

Conics - Ellipse

We explore the ellipse this time, in our continuing study of conics. Again, we put the equations in standard form, solve, and graph. If we want, we can check or find the solutions with G-Solve, a useful tool within the Conics application. To use G-Solve, tap in the conics graph window so the Analysis menu is displayed. Within Analysis is G-Solve, which contains many functions that will assist you in your work with conics. You also have the opportunity to explore (play) with this new-found functionality on your own.

This file includes eActivities on:

Ellipse 1 x-(0,0) A basic look at an ellipse with the center at the origin. Also, a first look at G-Solve for an ellipse.

Ellipse 2 y-(0,0) Let's look at another ellipse, but this time with a vertical major axis.

Ellipse 3 x-(h,k) Not centered on the origin is no problem, just follow the steps and graph.

Ellipse 4 y-(h,k) Enter the equation (drag n' drop) into the Conics editor. In the Fit menu you will find "Fit into Conics Form". When you have the equation in Standard Form, tap the Graph button. You now have your ellipse with a vertical major axis.

Ellipse 1

A basic look at an ellipse with the center at the origin. Also, a first look at G-Solve for an ellipse.

File Edit Insert Action

Ellipse 1
with Center (0,0)

Focal axis is x-axis.

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

Foci $(\pm c, 0)$
Vertices $(\pm a, 0)$
Semimajor axis a
Semiminor axis b
Relation $a^2 = b^2 + c^2$

<Example>
When $4x^2 + 9y^2 = 36$,
find the vertices and

Edit Zoom Analysis

Focus
Vertex
Directrix
Symmetry
Length of Latus Rectum
Center
Radius
Asymptotes
Eccentricity
x-Intercept
y-Intercept
x-Cal
y-Cal

Alg Standard Real Deg $\langle m \rangle$ Deg Real $\langle m \rangle$

Ellipse 2

Let's look at another ellipse, but this time with a vertical major axis.

File Edit Insert Action

Ellipse 2
with Center (0,0)

Focal axis is y-axis.

$$\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$$

Foci $(0, \pm c)$
Vertices $(0, \pm a)$
Semimajor axis a
Semiminor axis b
Relation $a^2 = b^2 + c^2$

<Example>
When the foci are
 $(0, -3)$ and $(0, 3)$

Alg Standard Real Deg $\langle m \rangle$

Ellipse 3

Not centered on the origin is no problem, just follow the steps and graph.

File Edit Insert Action

0.5 B A \sqrt{x}

Ellipse 3
with Center(h,k)

Focal axis is y=k.

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

Foci (h±c,k)
Vertices (h±a,k)
Semimajor axis a
Semiminor axis b
Relation $a^2 = b^2 + c^2$

<Example>
When the major axis
has endpoint(-2,-1)

Alg Standard Real Deg \sqrt{x}

Ellipse 4

Enter the equation (drag n' drop) into the Conics editor. In the Fit menu you will find "Fit into Conics Form". When you have the equation in Standard Form, tap the Graph button. You now have your ellipse with a vertical major axis.

File Edit Insert Action

0.5 B A \sqrt{x}

Ellipse 4
with Center(h,k)

Focal axis is x=h.

$$\frac{(y-k)^2}{a^2} + \frac{(x-h)^2}{b^2} = 1$$

Foci (h,k±c)
Vertices (h,k±a)
Semimajor axis a
Semiminor axis b
Relation $a^2 = b^2 + c^2$

<Example>
When the equation is
 $9x^2 - 54x + 4y^2 + 8y + 85 = 36$

Alg Standard Real Deg \sqrt{x}