numpy, scipy, matplotlib

The polar equation of a conic section is given by,

$$r = \frac{pe}{1 + e\cos(\theta)} \quad \text{—— (1)}$$

where *e* is *eccentricity* and *p* is the *focal parameter*.

Check https://mathworld.wolfram.com/FocalParameter.html for the values e and p can have for various conic sections.

(1) Plot an ellipse, a circle, a parabola, and a hyperbola together (in one plot), where a function calculates the polar equation for a given *e* and *p*.

(2) Write a code where a random number generator selects value of *e*. You can use the module *numpy.random*. Try plotting 10 different conic sections of random *e* values together. We will have a discussion on *random samplers* in slack.