

Grades 9-12 (S)

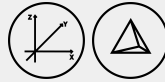
Duration: 20 min

Tools: one Logifaces Set / class,
GeoGebra

Individual work

Keywords: GeoGebra 3D, Coordinates,
Polygons, 3D coordinate system

528 - Read the Results in GeoGebra



MATHS / COORDINATE GEOMETRY



LOGIFACES
METHODOLOGY
Erasmus+

TEACHER

Logifaces

2019-1-HU01-KA201-0612722019-1

DESCRIPTION

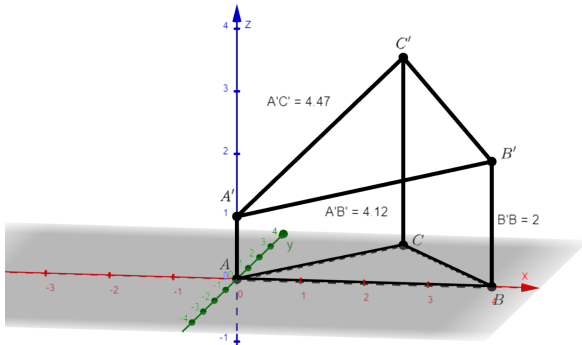
Students draw a Logifaces block in GeoGebra 3D so that one vertex of the base is at the origin and another vertex of the base is at (4, 0, 0), then use GeoGebra to read the following data (or to check previous calculations).

- Edge lengths.
- Face areas.
- Total surface area.
- Volume.
- Angles between edges.
- Angle between the plane of the base and the top triangle.

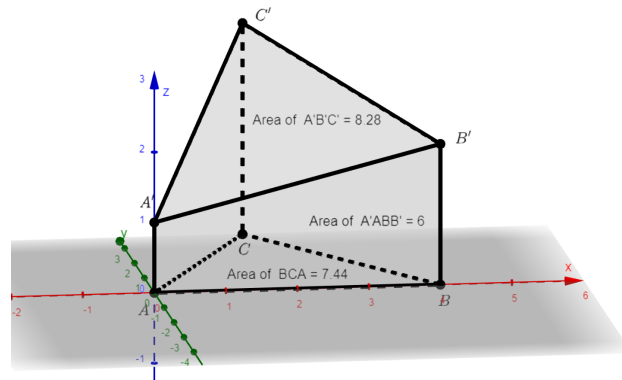
SOLUTIONS / EXAMPLES

We show solutions for block 123.

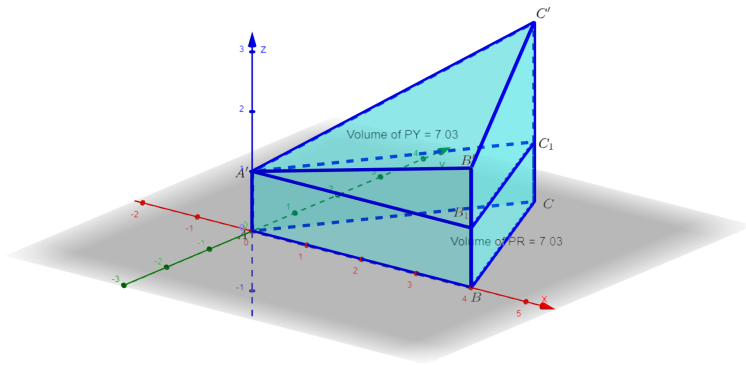
- a.) Use the Distance command to measure the distances.



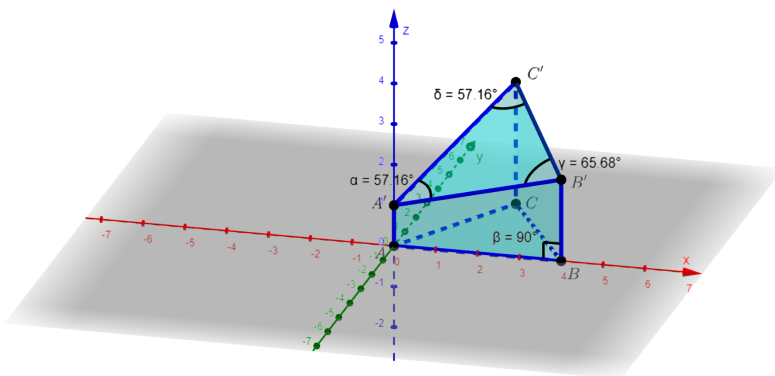
- b.) Use the Area command to find the areas.



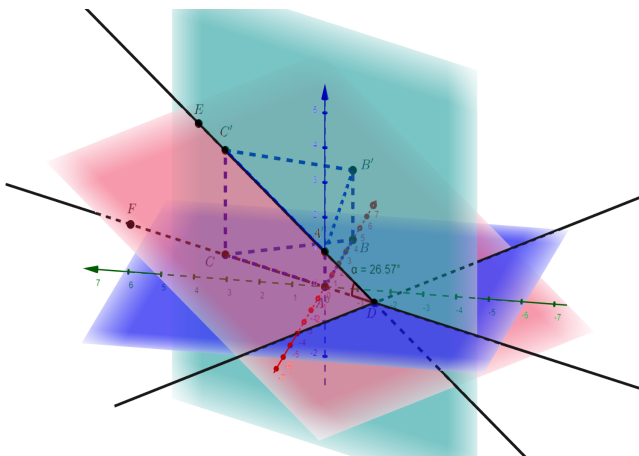
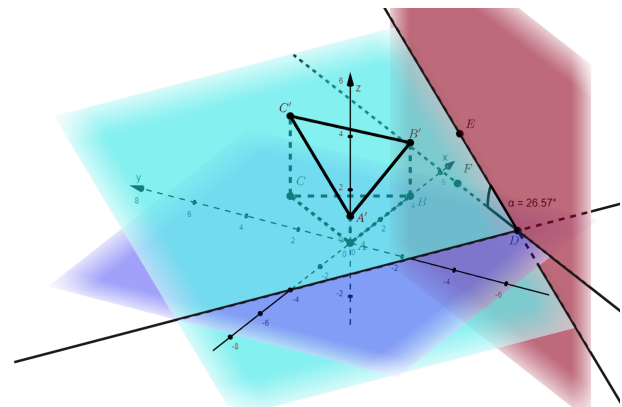
- c.) Use the Area command to find the areas of the faces and add them to get the total surface area.
- d.) Use the Volume command to find the volume of the prism and the pyramid and add them to get the volume of the block.



- e.) Use the Angle command to find the angles between the edges.



- f.) Use the Plane, Intersect, Perpendicular Plane and Angle commands (and pick up auxiliary points D - any point of the intersection line of the planes, E - any point of the line in the plane of the top face perpendicular to the intersection of the planes, and F - any point of the line in the plane of the base perpendicular to the intersection of the planes) to measure the angle between the planes.



Notice that by moving the point D (taken on the line of intersection of the two planes), it turns out that the angle between one of the edges of the base and the edge connecting the top vertices of the vertical edges of length 1 and 3 is exactly the angle between the two planes, as seen in the figure below.

PRIOR KNOWLEDGE

GeoGebra commands, General geometric knowledge

RECOMMENDATIONS / COMMENTS

These tasks can also be used to verify previous calculations. The non-GeoGebra versions of the results for each subtasks are:

- a) lengths: [404 - Top Edges](#)
- b) areas: [409 - Area of Rectangular Faces](#) and [411 - Area of Triangles](#)
- c) total surface area: [513 - Surface Area Calculation](#)
- d) volume: [515 - Simple Volumes](#) and [516 - Truncated Volumes](#)
- e) angles between edges: [535 - Calculating Angles](#)
- f) angle between the base and top planes: [537 - Ratio of Heights](#), [538 - Ratio of Areas](#) and [539 - Angle of Planes](#)

We recommend sorting by object type in the algebra window in order to make the comparison of the calculated values easier.