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# MATHCOUNTS®

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2019  
■ State Competition ■  
Target Round  
Problems 1 & 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 left-hand column of the problem sheets. If you complete the problems before time is called, use the time remaining to check your answers.

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Problem 1	Problem 2	Scorer's Initials



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1. \_\_\_\_\_ feet An architectural scale drawing of a classroom is 9 inches by 12 inches. The area of the actual classroom is  $768 \text{ ft}^2$ . What is the actual length of the longer side of the classroom?

2. \_\_\_\_\_ units<sup>2</sup> Triangle ABO has vertices A(6, 12), B(12, 9) and O(0, 0). What is the area of triangle ABO?

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# MATHCOUNTS®

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2019  
■ State Competition ■  
Target Round  
Problems 3 & 4

Name \_\_\_\_\_

School \_\_\_\_\_

Chapter \_\_\_\_\_

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Problem 3	Problem 4	Scorer's Initials



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3. \_\_\_\_\_ % Pismo clams may be harvested along the California coast from September 1st through April 30th. In a non-leap year, during what percent of the year can clams not be harvested? Express your answer to the nearest tenth.

4. \_\_\_\_\_ integers How many of the first 2018 positive integers have an odd number of positive factors?

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# MATHCOUNTS®

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2019  
■ State Competition ■  
Target Round  
Problems 5 & 6

Name \_\_\_\_\_

School \_\_\_\_\_

Chapter \_\_\_\_\_

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Problem 5	Problem 6	Scorer's Initials

# Raytheon

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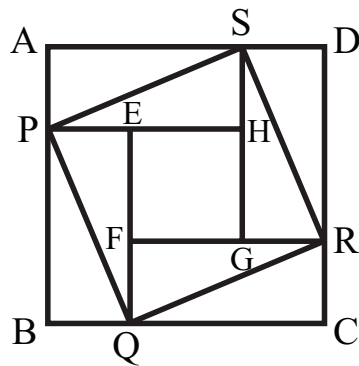
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5. \_\_\_\_\_ points The Rockets had 6995 possessions during the first 70 basketball games of the season. With those possessions, the team made 1019 baskets worth three points each, 1797 baskets worth two points each and 1421 baskets worth one point each. If only one, two or three points are awarded for making baskets, on average, during those 70 games, how many points did the Rockets score per 100 possessions? Express your answer as a decimal to the nearest thousandth.

6. \_\_\_\_\_  $\text{cm}^2$  In the figure, square ABCD is divided into eight congruent right triangles and square EFGH, as shown. If the area of square ABCD is  $1156 \text{ cm}^2$  and the area of square PQRS is  $676 \text{ cm}^2$ , what is the area of square EFGH?



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# MATHCOUNTS®

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2019  
■ State Competition ■  
Target Round  
Problems 7 & 8

Name \_\_\_\_\_

School \_\_\_\_\_

Chapter \_\_\_\_\_

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Problem 7	Problem 8	Scorer's Initials

**Raytheon**

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7. \_\_\_\_\_ Andy has a cube of edge length 8 cm. He paints the outside of the cube red and then divides the cube into smaller cubes, each of edge length 1 cm. Andy randomly chooses one of the unit cubes and rolls it on a table. If the cube lands so that an unpainted face is on the bottom, touching the table, what is the probability that the entire cube is unpainted? Express your answer as a common fraction.

8. \_\_\_\_\_ The sequence  $a_n$  is defined by  $a_1 = 20$ ,  $a_2 = 19$  and for  $n \geq 3$ ,  $a_n = |a_{n-1}| - |a_{n-2}|$ . What is the value of  $a_{2019}$ ?