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India International Mathematics Competition
Organized by - CITY MONTESSORI INTER COLLEGE, RDSO Campus, Lucknow - INDIA
Phone: +91-522-2453546, E-mail: inimc@cmseducation.org, rdso@cmseducation.org

Elementary Mathematics International Contest

Team Contest

Time limit: 70 minutes

Information:

- You are allowed 70 minutes for this paper, consisting of 10 questions printed on separate sheets. For questions 1, 3, 5, 7 and 9, only numerical answers are required. For questions 2, 4, 6, 8 and 10, full solutions are required.
- Each question is worth 40 points. For odd-numbered questions, no partial credits are given. There are no penalties for incorrect answers, but you must not give more than the number of answers being asked for. For questions asking for several answers, full credit will only be given if all correct answers are found. For even-numbered questions, partial credits may be awarded.
- Diagrams shown may not be drawn to scale.

Instructions:

- Write down your team's name in the space provided on every question sheet.
- Enter your answers in the space provided after individual questions on the question paper.
- During the first 10 minutes, the four team members examine the first 8 questions together, and then altogether discuss them. Then they distribute the questions among themselves, with each team member is allotted at least 1 question.
- During the next 35 minutes, the four team members write down the solutions of their allotted problems on the respective question sheets, with no further communication /discussion among themselves.
- During the last 25 minutes, the four team members work together to write down the solutions of the last 2 questions on the respective questions sheets.
- You may not use instruments such as protractors, calculators and electronic devices.
- At the end of the contest, you must hand in the envelope containing all question sheets and all scratch papers.

English Version

Team: _____ ***Score:*** _____

For Juries Use Only

No.	1	2	3	4	5	6	7	8	9	10	Total	Sign by Jury
Score												
Score												

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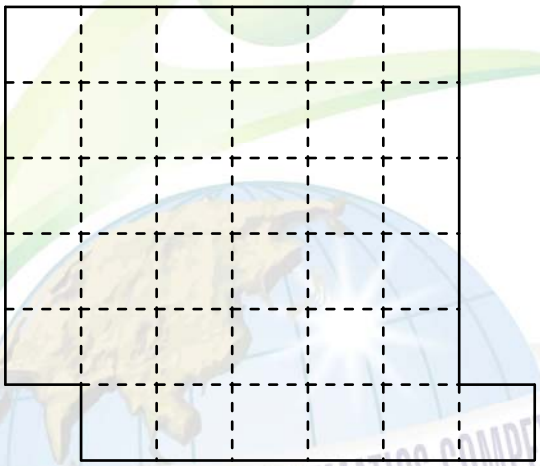
Elementary Mathematics International Contest

TEAM CONTEST

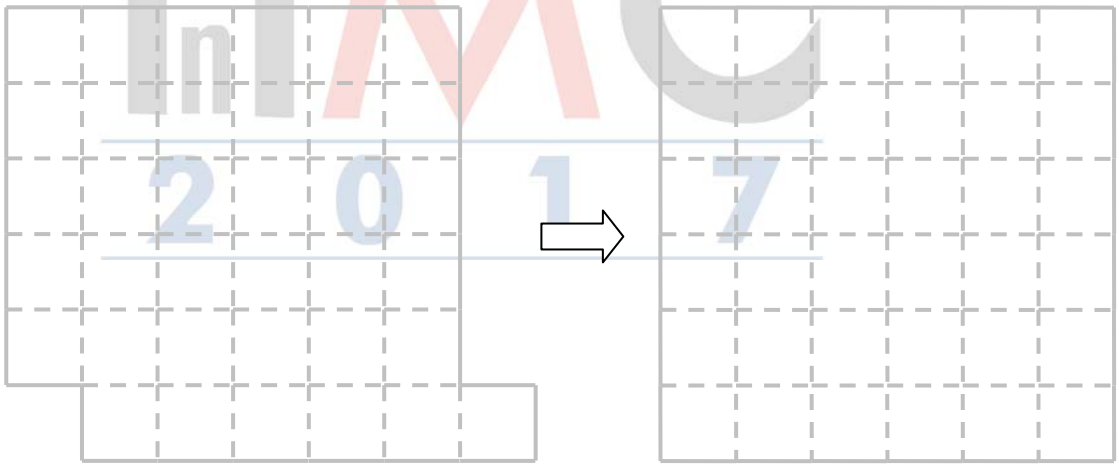
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Team : _____ Score : _____

1. Dissect the following figure into two identical pieces and put them together to form a square. The pieces may be rotated or reflected.



Answer:



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2. Let each of the letters *L*, *U*, *C*, *K*, *N*, *W*, *I*, *M* represent a distinct digit from 1 to 9, and let *O* represent the digit 0. Find the number of solutions to

$$\begin{array}{cccccc} & L & U & C & K \\ + & & N & O & W \\ \hline & I & I & M & C \end{array}$$

Answer: _____ solutions

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3. Find the least multiple of 704 using digits 1 and 2 only. (Repetition of digits is allowed).

Answer: _____

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4. How many positive integers less than or equal to 2017 have a units digit of 7 and can be expressed as the sum of two perfect squares?

Answer: _____ integers

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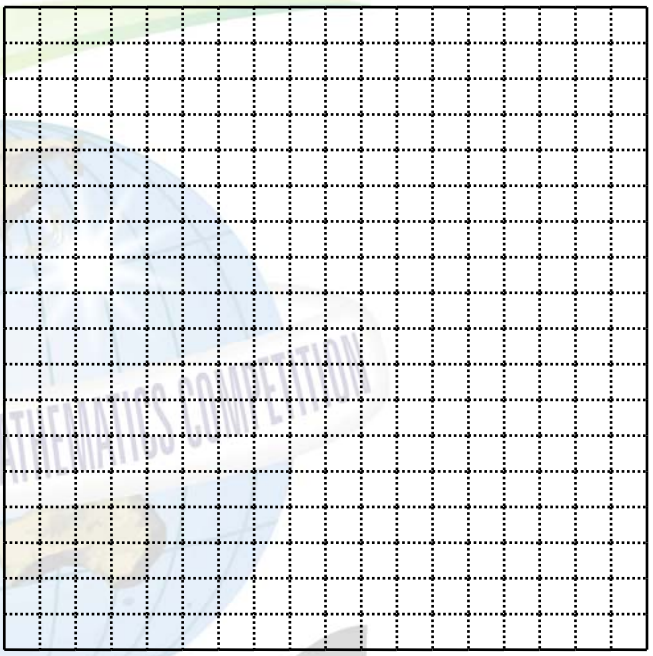
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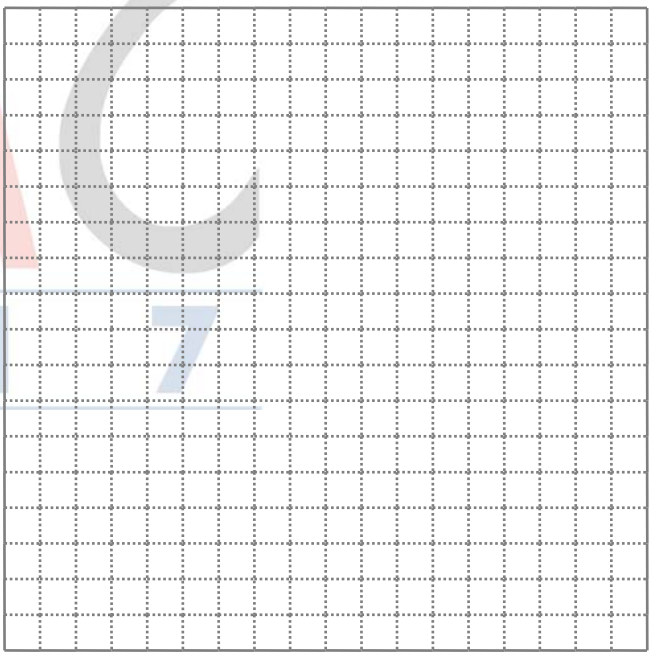
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5. On the 18×18 grid, diagonals are drawn all in the same direction on some of the unit squares. If no two diagonals share a common point, what is the largest number of diagonals that can be drawn? Show a sample pattern where this can be achieved





Answer: _____ diagonals,

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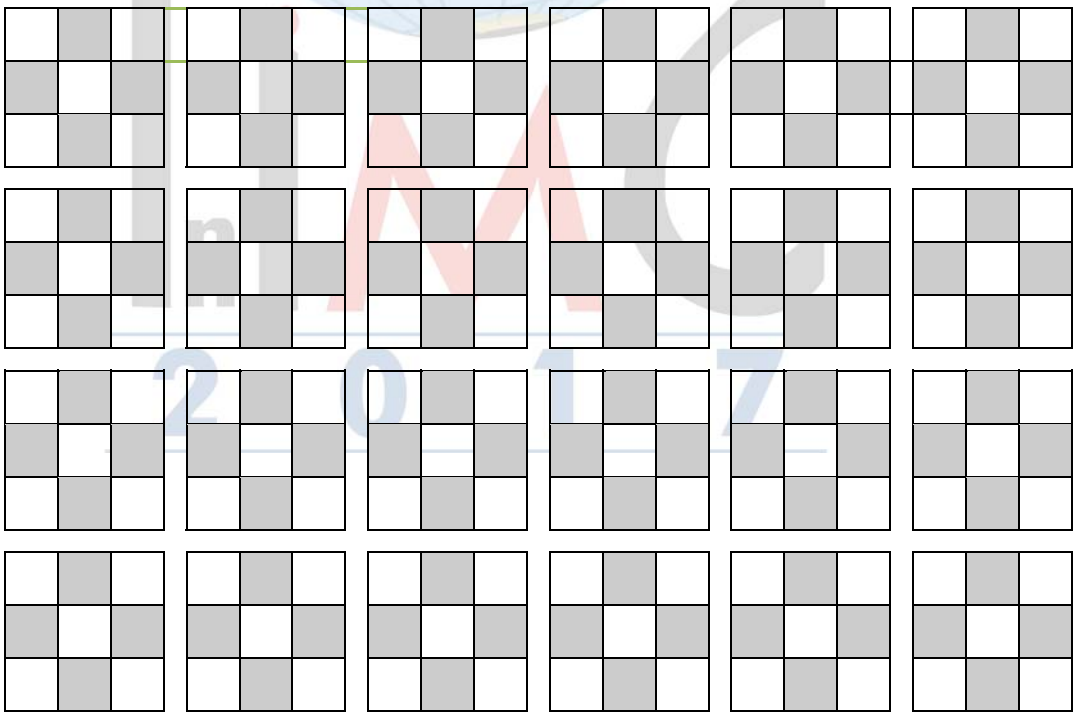
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6. In the diagram, eight of the numbers from 1 to 10 are used to fill the squares *A*, *B*, *C*, *D*, I, II, III, and IV . The numbers in I, II, III, and IV are the sums of their two neighbors. List down all the possible solutions. (Rotations and reflections are allowed).

I	*B*	II
A		*C*
IV	*D*	III



Answer: _____

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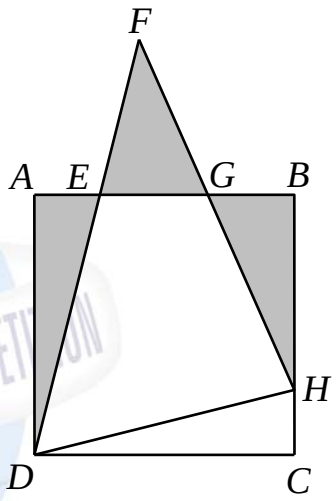
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7. *H* is a point on the side *BC* of a square *ABCD*. *F* is a point outside *ABCD* such that the side *AB* intersects *FD* at *E* and *FH* at *G*, where *DE* : *EF* = 5 : 3 and *GH* : *FG* = 5 : 4. If the areas of triangles *ADE*, *EFG* and *BGH* are the same, find the ratio of the area of *DEGH* to the area of *CDH*.



Answer: _____

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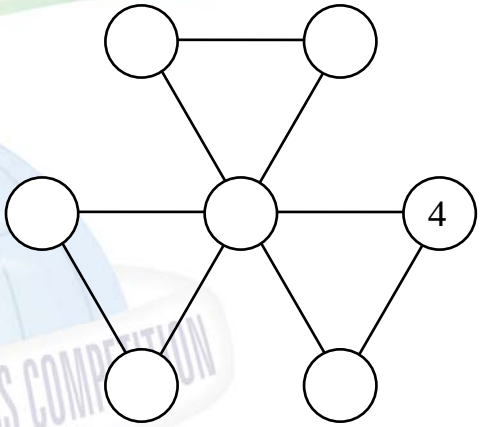
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Team : _____ Score : _____

8. The integers from 1 to 7 are to be placed in the seven circles in the diagram. In each of the three triangles drawn, the sum of the three numbers is the same. One of the numbers, namely 4, is given. Find the number of different ways of placing the other six numbers?



Answer: _____ ways

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Team：_____ Score：_____

9. When a positive integer is inputted into a machine, the machine returns a number which is half the original number if it is even, and 1 less than the original number if it is odd. Find the smallest positive integer such that if we input it into the machine, and continue to input the number that we receive in return continuously for 17 times, we obtain the result of 1. (17 operations performed in total.)

Answer: _____

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10. Find the largest four-digit number $\overline{abcd}$ such that at least one of its digits is 1 and $\overline{abcd} = 2 \times a \times b \times c \times d + 2017$.

Answer: _____