

# Geometry Applications

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**Rezumat.** În rezolvarea problemelor de geometrie, reprezentarea grafică ajută la intuirea soluției. În acest caz folosirea unor programe specializate pentru modelarea unor fenomene matematice, constituie un instrument folosit din ce în ce mai mult în cadrul lecțiilor de predare-învățare, fixare și consolidare a cunoștințelor. Un astfel de soft este GeoGebra.

## 1. Applications. Line equation;

Topic: Applications. Line equation;

Lesson type: Knowledge review and consolidation;

General objectives:

1. Knowledge and understanding of the concepts, terminology and calculation procedures;
2. Development of exploitation / investigation and problem solving abilities;

Specific objectives;

1. To learn the terms of parallelism and perpendicularity;
2. To determine the equation of a straight line in certain conditions;
3. To determine the angle measurement in a triangle;

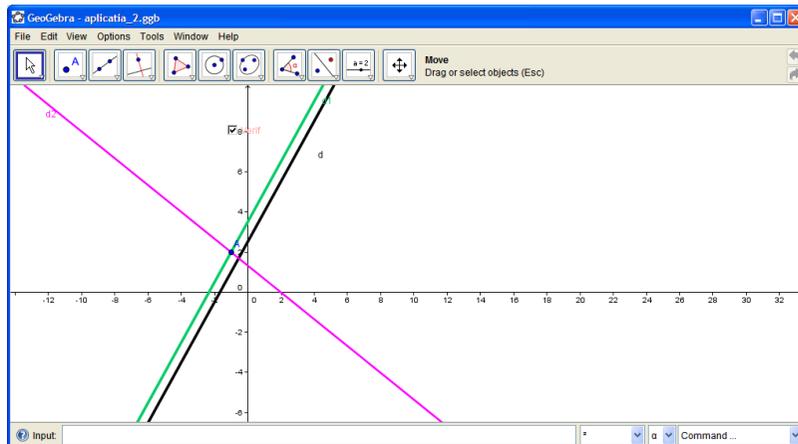
Students receive a worksheet in which the following exercises are given:

## 2. Application 1

Let  $(d)$  be a straight line and the point  $A(-1, 2)$ . Write the equation of a straight line that passes through point  $A$  and is:

- a) parallel to the straight line;
- b) perpendicular to the straight line;

With the help of the GeoGebra program the straight line and point  $A$  is plotted. After mathematically solving the problem, students are able to check whether they worked properly by observing the graphical images of the straight lines required in the problem.



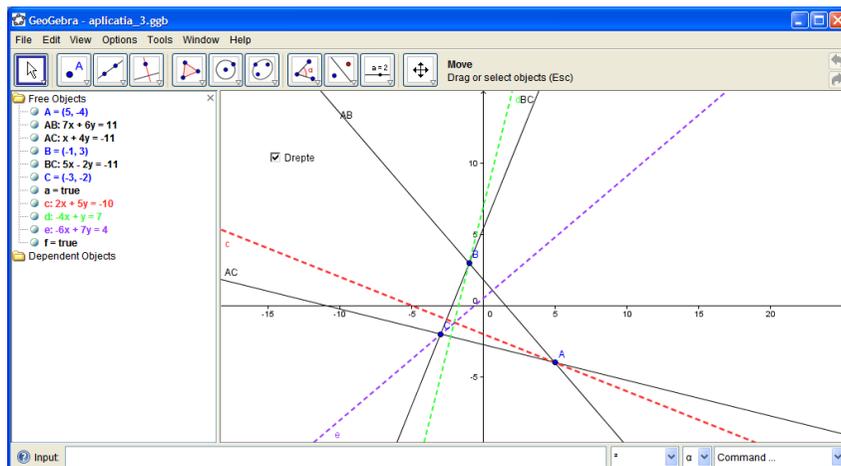
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### 3. Application\_2

Consider points A (5, -4), B (-1,3), C (-3, -2). Determine:

- the slope of the straight lines: AB, BC, AC;
- the equation of the straight lines: AB, BC, AC;
- the height equations of the triangle ABC.

This application starts from the vertices of a triangle. Students determine the equations of the straight lines. Using the GeoGebra program, the straight lines obtained are plotted, and the facility offered by the program is to see whether or not the exercise has been resolved properly by observing the concurrency of the straight lines in the given points and the concurrency of the heights of the triangles. In the image, two links can be seen that allow the user to hide the straight lines or the triangles.



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#### 4. Application\_3

The sides of a triangle are given by the following equations:

$$(AB): 2x - y + 2 = 0$$

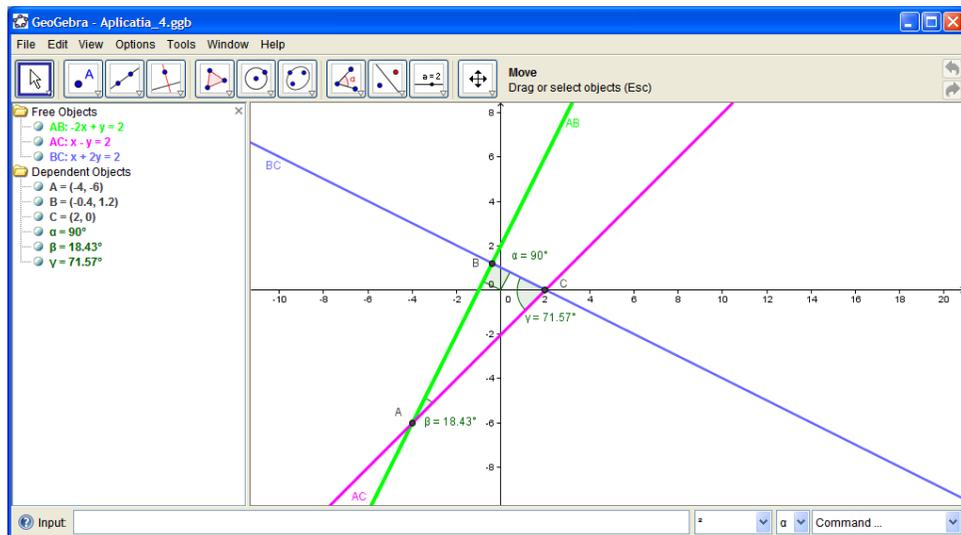
$$(BC): x + 2y - 2 = 0$$

$$(AC): x - y - 2 = 0$$

Determine:

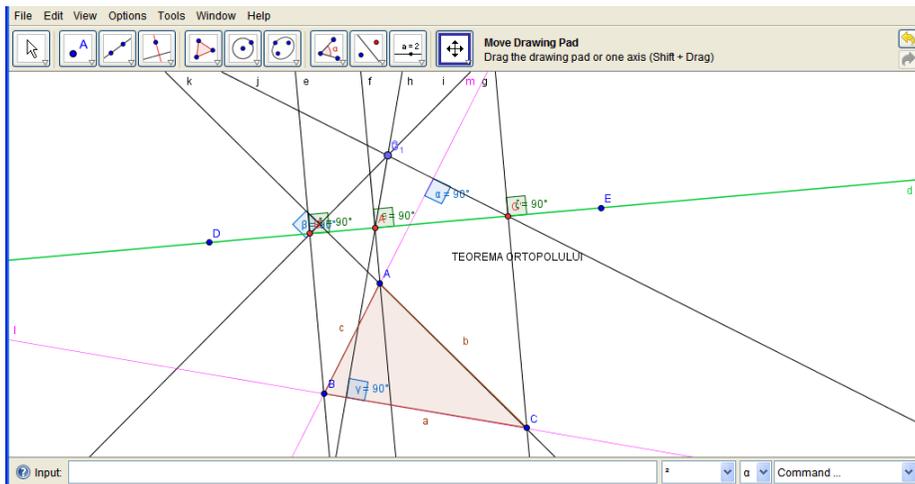
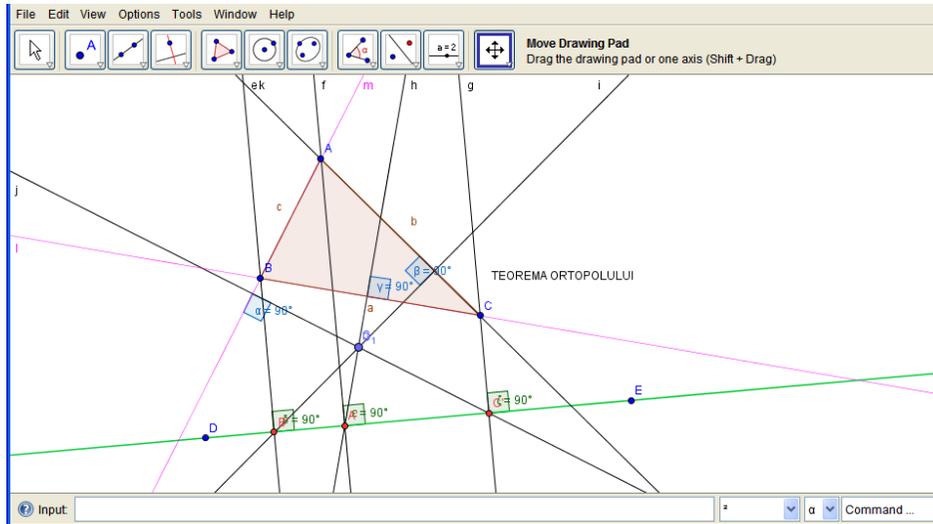
- the coordinates of the vertices of the triangles;
- the angle measurements of the triangle

The exercise is given to the students to be resolved. With the help of the Geo Gebra program the straight lines are plotted, the coordinates of the vertices of the triangles and the angle measurements are determined as can be seen in the following figure:



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The Geo Gebra program allows the students to check their solutions as you can see the straight lines, the resulting triangle and angle measurements.



Using the program during the lesson gives the students the opportunity to develop an open mind, having the opportunity to see the lines, the points and to determine the measurements of the angles; the student strengthens his knowledge through direct observation.

## Bibliography

- [MG99] **M.Ganga** – *Probleme de geometrie analitică*, Ploiești, Editura Mathpress, 1999  
 [HH02] **J. Hohenwarter, M.Hohenwarter** – *Introduction to GeoGebra*