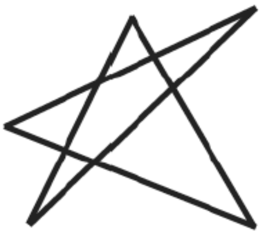
FSJM – SEMI-FINAL- 14 MARCH 2026

Information and results at http://www.fsjm.ch/

START for ALL PARTICIPANTS

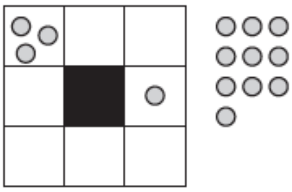
1. Dancing Star (coefficient 1)



How many fully drawn triangles can be seen in this star?

2. Matilda's Tokens (coefficient 2)

Matilda has placed four tokens in two squares of the grid.

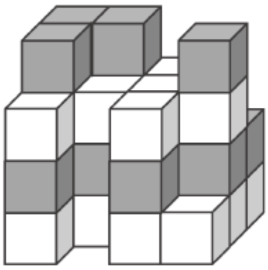


She wants to place the remaining ten tokens in the empty white squares so that:

- there is at least one token in each white square;
- in each row of three white squares (horizontal or vertical), no two squares contain the same number of tokens.

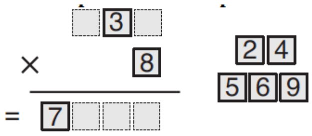
After placing the tokens in the grid, write as numbers how many are in each box.

3. The Cubes (coefficient 3)



Lulu and Lily built this structure using small grey and white cubes. The cubes on each layer are all the same colour. The bottom layer has 11 cubes, and in the layers above, each cube is placed directly on top of a cube from the previous layer. **How many cubes of each colour did they use?**

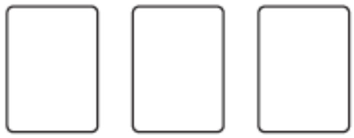
4. Complete the Multiplication (coefficient 4)



Complete this multiplication by placing the five counters to the right on the empty squares.

What will be the result?

5. Three Cards (coefficient 5)



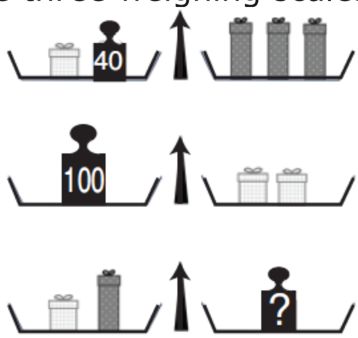
Matilda laid out three playing cards in front of her. Among these cards were a king, a queen, and a jack, as well as a heart (♥), a spade (♠), and a club (♣). The club was to the left of the jack. The queen was to the right of the king. The heart was to the left of the club.

Identify the three cards by placing the letters K, Q, J and H, S, C on them.

END for CE PARTICIPANTS

6. Weight and See (coefficient 6)

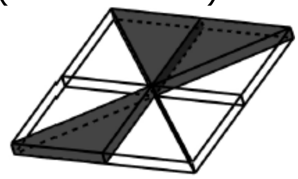
Here are three weighing scales:



Identical unlabelled boxes all have the same weight. Each scale is balanced.

What is the weight on the right side of the 3rd scale.

7. Three from Eight (coefficient 7)

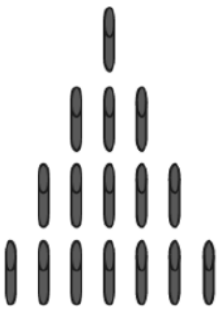


Using his 3D printer, Matthew created triangles, three black and five white, which he assembled as shown to form a large square. By randomly choosing which three triangles would be black, he could obtain different results.

How many can he obtain (including the example)?

The resulting artwork can be rotated and flipped. Multiple arrangements derived from one another by rotating or flipping the large square count as only one result.

8. Marienbad (coefficient 8)



Marie and Bart are playing a sticks game. At the start, the 4 rows contain 1, 3, 5, and 7 sticks. On each turn, a player removes as many sticks as they want, but at least one, and only from one row. The player who takes the last stick loses. Bart starts and removes 2 sticks, Marie next removes 2, then Bart removes 6. Marie then takes her turn and says she will soon win.

How many sticks does she remove on that turn?

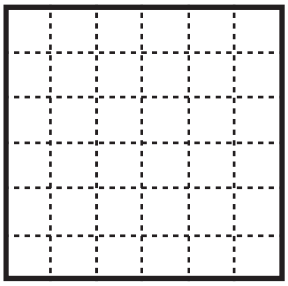
END for CM PARTICIPANTS

Problems 9 to 18: beware! For a problem to be completely solved, you must give both the number of solutions, and give the solution if there is only one, or give any two correct solutions if there are more than one. For all problems that may have more than one solution, there is space for two answers on the answer sheet (but there may still be just one solution).

9. Le Corbusier (coefficient 9)

The architect Le Corbusier created a table with various ways to divide a square with straight line segments. Draw a diagram of a possible division on the square with the following conditions:

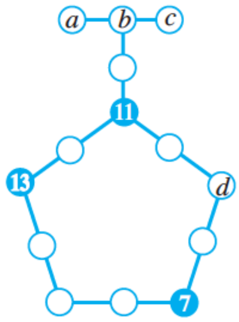
- There must be exactly 3 segments of length equal to the side of the square.
- The segments are drawn on grid lines.
- The square is divided into 6 parts, each with a different area.



What are the areas of the different parts, in ascending order?

The area of a small square on the grid will be used as the unit of area.

10. Detector (coefficient 10)



The figure represents an extraterrestrial signal detector. The discs contain the numbers from 1 to 14 (7, 11, and 13 are already placed) such that:

- the sum of three numbers located on the same segment equals 26;
- a < c.

Which numbers are in disks b and d?

11. Clumsy Cashier (coefficient 11)

Matilda has just bought a game whose price, marked in euros, is a two-digit whole number.

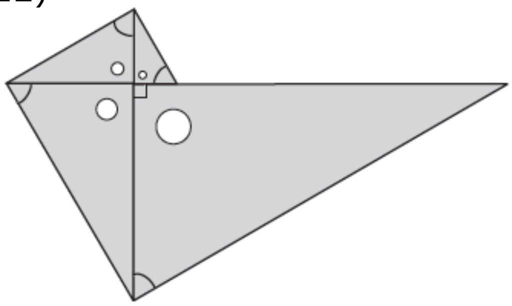
When entering the price, the cashier made a mistake and typed the sum of the square of the first digit and the square of the second digit.

Upon examining the receipt, Matilda sees that the price she paid is the marked price minus 1 euro.

How much did Matilda pay for her game?

END for C1 PARTICIPANTS

12. Four Set-Squares (coefficient 12)



These four set-squares all have one right angle and one 60° angle.

If the smallest has an area of 26 cm², what is the area of the largest?

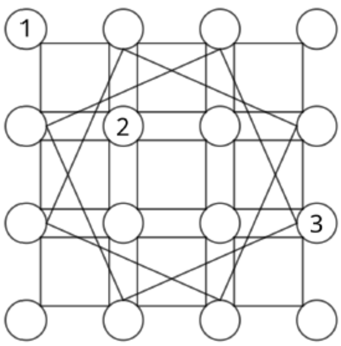
If necessary, √3 as 1.732 and answer rounded to the nearest cm².

13. Daily Bread (coefficient 13)

In Mathville, there are only five bakeries. Each bakery wants to close exactly one day a week. The residents would like at least one bakery to be open on any of the seven days of the week.

In how many different ways is this possible?

14. Fantastic Squares (coef. 14)



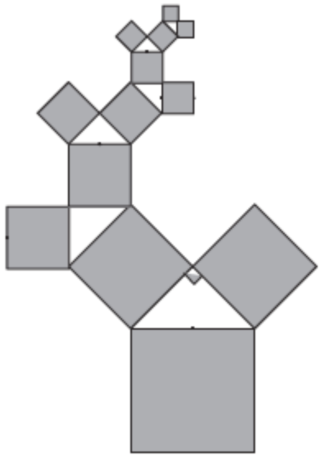
This figure is composed of 16 discs and 11 squares (9 small and 2 larger).

The goal is to distribute the numbers from 1 to 16 among the 16 discs, with the following constraint: for each of the 11 squares, the sum of the numbers in the four discs that touch the corners of the square must be equal. The numbers 1, 2, and 3 have already been placed. Complete the figure with numbers from 4 to 16.

What will be the four numbers in the bottom row?

END for C2 PARTICIPANTS

15. Strange Cactus (coefficient 15)



On the planet Koch, there are strange cacti with square leaves.

Each year, the plant produces two new leaves, only one of which will produce two new leaves the following year. The new leaves are arranged as shown in the figure relative to the parent leaf, and always surround a right isosceles triangle space. The figure represents the cactus six years after the first leaf was planted.

If the first leaf had an area of 16 dm², what will be the total area of the plant 16 years after this first leaf was planted?

Answer in dm², as an irreducible fraction.

16. Pianable Quadrilateral (coefficient 16)

A polygon is said to be pianable if at least one point within it lies at distances to the lines containing the sides that are proportional to the lengths of the sides, each distance from the point in question to the line containing a side of the polygon being proportional to the length of that side. All triangles are pianable, but few polygons with more than three sides are. In an orthonormal coordinate system, the coordinates of the 4 vertices of a quadrilateral are as follows: A(0, 0) B(7, 3) C(4, 0) D(7, -3).

In this quadrilateral, give the x-coordinate of such a point P.

If necessary, round to the nearest thousandth.

END for L1, GP PARTICIPANTS

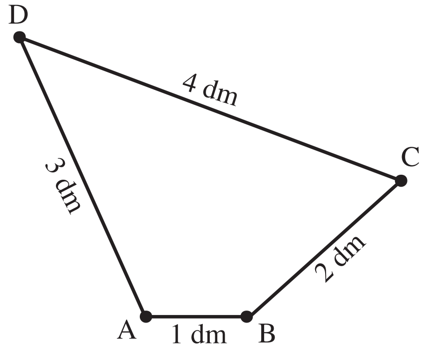
17. Square Share (coefficient 17)

We want to divide a square with sides of 1 dm into four equal areas using three line segments of equal length. These three segments must pass completely through the square and not intersect, except possibly at their endpoints.

What is the maximum length of any one of these three segments?

Answer in dm, rounded to the nearest thousandth, and if necessary, take √2 as 1.414, √3 as 1.732, and √5 as 2.236.

18. Hinged Quadrilateral (coeff.



18)

We have a hinged quadrilateral ABCD whose sides measure 1 dm, 2 dm, 4 dm, and 3 dm respectively.

What is its maximum area?

Answer in dm² rounded to the nearest hundredth, and take √2 as 1.414 and √3 as 1.732 if necessary.

END for L2, HC PARTICIPANTS

The Swiss Federation of Mathematical Games warmly thanks its sponsors for their help in organizing this event

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