

## Yellow level



- (5 credits)** Pinocchio chose a two-digit number and said the following about it: "If the first digit of my number is even, then the second one is odd." As usual he lied. How many different numbers could he choose in this case?
- (5 credits)** The positive numbers  $a$ ,  $b$  and  $c$  are such that  $a^2 + 2bc = b^2 + c^2$  and their sum is 2020. What is the largest of the numbers  $a$ ,  $b$  and  $c$ ?
- (7 credits)** In how many ways can asterisks in the record  $2^{***}2$  be arranged so that the resulting number is a multiple of 24?
- (7 credits)** A ray from the vertex  $B$  of the quadrangle  $ABCD$  divides the segments  $AC$  and  $AD$  in half. A ray from the vertex  $D$  divides the segments  $AC$  and  $AB$  in half. In which ratio do the diagonals of the quadrangle divide each other?
- (7 credits)** The sum of some natural number  $A$  and the sum of its digits is equal to  $B$ . The sum of  $B$  and the sum of its digits is equal to  $C$ . Then we got the initial number  $A$  after subtracting the sum of digits of the number  $C$  from the number  $C$ . What is the minimum value of  $A$  matching the problem statement?
- (10 credits)** Is it possible to place the numbers  $1, 2, \dots, 16$  into cells of the  $4 \times 4$  table so that any two numbers in its horizontally or vertically adjacent cells differ by 2 or 3? If yes, enter 1, if no, enter 0.
- (12 credits)** How many ways can the word CANADA be 'read', if we start from a certain cell and move horizontally or vertically from the letter in this cell to the letter in any adjacent cell? Any letter may be read several times.

				C
			C	A
		C	A	N
	C	A	N	A
C	A	N	A	D

- (12 credits)** Find the common fraction with the denominator less than 17, which is located on the coordinate line between  $15/17$  and  $17/19$ .
- (15 credits)** In the triangle  $ABC$ , the angle  $A$  is  $46^\circ$ , and the angle  $C$  is  $78^\circ$ .  $O$  is a point on the bisector of the angle  $B$  inside the triangle; this point is placed so that the angle  $AOC$  is  $118^\circ$ . Find all angles in the triangle  $AOC$ .
- (20 credits)** A rectangle  $n \times m$  is cut into three-cell corners. The total length of the cuts is 2011. Find the lengths of the sides of the rectangle.