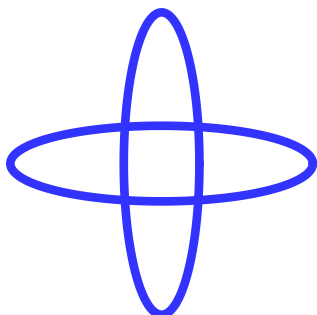


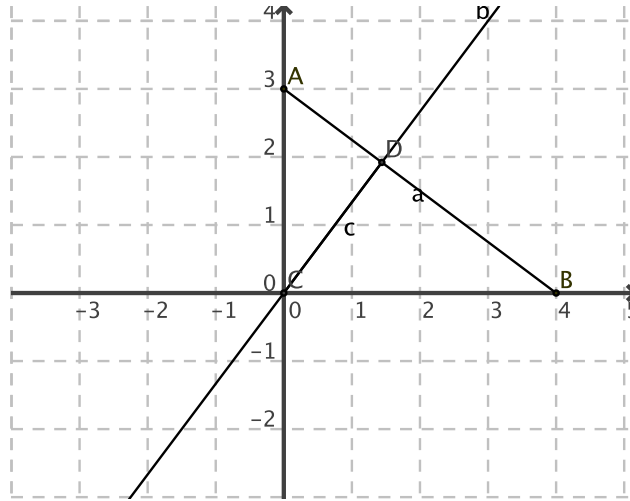
Some exercises about conics using Geogebra



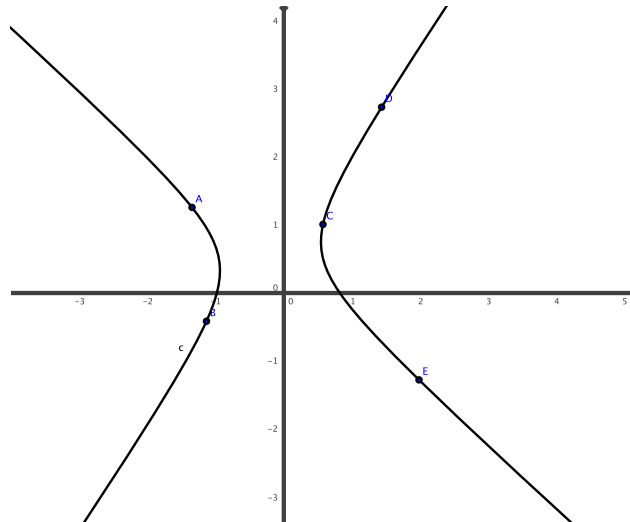
Eric Lehman

17 février 2011

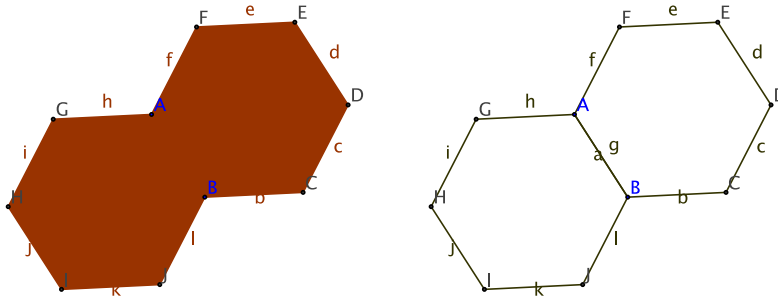
Exercise 1. In the menu "View" choose Axes and choose Grid. You may also take them away. In the menu "Options", you may use "labelling", "language" and "Drawing Pad". Put a point with coordinates $(4, 0)$ on the xAxis and the point $(0, 3)$ on the yAxis. Call them A and B . Put a point C at the origin $(0, 0)$. Draw the segment AB and the the line orthogonal to AB going through C . Call D the intersection of this line with AB . Measure the length CD . Why is it equal to $2,4$?



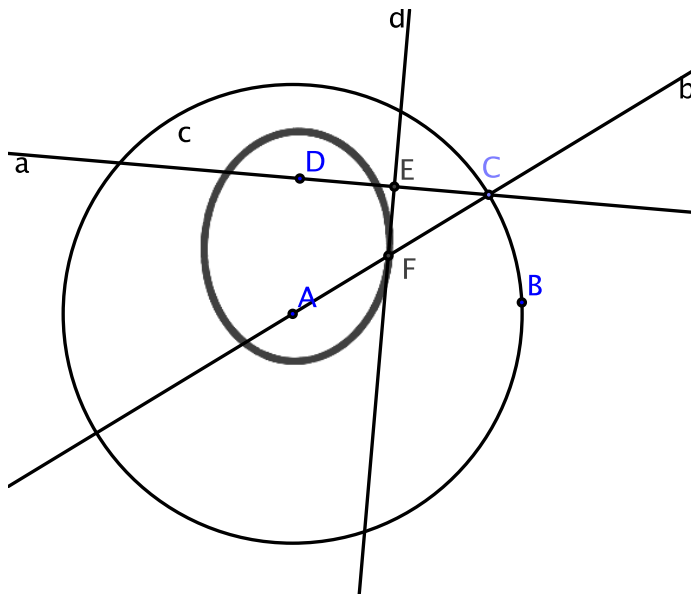
Exercise 2. On "Edit" choose "Select all" and then "delete". On option choose "Font size" and 12 the smallest. AT the end you can always make it bigger. Take away the grid and choose 5 points at random. In the fifth menu (about circles) choose "cinic through 5 points" and show your conic. Move the points and observe how the conic is behaving.



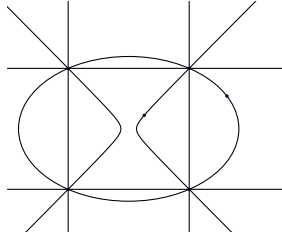
Exercise 3. On "Edit" choose "Select all" and then "delete". On option choose "Font size" and 12 the smallest. Take away the axis and the grid. Choose two points not to far from each other. In the third menu choose "regular polygon" click on your two points and then choose number 6. Once again with the same two points but choosen in the opposite order.



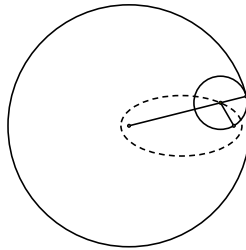
Exercise 4. On "Edit" choose "Select all" and then "delete". On option choose "Font size" and 12 the smallest. Take away the axis and the grid. Choose two points not to far from each other A and B . Draw the circle c with center A going through B . Choose a point C on the circle. Choose a point D inside the circle. Draw the line DC and using the second menu find the midpoint E of C and D . Draw the line AC and the line orthogonal to DC through E . These two lines cut in a point that you can mark by using the second menu. This point will be called F unless you change the label to M . Click on that point to show its properties and click on trace. Than go back to first menu and then move the point C around.



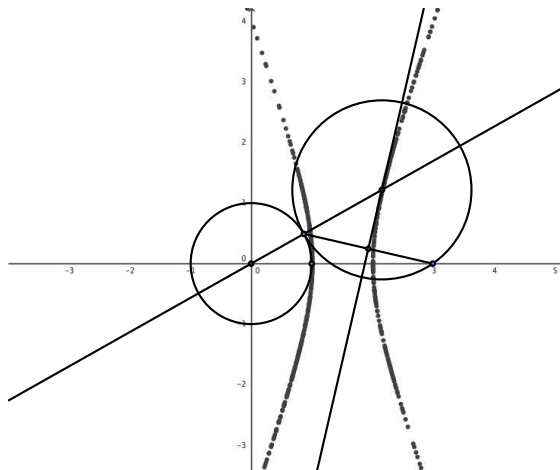
Exercise 5. Choose 4 points vertices of a square and a point M anywhere. Draw the conic through these 5 points. Draw the lines which are sides of the square. In what part of the plane should one choose M to get an ellipse? Where to choose M to get a hyperbola? Is it possible to get a parabola?



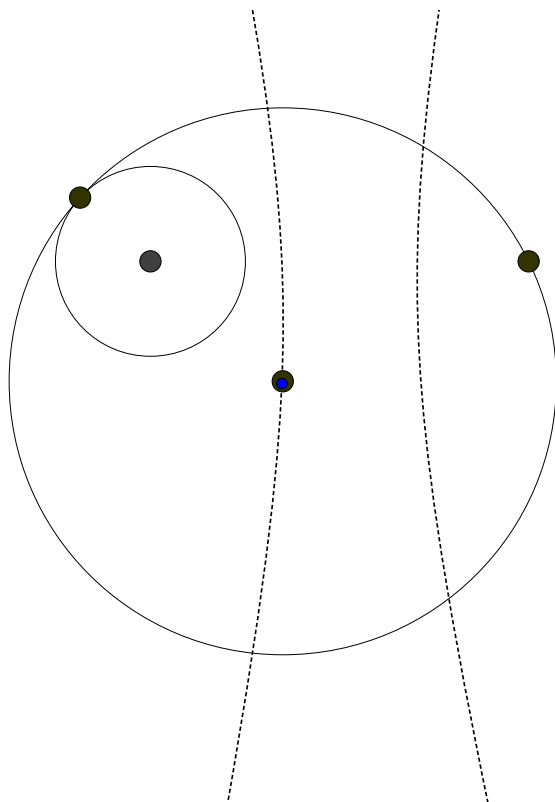
Exercise 6. Given two points F' and F and a point M draw the ellipse through M with foci F' and F .



Exercise 7. Given a circle Γ with center F' and a point F outside of that circle. Take a point T on the circle. Draw the circle Tangent to Γ at T and going through F . Call M the center of that circle. What is the locus of M when T describes the circle Γ ?



Hide the construction elements. Choose 5 points on the trace and draw the hyperbola nicely.



Exercise 8. Let $e > 0$. Given a line D and a point F , construct the locus of the points M such that

$$MF = eMH$$

where H is the orthogonal projection of M on D . Verify that for $e = 1$ you get a parabola. When do you get an ellipse? When do you get a hyperbola? Organize your drawing in such a way that you can see the conic change when you change e continuously.