COMENIUS PROJECT "STORYTELLER" - THIRD MEETING
BARI – ITALY - 9th APRIL 2014

Education and Culture
Lifelong learning programme

WORKSHOP TASK: the Golden Rectangle and PHI number

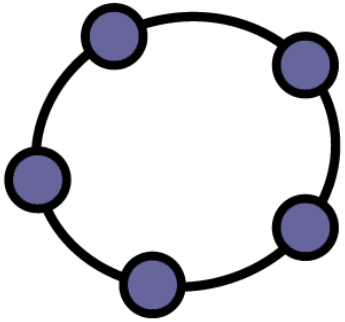
Reconstruction of geometrical patterns using Geogebra.org

IISS Vivante-Pitagora – Bari

Prof. Palmira Ronchi and IV A_{SIA} students

THE BUILDING OF CASTEL DEL MONTE

GeoGebra



Geometry +AlGebra

Dynamic geometry, algebra and calculus

Open source (free of charge)

It runs on Windows, Linux, Solaris, MacOS

GeoGebra Tablet Apps

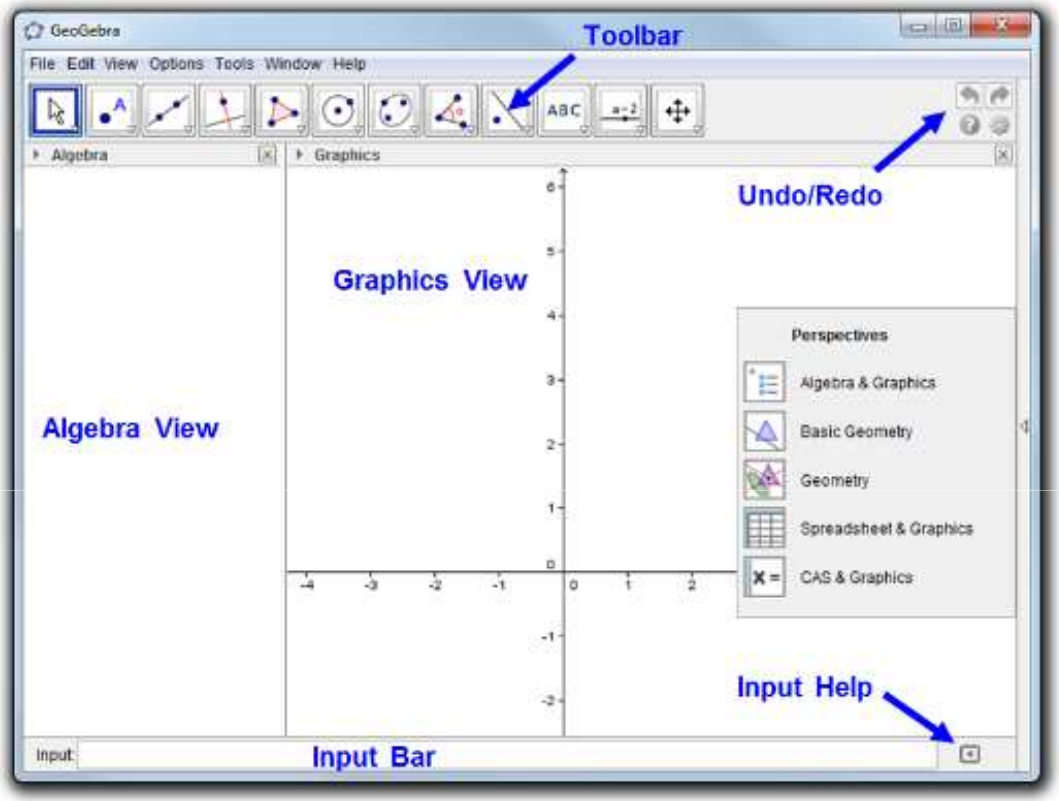
Available on the Windows Store

Available on the App Store

ANDROID APP ON Google play

www.geogebra.org

Geogebra’user interface



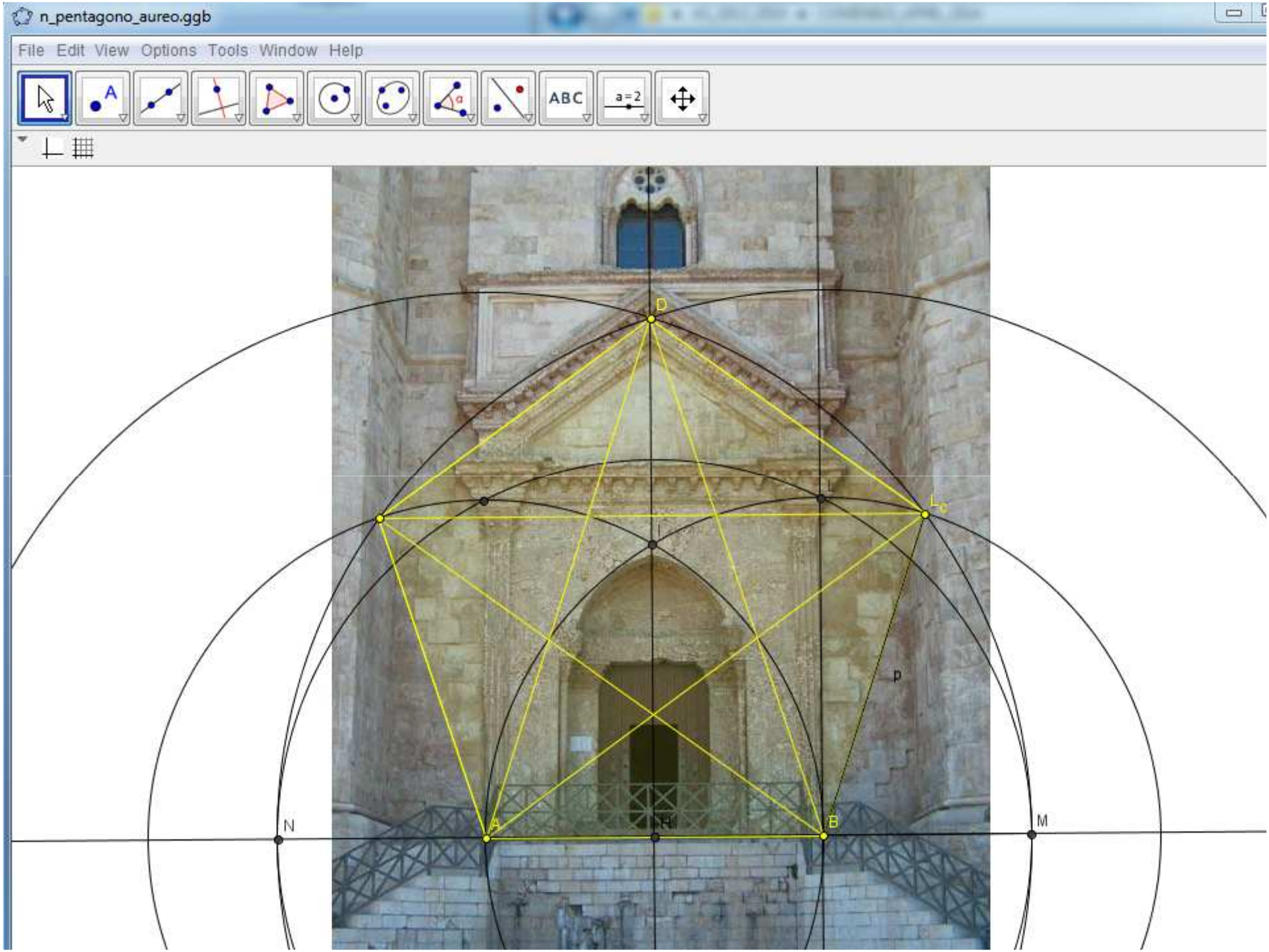
Using the provided geometry tools in the *Toolbar* you can create geometric constructions on the *Graphics View* with your mouse. At the same time the corresponding coordinates and equations are displayed in the *Algebra View*. On the other hand, you can directly enter algebraic input, commands, and functions into the *Input Bar* by using the keyboard. While the graphical representation of all objects is displayed in the *Graphics View*, their algebraic numeric representation is shown in the *Algebra View*. In GeoGebra, geometry and algebra work side by side.

GeoGebra Institute of Bari

The castle was built about 1240 by Frederick II of Swabian and is well known for its octagonal shape.

A CASTLE FULL OF THE GOLDEN NUMBER AND MATHEMATICAL SYMBOLS .

Castel del Monte – Andria di Bari (Italy)
Castle of the Mount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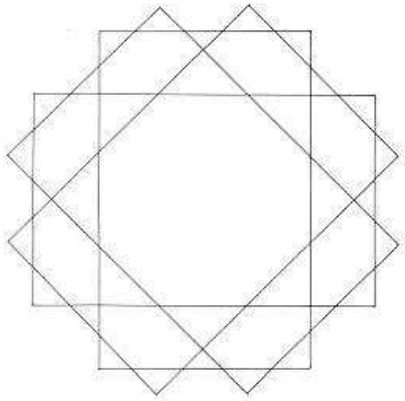
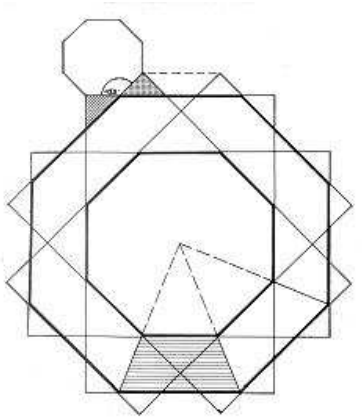
THE BUILDING OF CASTEL DEL MONTE

Four golden rectangles draws two octagons: an external one and an internal one.

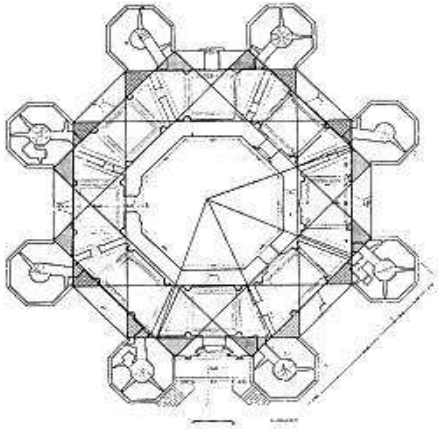
The octagon coincides the internal and external walls.

Rectangle sides: 35.60 m and 22 m.



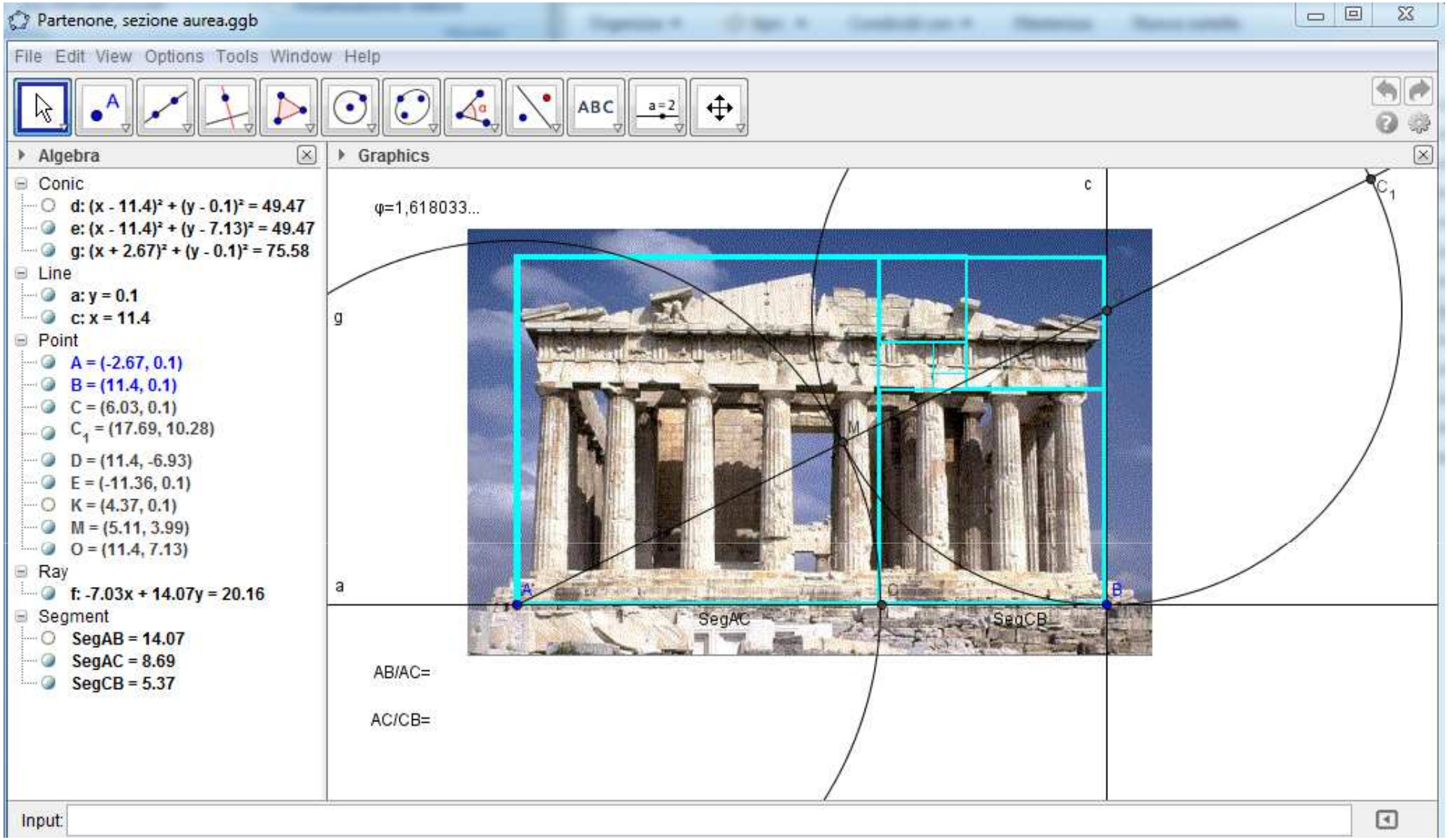


(35,60)/22 = ϕ = 1,618...



ϕ= the Greek letter **phi,**

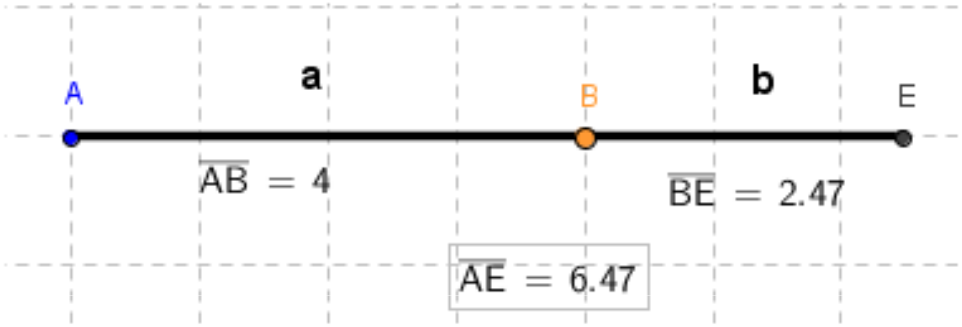
the golden number



The Greek letter (phi) mean of **Phidias** (Φειδίας, *Pheidias*; c. 480 – 430 BC) was a Greek sculptor, painter and architect of Parthenon, who lived in the 5th century BC in Athen, and is commonly regarded as one of the greatest of all sculptors of Classical Greece.

For more details on the Golden ratio surf on this youtubevideo2

The golden ratio has fascinated intellectuals of diverse interests for at least 2,400 years. Some of the greatest mathematical minds of all ages, from Pythagoras and Euclid in ancient Greece, through the medieval Italian mathematician Leonardo of Pisa (Fibonacci) and the Renaissance astronomer Johannes Kepler, have spent endless hours over this simple ratio and its properties.



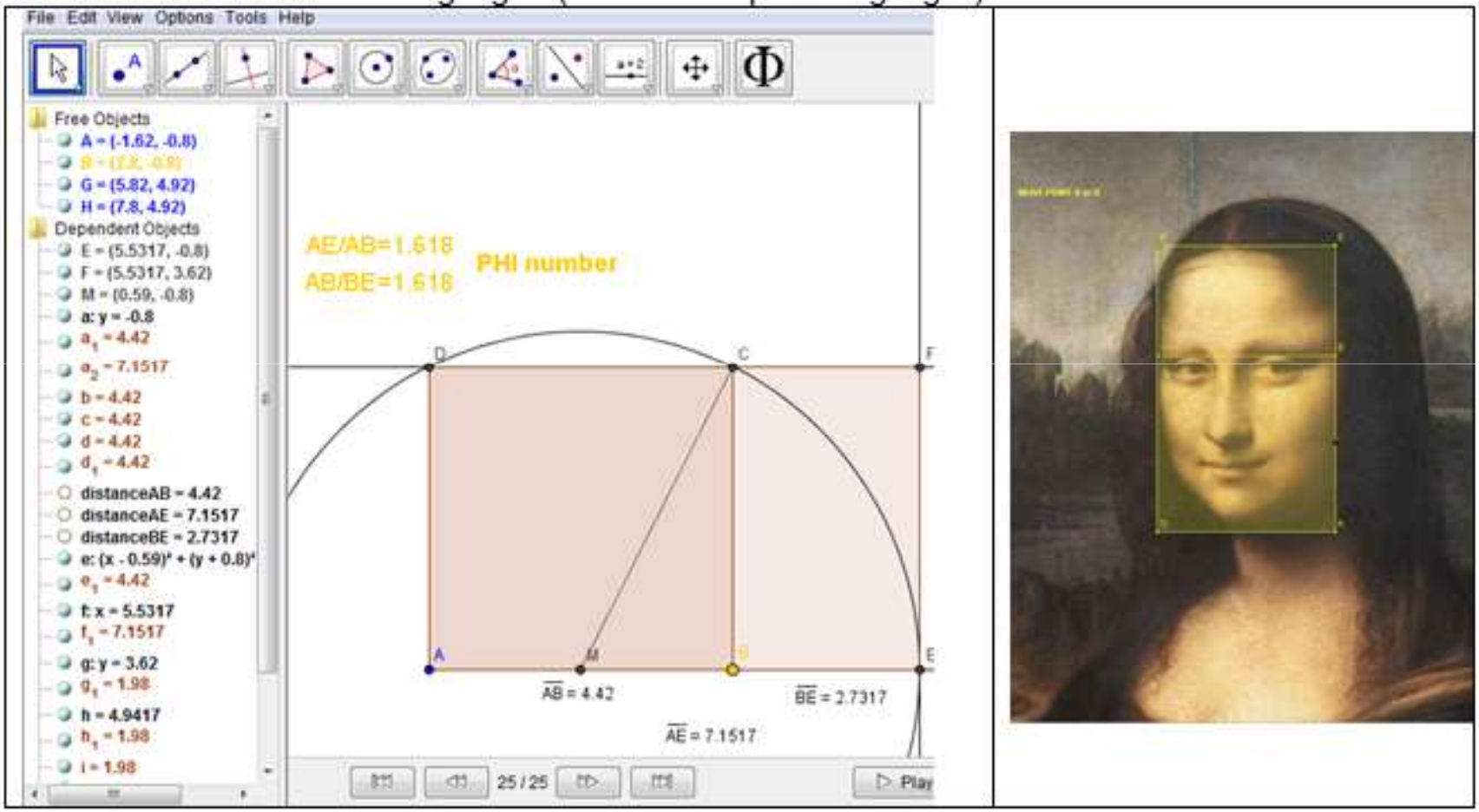
In mathematics and the arts, two quantities (segments a and b) are in the **golden ratio** if the ratio between the sum of those quantities and the larger one is the same as the ratio between the larger one and the smaller.

$$\frac{a+b}{a} = \frac{a}{b} = 1,6180339887... = \Phi$$

The golden ratio can be expressed as a mathematical constant, usually denoted by the Greek letter φ(phi). For more details on the Golden ratio surf on this youtubevideo2

TASK: the Golden Rectangle and PHI number youtubevideo1

TASK: the Golden Rectangle and PHI number: in this activity you are going to construct a Golden Rectangle, and to search it in art using Geogebra: a dynamic geometric free software, available in more than 50 languages (see menu "option/languages).



www.geogebra.org

How many golden rectangles do you can find in Monna lisa?