

Good practices

PROG_201BCD_EN

Author's name and institution: **Stettner Eleonóra**, Hungarian University of Agriculture and Life Sciences Kaposvár Campus

Description of the problem/exercise:

Construct a Poly-University triangle and square element in GeoGebra.

PUSE Task Number: 519_BC, 520_BC

Further development of the tasks: Do not fix the ratio, but change it dynamically with the slider. Let us also allow the negative ratio. In this case, the smaller elements are outside the base element. Which is the ratio at which the large and medium triangles (squares) just touch each other? (Golden ratio) Why?

<https://www.geogebra.org/classic/whxahtat>

Slider min: -1, max: 1

<https://www.geogebra.org/classic/zkncndfk>

Slider min: -2, max: 2, translucent colors so that overlapping cases are more visible

You can also perform similar tasks with the square element.

- *Why this exercise is good:* It shows well the possibilities of expanding and varying the set. János Szász Saxon also made other works with different proportions from the $\frac{1}{2}$ ratio, also those where the smaller shapes fall in the outer region of the basic element. Let's find and study them! Mathematics: properties of central similarity, (dilation) at different ratios (at different dilations factor), > 1 , < 1 , negative ratio can be dynamically illustrated. The task also provides an opportunity to talk about the golden ratio. Multidisciplinary approach; mathematics, art, informatics
- *Level of teacher training:* Elementary, secondary school, teacher training (mathematics, IT)
- *School subject(s):* Mathematics, IT, Arts
- *Comments:* The tasks are not fully developed everywhere, they only give ideas and encourage the teachers and students further experimentation and development.