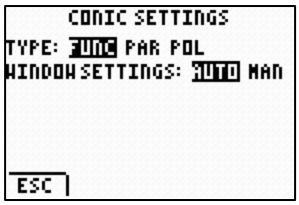
Conic Graphing

CATEGORY
Reference

DESCRIPTION
Conic Graphing can be used to graph the four basic conic sections. The conic equations can be in function, parametric and polar forms. Conic Graphing does not address degenerate cases of conic sections.

DIDACTICAL SUGGESTIONS
This reference allows students to graph or trace circles, ellipses, hyperbolas and parabolas and solve for the conic's characteristics. They can learn about the dependence and causal relationships between equations, parameters and graphs and find out characteristics of conic sections.

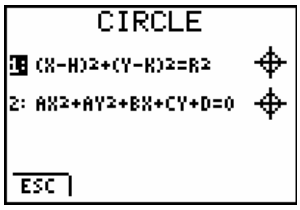
You can graph conic sections in function, parametric, or polar mode, based on your requirements. You can change the `CONIC SETTINGS` pressing the `MODE`-key while the application is running. There you can choose the `TYPE` of the Conic and the `WINDOW SETTINGS`.

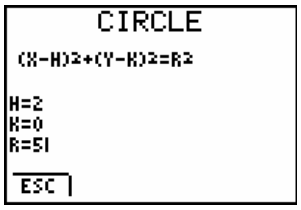


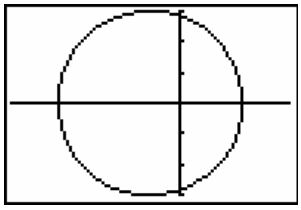
Conic Graphing restores the original mode of the calculator (as before you started the application) when you exit the application.

Select from the four conic types, from the main menu, `1: CIRCLE`.

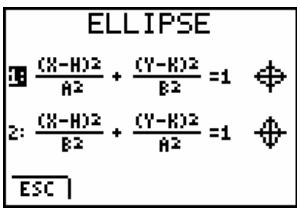
When you graph a conic section, you select first the type of the equation and then you input values for the parameters. In this case you input values for H, K and R of the circle equation $(X - H)^2 + (Y - K)^2 = R^2$. Press [GRAPH] to plot the circle and [Y=] to go back to the definition screen.

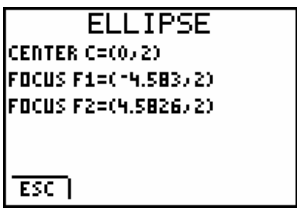


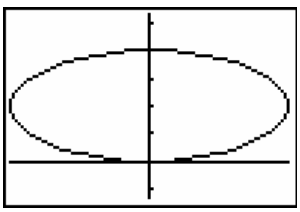




An *ellipse* is the set of points in a plane whose distances from two fixed points in the plane have a constant sum. The two fixed points are called the foci of the ellipse. Press `ALPHA[SOLVE]` when the definition screen is active to calculate the center and the foci.

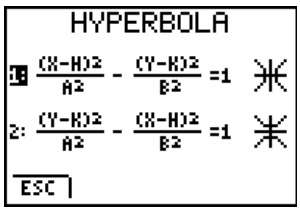


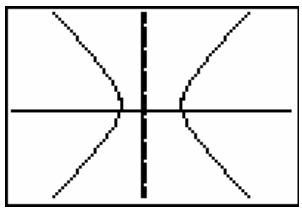


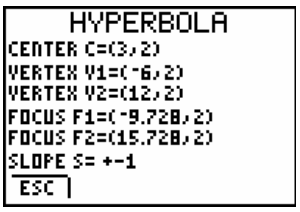


A *hyperbola* is the set of points in a plane whose distances from two fixed points in the plane have a constant difference. The two fixed points are called the foci of the hyperbola and the line through the foci of the hyperbola the focal axis. The point on the axis halfway between the foci is the hyperbola's center. The points where the focal axis and hyperbola cross are the vertices.

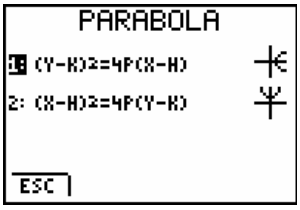
Again `ALPHA[SOLVE]` you will get the center and the two foci as well as the two vertexes and the slope. By this option the student can find out characteristics of each conic.

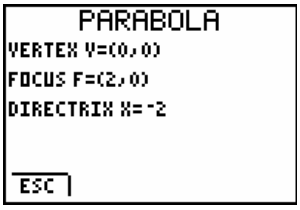






A set that consists of all the points in a plane equidistant from a given fixed point and a given fixed line in the plane is a *parabola*. The fixed point is the focus of the parabola and the fixed line the directrix. The point where the focal axis intersects the parabola is the vertex.





When the graph is displayed, press `TRACE` and move around on the curve to find the vertex graphically.

POINT OF VIEW

This application is by itself only a reference and therefore not very challenging for the students, because they only can graph or trace conic functions and they cannot see at first sight the implemented didactical value for learning about conic functions. But teachers can transform this simple reference into a very useful learning material with the help of additional exercise sheets, where the students are told, what they should explore. The teacher has to make the student aware of the functionality the author of the software implemented in it.