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## Surface of the triangle

<b>Teaching area</b>	<b>Mathematics - the surface of the triangle</b> Geography - maps, scales History - the territory of the medieval settlement Mehumi Technical Education (TE)
<b>Topic</b>	<b>Surface of the triangle</b> (Basis for calculating Mehumi surface)
<b>Learning outcomes / competences</b>	To extract useful information from the graphic display To calculate the surface of an irregular geometrical figure by analyzing and extracting known elements To solve practical problems with available mental tools; to search for more possibilities to solve problems To create a formula for calculating the surface of the triangle (according to the rectangle surface formula) To display the surface on the map as an irregular polygon To turn the character smaller in scale into natural size To understand the quadratic measures To calculate the surface To apply the knowledge
<b>Age of students</b> (previous knowledge required)	Pupils of 6th grade, age of 12 Surface of the rectangle
<b>The prevailing type of activity</b> (field work, play, practical activity ... )	Exploring geographical maps, drawing - schematic presentation of terrain from maps, problem solving, public presentation, comparison and explanation of results
<b>Key concepts</b>	Irregular figure, polygon, right triangle, scalene triangle, scale, reduced scale, square measures
<b>The pedagogical scenario / course of realization of teaching sequences</b>	<b>Motivation</b> On the map of Brač teacher shows the territory of the medieval settlement of Mehumi, which surface should be calculated. Pupils show important natural and social content on that territory. They highlight edges and inner points on the map.

### Information processing

1. Preparation for calculating the surface of an irregular figure.

Problem task: Highlights of the map should be transferred to blank paper. Pupils propose different solutions (punching paper folded to the map, transferring the length by compass ...)

The highlighted points, kote, need to be linked with the lines. We got many scalene triangles.

2. By sketching the rectangle, the teacher clearly shows the surface of the triangle. The students write the formula for calculating the right triangle.

Problem question: Is the same formula valid for the surface of other triangles?

Pupils respond differently but must prove the accuracy of their responses. Conclusion: The surface of all triangles is calculated by the formula: base (a) x altitude (v)

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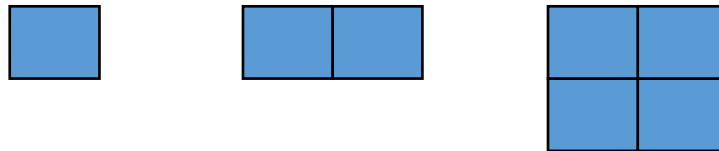
3. Students individually calculate the surface of the Mehum (summing the surfaces of all drawn triangles).

### Publishing, comparing, and showing results

1. Pupils publish their findings, compare solutions and solving procedures; they explain different methods of solving (those who have managed to divide the figure into less triangles solved the task faster).

2. Calculated surfaces from the map at scale 1 : 25.000 should be converted to the size of the actual surface.

The teacher reminds the students (using the sketch) how to enlarge the character.



If we multiply the surface with the scale only once, the result changes the appearance of the figure.

The enlargement process should be carried out twice to adequately increase the figure. That is the essence of the square measures.

- **Data needed**

Map scale: 1 : 25 000

The surface of the territory on the map: 64 cm<sup>2</sup>



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	<p><b><math>64 \text{ cm}^2 \cdot 25\,000 \cdot 25\,000 = 40\,000\,000\,000 \text{ cm}^2 = 4\,000 \text{ m}^2 = 4 \text{ km}^2</math></b> The surface of the Mehumi is <math>4 \text{ km}^2</math></p> <p><b>The conclusion</b> The students learned that the Mehumi area was not very large because they compared it to the territory where their families breed olives. They gained a clear and comparable picture of the size of the territory where medieval settlements were created. The motivation for the work was high all the time, because they knew in which life situations they could use the acquired knowledge of geometry. The biggest problem in math is acquiring routine, and routine is achieved by exercise. Students refuse to practice exercises and tasks they do not see practical purpose of.</p>
<p><b>Place of activity realization</b> (Classroom, outdoor space...)</p>	<p>classroom</p>
<p><b>Teaching material and aids</b></p>	<p>Map, pins, geometric accessories, papers</p>
<p><b>Duration of activity</b></p>	<p>4 hours</p>
<p><b>Ways of assessing the outcomes</b></p>	<p>Student solving similar problem tasks</p>
<p><b>Material results / evidences on the work and results</b></p>	<p>Student sketches with highlighted points, maps  Ppt presentation on workflow</p>