

First round

Dutch Mathematical Olympiad

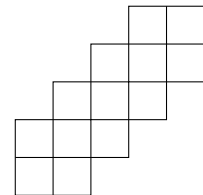


19 January – 30 January 2026

- Time available: 2 hours (120 minutes).
- The A-problems are multiple choice questions. Exactly one of the five given options is correct. Please circle the letter of the correct answer on the form. A correct answer is awarded 2 points, for a wrong answer no points are given.
- Each B-problem requires a short answer (e.g. a number) without further explanation. A correct answer is awarded 5 points, for a wrong answer no points are given. Please work very accurately: a minor error in a calculation may result in a wrong answer.
NOTE: All answers should be given in exact and simplified form, like $\frac{11}{81}$, $2 + \frac{1}{2}\sqrt{5}$, $\frac{1}{4}\pi + 1$, or 3^{100} .
- Formula sheets, calculators, and other electronic devices are not allowed. You can only use a pen, paper, compass, ruler or set square and of course your mental skills.
- After the contest, hand in your answer sheet, this problem sheet and any scrap paper. The problems and solutions will be available from 1 February on the website: www.wiskundeolympiade.nl.
- Good luck!

A-problems

1. There is a piece of cheese on each square in the figure on the right. A mouse chooses a square to start at and then keeps walking (after eating the piece of cheese) to a neighbouring square. (Two squares are neighbours if they have one side in common.) It wants to eat as many pieces of cheese as possible, but never enter a square it has been at before. How many cubes of cheese can it eat at most?



A) 8 B) 9 C) 10 D) 11 E) 12

2. Dominoes are rectangular stones with two numbers on them. You can place two dominoes against each other if the numbers on the ends are equal. So the stones 2-5, 0-5 and 2-3, for example, can be placed in a row one after the other as follows: 3-2, 2-5, 5-0. Emre has taken the dominoes 0-1, 0-4, 2-2, 2-3, 2-4, 2-5, 4-5 and 4-6. He wants to put seven of these eight dominoes together in a row.

Which domino should Emre not use?

A) 0-1 B) 2-3 C) 2-4 D) 2-5 E) 4-6

3. In a class of 15 students, one or more students always speak the truth. The other students sometimes speak the truth and sometimes not. The students know which other students are always speaking the truth. The head of the school asks each of the students how many students always speak the truth. She gets the following fifteen answers: “two” (1 time), “three” (4 times), “four” (3 times), “five” (2 times) and “six” (5 times).

How many students always speak the truth?

A) 2 B) 3 C) 4 D) 5 E) 6

PLEASE CONTINUE ON THE OTHER SIDE

4. Five chairs with the letters A to E on them stand in a circle in that order. Five people named A to E are sitting on the chairs, each on a different chair, but not necessarily on the chair with their own letter. We know the following:
- Person A is sitting on chair D.
 - Person B sits on a chair right next to chair B.
 - Person C is sitting on a chair with a different letter and the person with that letter is actually sitting on chair C.
 - Person E sits between person C and person D (with no other people in between).

Which chair is person D sitting on?

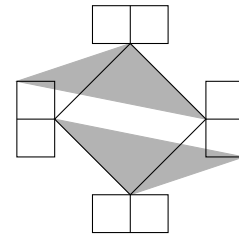
- A) chair A B) chair B C) chair C D) chair D E) chair E

5. A bin contains red, white and blue balls. The total number of balls in the bin is less than 100. There is at least one ball of each colour. The number of red balls is an even number. The number of white and blue balls together is 4 times the number of red balls. The number of red and blue balls together is 6 times the number of white balls.

How many balls are in the bin?

- A) 28 B) 30 C) 35 D) 70 E) 84

6. Peter wants to design a flag for his new maths club. His current design consists of a large square with an area of 100 and at each of the four vertices two small squares with sides parallel to the diagonals of the large square. He would like to colour the two triangles indicated in the figure red. Peter creates 9 designs for which the small squares are increasing in size from 1×1 to 9×9 (in which case they overlap). How does the area of the red triangles change?



- A) it keeps increasing B) it keeps decreasing
 C) it increases first and then decreases D) it decreases first and then increases
 E) it is constant

7. Dascha creates a sequence of numbers with the following properties:

- The sequence contains 100 numbers.
- The sequence contains only the numbers 1, 2, 3, 4, all exactly the same number of times.
- Each pair of consecutive numbers in the sequence differs by at least 2.

How many sequences can she make this way?

- A) 0 B) 2 C) 4 D) 200 E) 2^{50}

8. Dana starts with an odd 1-digit number. She now tosses a coin 2026 times in a row and after each toss she does one of the following (using a computer):

- Heads: she multiplies her number by 2 and then adds 1, or
- Tails: she multiplies her number by 7 and adds 6.

She finishes with the huge 625-digit number $646 \dots 143$.

Which number did she started with?

- A) 1 B) 3 C) 5 D) 7 E) 9

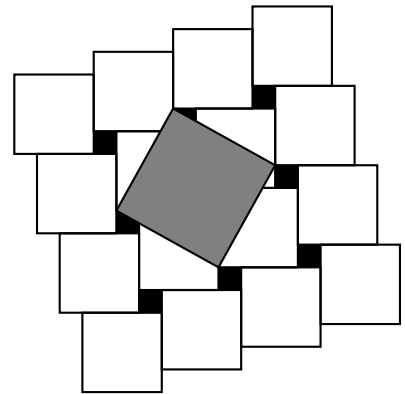
B-problems

- Jasper chooses five numbers under one hundred. He chooses the five numbers in such a way that the five numbers contain each of the digits 0 to 9 exactly once and do not start with zero. Moreover, the numbers are all divisible by 3 but not by 9. There are several ways to do this. He does it such that the five numbers added together give the largest possible outcome. What is that outcome?

- A floor is tiled with square tiles as shown in the figure on the right. The white tiles all have the same size and the black tiles all have the same size. The area of one white tile is 92 and the area of one black tile is 7. On the floor there is also a square grey tile.

What is the area of that grey tile?

Please note that the figure is not to scale.



- The time twelve past eight in the evening on 20 December 2012 can be written as 20:12 on 20-12 in 2012. Thus, the number 2012 can denote a time, a date and a year.

How many four-digit numbers that do not start with a zero can indicate a time, a date and a year in this way?

- In the pyramid on the right, the letters A to I indicate integers that are greater than 1. Each colon in a row indicates a division, for which the outcome is in the row below. That means, for example, that $A : B = E$ and $B : C = F$. At the bottom of the pyramid, there is a 1. Moreover, it is given that $B = 150$.

What is the value of G ?

$$\begin{array}{cccc}
 A & : & B & : & C & : & D \\
 & & E & : & F & : & G \\
 & & & & H & : & I \\
 & & & & & & 1
 \end{array}$$