The Niels Henrik Abel mathematics competition: Second round 2025–2026

8 January 2026 (English)

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The second round of the Abel competition consists of 10 problems to be solved in 100 minutes. The solutions are integers between 0 and 999, inclusive. Write your answers in the lower left hand side of the form.

You get 10 points for each correct answer and 0 points for a blank or wrong answer. This yields a total between 0 and 100 points.

No aids other than scratch paper and writing implements (including compass and ruler, but not protractor) are allowed.

Fill in using block letters

Name		Date of birth
Email		Gender F ☐ M ☐
School		Class
Citizenship		Mobile phone

☐ Check the box to allow us to put your name on the score board. (Only applies to the highest scores, approx. top 33 %.)

Answers

1		6	
2		7	
3		8	
4		9	
5		10	

Problem 1

In a mathematics competition, the number of qualified girls for the finals equalled 25% of the number of qualified boys. Unfortunately, one of the girls was unable to attend, and her place was given to the next on the list – a boy. After this substitution, the number of girls in the finals became 20% of the number of boys. How many competitors in total competed in the finals?

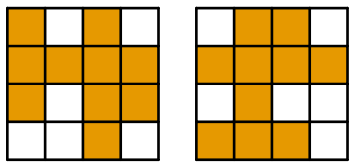
Problem 2

How many different positive integers divide the number 2025?

Problem 3

Three circles of radius 20, 30, and 100, respectively, are mutually tangent on the outside. Determine the radius of the circle passing through the three circle centres.

Problem 4



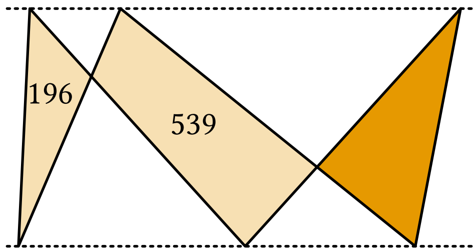
Nina wants to colour ten of the squares on a 4×4 board, so that one row has one coloured square, one row has two coloured squares, one row has three, and one has four coloured squares. The corresponding requirement is to hold for the columns as well. In how many ways can she do this?

We don't consider two colourings to be equal if they are merely mirror images or rotated. We count the two examples in the figure as different colourings, even though one equals the other rotated 90°.

Problem 5

Define $f(n)$ to be the sum of the last digit of n, ten times the next to last digit, the third from last digit, ten times the fourth from last digit, and so on. For example, $f(6789) = 9 + 80 + 7 + 60$. How many times does 99 occur in the list of numbers $f(f(1)), f(f(2)), \ldots, f(f(9999))$?

Problem 6



The dotted lines in the picture are parallel, and the areas of the triangle on the left and the middle quadrilateral are 196 and 539, respectively.

What is the area of the triangle on the right?

Problem 7

Imagine a function g such that $g(n)$ is a number between 1 and 7 for every number n between 1 and 7, and which furthermore satisfies

$$g(g(g(g(g(g(g(n))))))) = n$$

for every number n between 1 and 7. (By "number between 1 and 7", we mean one of the integers 1, 2, 3, 4, 5, 6, 7.) For each such function, we construct a number by simply putting the digits $g(1)$, $g(2)$, ..., $g(7)$ next to each other. For example, if $g(1) = 3$, $g(2) = 2$, $g(7) = 5$, we get a number on the form $32{*}{*}{*}{*}5$ where each $*$ represents a digit between 1 and 7. How many different numbers can we make in this way?

Problem 8

A polynomial $Q(x)$ has integer coefficients and degree less than or equal to 2025. Each term of the polynomial $xQ(x)+Q(x)$ has a coefficient less than or equal to 2026. To top it off, the value of $Q(1)$ is the largest possible given all these conditions. What will the remainder be, after dividing $Q(1)$ by 1000?

Problem 9

How many different (non congruent) right triangles exist for which all the sides have integer length and one side has length 2025?

Problem 10

An interior point P in the square $ABCD$ satisfies $AP = 17$, $BP = 11$ and $CP = 5$. What is the area of the square?