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**ISIJ 2020, Math Tournament,  
July 8, 2020, Yandex Contest**

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**1. CIRCLES**

Circles have radiuses 6 and 4 and intersect at two points. Find the difference in the area of two figures that are obtained after removing their common part from the corresponding circles.

*Output only the integer part of the number that is the answer.*

**2. CAKE**

The cake has the form of a parallelogram with vertex coordinates (0,0); (4,0); (6,6); (2,6). Rabbit and Fox share the cake as follows. Rabbit points to a point on the surface of the cake, and the Fox cuts the cake into two pieces in a straight line passing through this point and takes one for himself. Everyone wants a bigger piece. Where should the Rabbit put the dot?

*Output the answer - the coordinate of this point as two numbers separated by spaces.*

**3. TWO POLYHEDRONS**

Two convex polyhedra have 38 vertices and 64 edges together. How many faces do they have together?

*Output the number that is the answer to the problem.*

**4. MAX PRODUCT**

The sum of several natural numbers is 14. Find the largest possible value of their multiplication.

*Output the number that is the answer to the problem.*

**5. SUM OF ODD NUMBERS**

Find the largest positive root of the equation

$$\sqrt[3]{x^2 \sqrt[3]{x^2 \sqrt[3]{x^2 \dots}}} = 100$$

*Output the number that is the answer to the problem.*

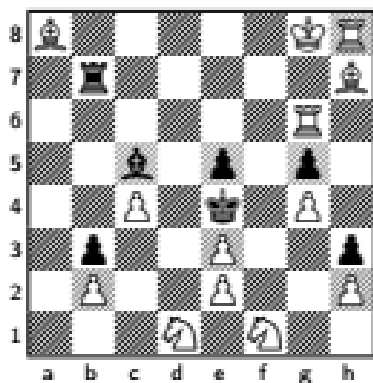
**6. MAX ROOT**

Find the largest positive root of the equation

$$\sqrt[3]{x^2 \sqrt[3]{x^2 \sqrt[3]{x^2 \dots}}} = 100$$

*Output the number that is the answer to the problem.*

## 7. CHESS



In a position on the chessboard, it seems that the move of any white piece leads to a checkmate. Still, white has the only move that doesn't checkmate black. Find it and write down the addresses of the cells of the course: from where to where.

Enter the cell address using a large Latin letter and a number (without a space between them).

*Output the answer, enter the addresses of the two cells (from where to where), separating them with a space.*

## 8. SOFA AND WARDROBE

Table	Table	Table
Wardrobe		Sofa

For the *smallest number of moves*, you can swap the Wardrobe and Sofa.

*Output the number that is the answer to the problem.*

## 9. SUM OF PERMUTATIONS

Find the sum of all the numbers that are obtained by permutations of digits from the number 12345.

*Output the number that is the answer to the problem.*

## 10. NUMBER OF FRACTIONS

How many different fractions can be obtained by placing brackets in the expression  $x_1 : x_2 : \dots : x_{10}$  ?

For example, from the expression  $x_1 : x_2 : x_3$  you can get only two different fractions:

$$x_1 : (x_2 : x_3) = \frac{x_1 \cdot x_3}{x_2}, \quad (x_1 : x_2) : x_3 = \frac{x_1}{x_2 \cdot x_3}.$$

*Output the number that is the answer to the problem.*