Q1. Although the plot function is designed primarily for plotting standard xy graphs, it can be adapted for other kinds of plotting as well.

(a) Make a plot of the so-called *deltoid* curve, which is defined parametrically by the equations

$$x = 2\cos\theta + \cos 2\theta, \quad y = 2\sin\theta - \sin 2\theta,$$

where $0 \leq \theta < 2\pi$. Take a set of values of θ between zero and 2π and calculate x and y for each from the equations above, then plot y as a function of x.

(b) Taking this approach a step further, one can make a polar plot $r = f(\theta)$ for some function f by calculating r for a range of values of θ and then converting r and θ to Cartesian Coordinates using the standard equations $x = r\cos\theta, y = r\sin\theta$.
Use this method to make a plot of the Galilean spiral $r = \theta^2$ for $0 \leq \theta \leq 10\pi$

(c) Show the plots obtained on (a) and (b) in a single page

Source: Part (a) and (b) are from Computational Physics by Mark Newman.