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Nordic Math Class Competition
Nordic final

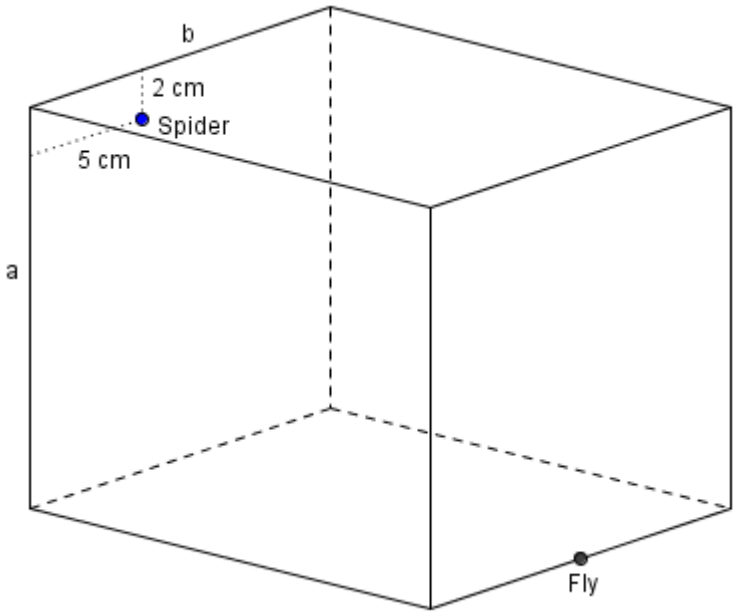
Task 1

The spider and the fly

You get a box which stands on the table with the opening down. In the middle of the shorter side down on the table sits a fly.

A string is attached to the box where the spider sits on the opposite side. The spider sits 5 cm from side ***a*** and 2 cm from side ***b***.

A. Use the string to find the shortest way from the spider to the fly on the surface of the box. You must show your solution to the judge.



B. You have three drawings with the box unfolded in different ways. The scale of the drawings is 1 : 4.
Show your solution on one of the 3 drawings.
On the other 2 drawings, show other routes the spider could travel in a straight line. Use the 3 drawings to show that you have found the shortest way.

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Answer task 1: The spider and the fly.

Country: _____

You also have to hand in
one set of worksheets to the jury.

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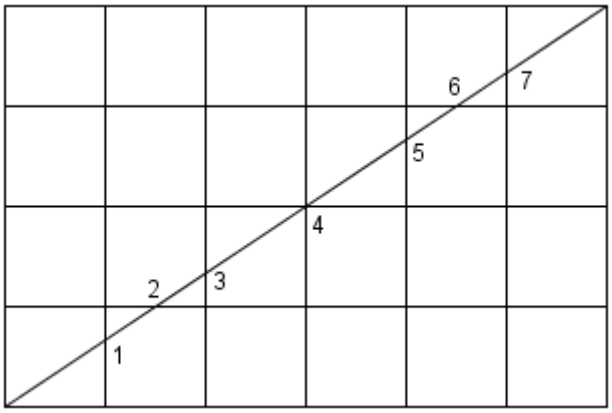
Task 2

Grid

In a 6 x 4 grid, the diagonal cuts the grid in 7 places.



Study these three grids:

27 x 27
26 x 28
25 x 29

In which grid does the diagonal cut in the fewest number of places?

In which grid does the diagonal cut in the greatest number of places?

Argue for your answers.

Can you find a general rule for how many places the diagonal cuts in a *m* x *n* grid?

Each team gets 1 x 1 cm grids.

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Answer task 2: Grid. Country: _____

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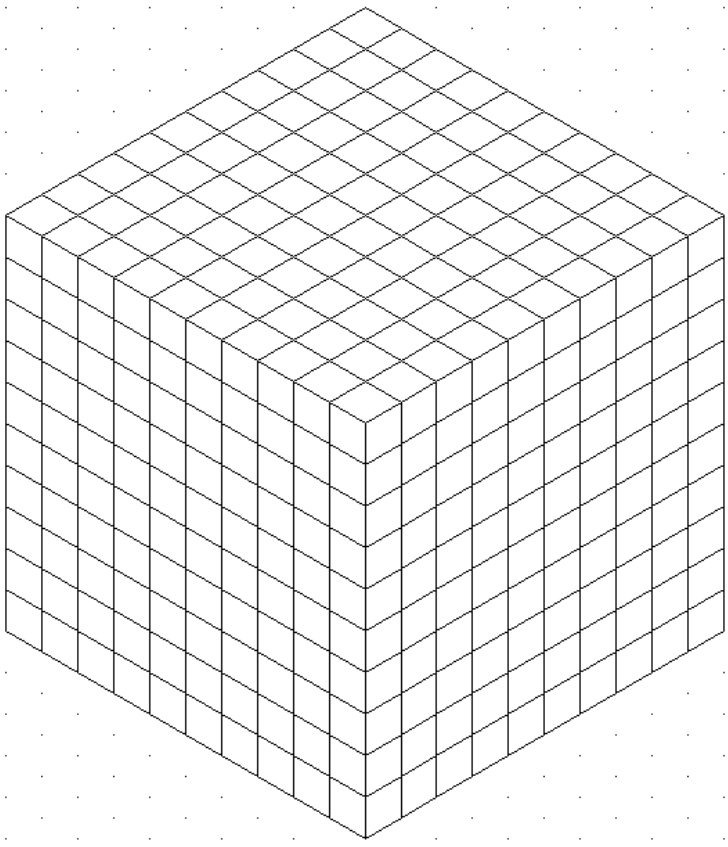
Task 3

A painted cube

A cube measuring 10 x 10 x 10 is painted on 5 sides.

The cube is then cut into small cubes, each measuring 1 x 1 x 1.

How many of the small cubes have paint on them?



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Answer task 3: A painted cube.

Country: _____

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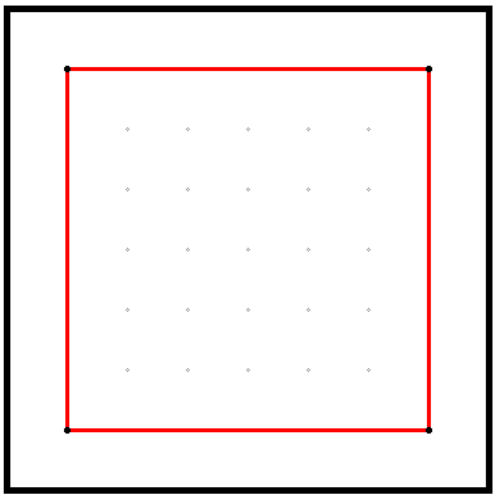
Task 4

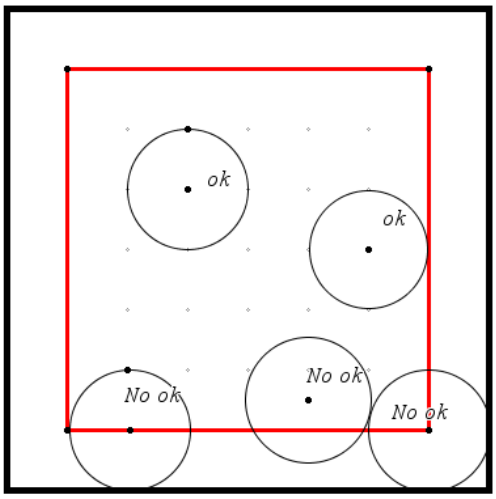
The coin in the box

A coin with diameter 1 lands at a random place in the bottom of a square box with side length 4.

In the middle of the bottom of the box is a red square with side length 3.

What is the probability that a coin
DOES NOT land touching a side of the square?





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Answer task 4. The coin in the box

Country: _____

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Task 5

Many zeros

How many zeros are there at the end of the product

1 x 2 x 3 x 4 x 5 x … x 98 x 99 x 100 ?

0000000...0000

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Answer task 5: Many zeros.

Country: _____

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Extra task

From start to goal

Move from one square to a neighboring square, either right/left or up/down, but not diagonally.

You may only go through a square once.

Make a line to show which squares you are travelling through.

Add the numbers in the squares you travel through.
Divide this sum by the number of squares you go through.

The goal is to get the greatest quotient possible.

START →	+1	+7	+13	–4	+21	
	+17	–3	–10	–8	–2	
	–8	+5	–13	+17	–5	
	+15	–1	–3	+13	+9	
	–11	+19	–5	+8	–5	← GOAL

If any teams have the same quotient,
the winner shall be the team with the greatest sum.

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Answer Extra task: From start to goal.

Country: _____

START →	+1	+7	+13	–4	+21	
	+17	–3	–10	–8	–2	
	–8	+5	–13	+17	–5	
	+15	–1	–3	+13	+9	
	–11	+19	–5	+8	–5	← GOAL