## **BASIC DIFFERENTIAL PROPERTIES OF THE ELLIPSE**

In this applet you will learn some basic properties of an ellipse.

1. Move the sliders “Semiaxes” to understand their effect on the shape of the ellipse
2. Move the slider “Position of the point P”, to move the point P around the ellipse and observe the behavior of the curvature of the ellipse at the point P.
3. In which points is the curvature maximal? In which points is it minimal?
4. Can you relate the maximum and minimum values of the curvature with the semiaxes of the ellipse?

The red curve is an offset of the ellipse: at every point of the ellipse we draw a new point at distance d in the normal direction at the point, given by the normal vector.

1. Move the slider “Offset” to understand its effect on the offset curve

Note that for certain values the offset curve is a *smooth* curve, but from a certain value, the offset presents some *cusps*.

1. Describe the minimal values of the offset for which the offset curve has cusps. Can you relate them to the characteristics of the ellipse?