STUDY KIT 6

Title: CARTOMERTY: MAPS AND SCALES
Topic: Measuring surfaces from large and medium scale maps
Keywords: similar shapes, reduction, enlargement, zoom in, zoom out
Subject: Mathematics, Geometry
Cross-curricular Topic: Mathematics, Geography, ICT
Level: Senior High School
Age: 13+
Number of students: 30
Duration in minutes: 35 minutes
Place (classroom, outdoor etc.): classroom (computer laboratory)
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Language: English

Overview:
Students work in groups with the attached worksheets. (Appendix 1)
They download and print the map of a certain area, including a scale. They cut out the outline of the area which they are about to measure. They copy the outline of the area on graph paper (1 cm^2 area per square).
They measure the number of squares which cover the surface of the map. As for the squares which are not complete, students take into account only the ones which intersect with the measurable area by at least half, otherwise they are ignored.
Finally, making use of the conclusions that the students have reached from the worksheets, they calculate the real area.

Learning material and tools:
Worksheet, graph paper, pencil, scissors, computer, map

Preparation:
None required

Evaluation:
Groups compare their results and suggest ways to approach the result with the biggest possible precision.

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Extra material:
None required

Detailed description/instruction:

Student's worksheet.

Activity 1

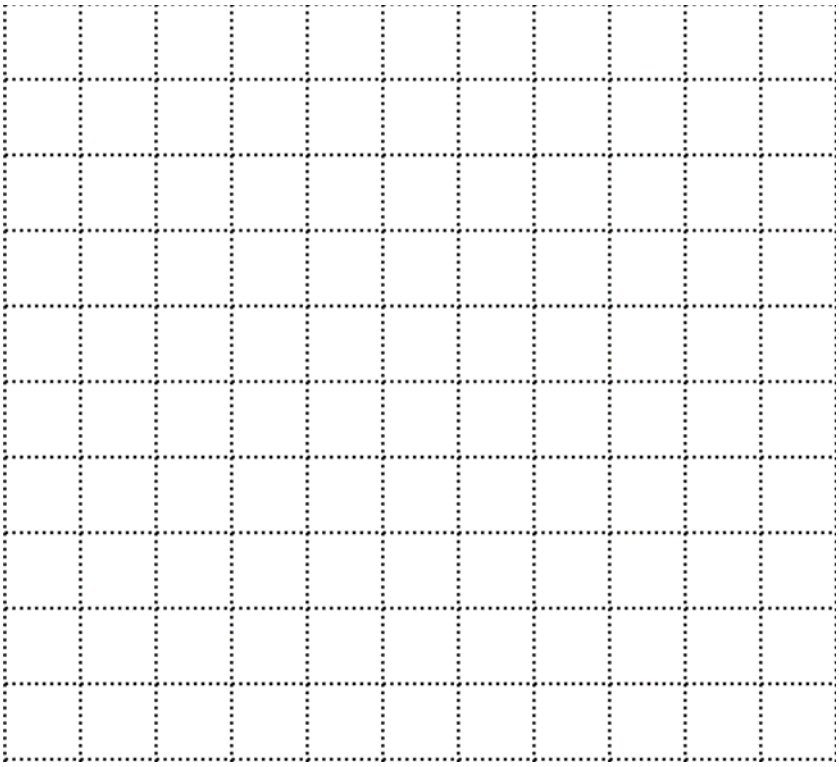
In the canvas below the area of every square is 1cm^2.

Design a rectangle 1cm by 2cm and name it R_1

Calculate its area and name it A_1.

Design a second rectangle (R_2) whose sides are double in size compared to R_1.

Calculate its area and name it A_2.



Fill in the following table:

Initial Area A_1	Enlargement coefficient	Final Area A_2

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Activity 2

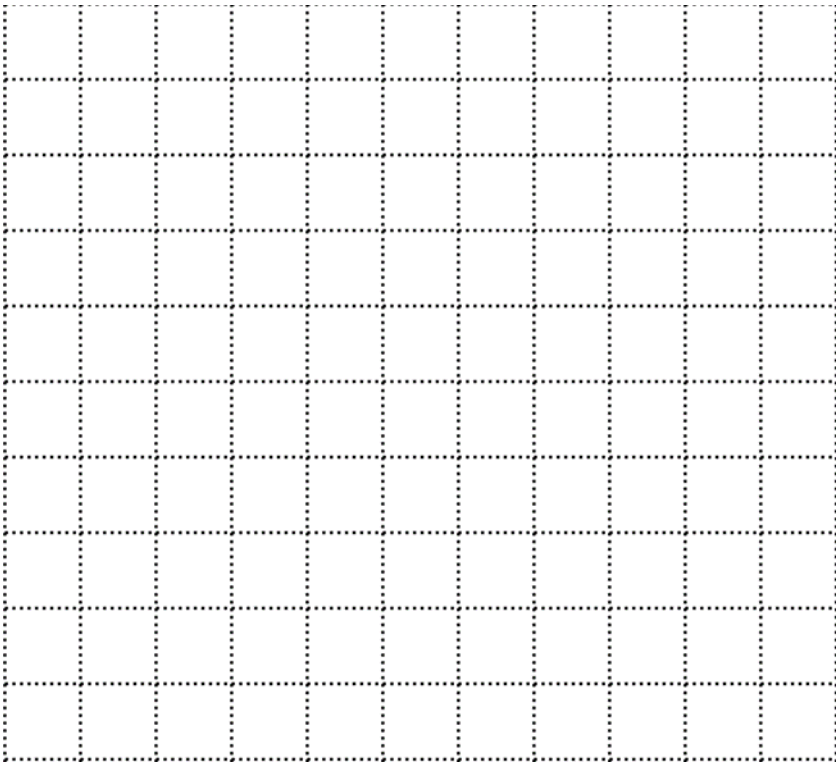
In the canvas below the area of every square is 1cm^2.

Design a square 1cm by 2cm and name it S1

Calculate its area and name it A1.

Design a second square (S2) whose sides are half in size compared to S1.

Calculate its area and name it A2.



Fill in the follwing table:

Initial Area A_1	Reduction coefficient	Final Area A_2

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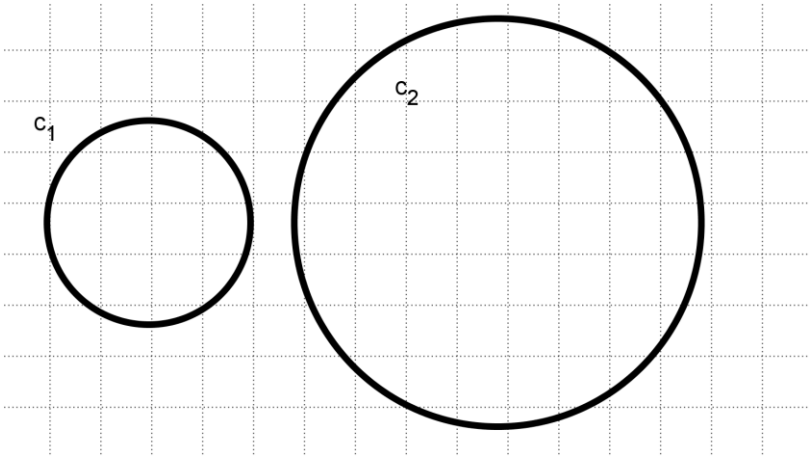
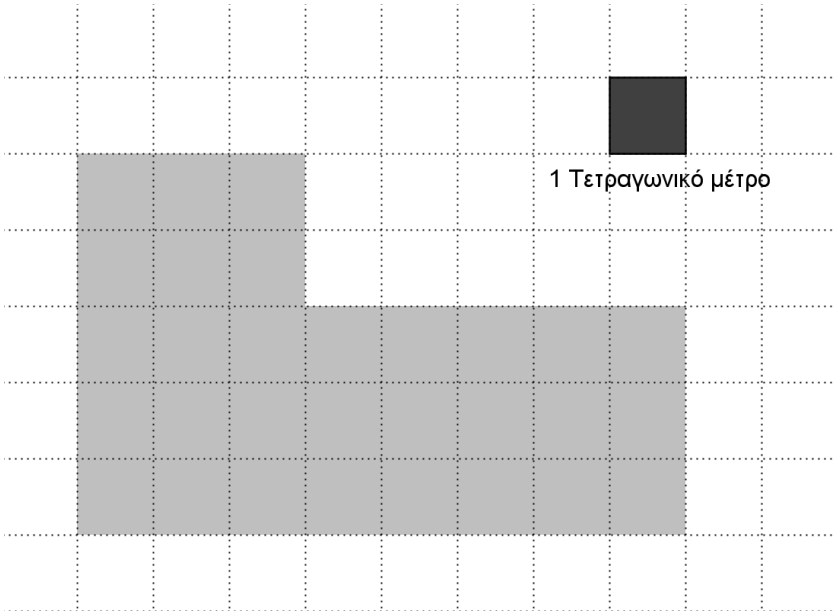
Activity 3

C1 has been formed from reduction to the half of circle C2.



Write down what part of area of C2 is C1

Activity 4



In the graph you can see the top view of a plot whose real area is 300

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m^2.
Find the scale that has been used to design the top view of the plot.

Activity 5

Cut out Czech Republic from the map.
Draw the outline of the country following the borderline.
Measure carefully how many complete squares on the graph paper the outline covers.
Calculate the real area of the country.
Compare your result to the one in geography books.
Suggest ways of minimizing error.

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