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# MATHCOUNTS

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1993-94

■ State Competition ■  
Target Round  
Problems 1 and 2

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Name \_\_\_\_\_

School \_\_\_\_\_

Chapter \_\_\_\_\_

## DO NOT BEGIN UNTIL YOU ARE INSTRUCTED TO DO SO

This section of the competition consists of eight problems. They will be presented to you in pairs. Work on one pair of the questions will be completed and answers will be collected before the next pair is distributed. The time limit for each set of two 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 read silently as the problems are read aloud. Pencils are to be down while the problems are being read. When instructed to begin, pick up your pencil and begin working. Record your final answer in the designated space on the question 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 questions before time is called, use the time remaining to check your answers.

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Total Correct	Scorer's Initials

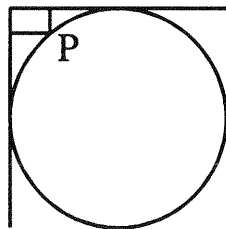
MATHCOUNTS is a cooperative project of the National Society of Professional Engineers, the CNA Insurance Companies, the Cray Research Foundation, the General Motors Foundation, the Intel Foundation, Texas Instruments Incorporated, the National Council of Teachers of Mathematics, and the National Aeronautics and Space Administration.

1. Solve for  $n$ :  $\frac{8!}{n!} = 336$ .

1. \_\_\_\_\_

2. A circular table is pushed into the corner of a square room so that a point P on the edge of the table is 8" from one wall and 9" from the other wall as shown. Find the radius of the table in inches.

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



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# MATHCOUNTS

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1993-94

■ State Competition ■  
Target Round  
Problems 3 and 4

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Name \_\_\_\_\_

School \_\_\_\_\_

Chapter \_\_\_\_\_

**DO NOT BEGIN UNTIL YOU ARE  
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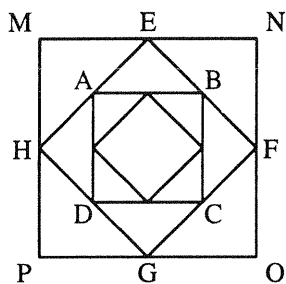
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3. The smallest square shown is inscribed in square ABCD which is inscribed in square EFGH which is inscribed in the largest square MNOP. If the area of the smallest square has the minimum possible value, what is the ratio of the area of the smallest square to the area of the largest square? Express your answer as a common fraction.

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



4. What is the units digit in the product  $(2^{23} + 3^{13}) \cdot 4^{17}$ ?

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

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# MATHCOUNTS

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1993-94

■ State Competition ■

Target Round  
Problems 5 and 6

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Name \_\_\_\_\_

School \_\_\_\_\_

Chapter \_\_\_\_\_

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5. Name the segment represented by the following expression:  
 $[\overline{AE} \cup (\overline{EF} \cap \overline{CD})] \cap [(\overline{AD} \cap \overline{CE}) \cup \overline{AB}]$

5. \_\_\_\_\_



6. A number is called increasing if each of its digits is greater than the digit immediately to its left, if there is one. How many increasing numbers are there between 100 and 200 ?

6. \_\_\_\_\_

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# MATHCOUNTS

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1993-94

■ State Competition ■

Target Round  
Problems 7 and 8

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Name \_\_\_\_\_

School \_\_\_\_\_

Chapter \_\_\_\_\_

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7. The force of gravitational attraction between two objects is inversely proportional to the square of their distance apart. If two objects have a gravitational force of 750 units when they are 3300 meters apart, how far apart are they when their gravitational force is 1000 units? Express your answer to the nearest meter.

7. \_\_\_\_\_

8. How many 2-digit numbers are not divisible by 13 ?

8. \_\_\_\_\_