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# MATHCOUNTS<sup>®</sup>

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2013

■ Chapter Competition ■

Target Round

Problems 1 and 2

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Name \_\_\_\_\_

School \_\_\_\_\_

**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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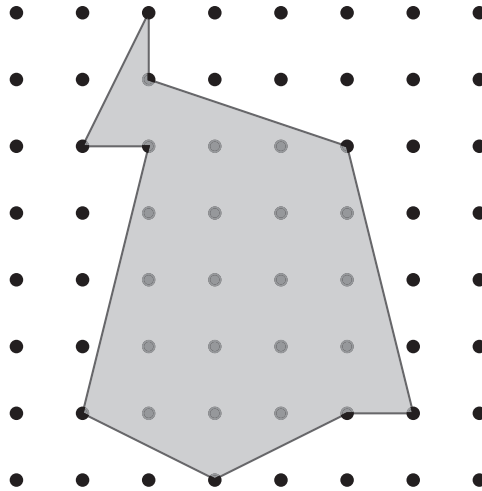
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1. \_\_\_\_\_ units<sup>2</sup>

In the figure shown here, the distance between any two horizontally or vertically adjacent dots is one unit. What is the area of the shaded polygon? Express your answer as a decimal to the nearest tenth.



2. \_\_\_\_\_ %



Barbara completely fills her mug with a mixture that is 15 mL of hot chocolate and 35 mL of cream. What percent of the mixture is hot chocolate?

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# MATHCOUNTS®

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2013

■ Chapter Competition ■  
Target Round  
Problems 3 and 4

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Name \_\_\_\_\_

School \_\_\_\_\_

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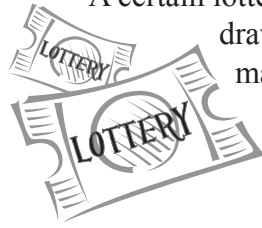
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3. \_\_\_\_\_ tickets



A certain lottery has 20 million possible combinations in their weekly drawing. If you wanted to purchase 20 million tickets, how many tickets would you need to purchase each second, on average, to buy them all in one week? Express your answer to the nearest whole number.

4. \_\_\_\_\_

What is the mean of all possible positive three-digit integers in which no digit is repeated and all digits are prime? Express your answer as a decimal to the nearest hundredth.

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# MATHCOUNTS®

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2013

■ Chapter Competition ■  
Target Round  
Problems 5 and 6

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Name \_\_\_\_\_

School \_\_\_\_\_

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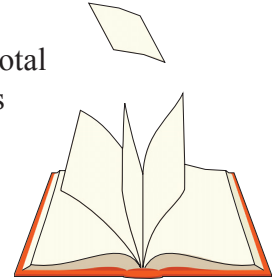
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5. \_\_\_\_\_ Ray's age is half his sister's age, and his age is the square root of one-third their grandfather's age. In 5 years, Ray will be two-thirds as old as his sister will be then. What is the ratio of Ray's sister's age to their grandfather's age right now? Express your answer as a common fraction.

6. \_\_\_\_\_ Alex added the page numbers of a book together and got a total of 888. Unfortunately, he didn't notice that one of the sheets of the book was missing with an odd page number on the front and an even page number on the back. What was the page number on the final page in the book?



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# MATHCOUNTS®

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2013

■ Chapter Competition ■

Target Round

Problems 7 and 8

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Name \_\_\_\_\_

School \_\_\_\_\_

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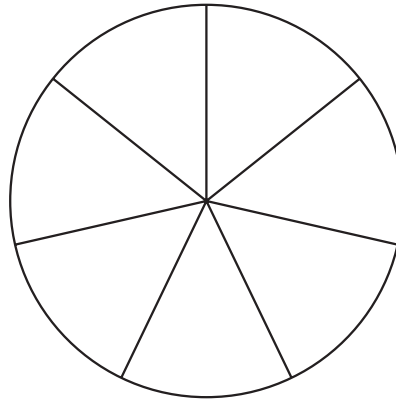
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7. \_\_\_\_\_ ways A circular spinner has seven sections of equal size, each of which is colored either red or blue. Two colorings are considered the same if one can be rotated to yield the other. In how many ways can the spinner be colored?



8. \_\_\_\_\_ units<sup>2</sup> A square is inscribed in a circle of radius 5 units. In each of the four regions bounded by a side of the square and the smaller circular arc joining the endpoints of that side, a square is drawn so that one side lies on the side of the larger square and the two opposite vertices lie on the circle, as shown. What is the total area of the five squares? Express your answer to the nearest whole number.

