the right-hand column of the problem sheets. If you complete the problems before time is called, use the time remaining to check your answers.

Total Correct	Scorer's Initials

1. Blossom is thinking of a positive three-digit integer. She gave some clues to finding it.
   - None of the digits is a zero.
   - The integer is divisible by 3.
   - Exactly one of the digits is a perfect square.

   What is the smallest possible integer Blossom could be thinking of?

1. _____

2. An employee of a delivery company drives 480 miles at 60 miles per hour in a vehicle that averages 20 miles per gallon of gas. The employee is paid $12 per hour, gasoline costs $3 per gallon, and maintenance on the vehicle is $0.15 per mile. According to these rates, what is the total cost of this trip for the company?

2. $_____

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Problems 3 and 4

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3. The Math Club ordered the Super Monster pizza from Pizza Shack for their meeting. Jose took 1/5 of the pizza. Marti took 1/4 of what was left. Then Bobbi took 1/3 of the remaining pizza. Finally, Ms. Gauss, the advisor, took 1/2 of the remaining pizza. What percent of the entire pizza was left after Ms. Gauss took her share?

3. _____ %

4. In the 21st century, Marco will celebrate his Nth birthday in the year N^2. In what year did he celebrate his 13th birthday?

4. _____

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Target Round
Problems 5 and 6

Name _____

School _____

Chapter _____

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Total Correct	Scorer's Initials

5. How many distinct sums can be obtained by adding three different numbers from the set {3, 6, 9. …, 27, 30}?

5. _____ sums

6. Suppose x and y are real numbers such that $xy = 9$ and $x^2y + xy^2 + x + y = 100$. What is the integer value of $x^2 + y^2$?

6. _____

MATHCOUNTS®

2011
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Target Round
Problems 7 and 8

Name _____

School _____

Chapter _____

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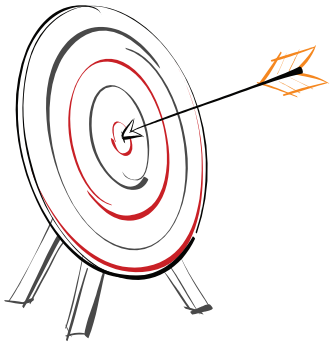
Total Correct	Scorer's Initials

7. Hans and Franz are in a shooting competition. The object of the match is to be the first to hit the bull's-eye of a target 100 feet away. The two opponents alternate turns shooting, and each opponent has a 40% chance of hitting the bull's-eye on a given shot. If Hans graciously allows Franz to shoot first, what is the probability that Hans will win the competition and take no more than three shots? Express your answer as a decimal to the nearest hundredth.

7. _____



8. The solid figure shown has six faces that are squares and eight faces that are equilateral triangles. Each of the 24 edges has length 2 cm. The volume of the solid can be expressed in cubic centimeters in the form $\frac{a}{b}\sqrt{c}$ where c has no perfect square factor except 1 and where a and b are relatively prime. What is the value of $a + b + c$?

8. _____