1. Let $r(t) = \langle \cos(t)^3, \sin(t)^3, \cos(t) \rangle$.
   Plot the curve traced out by $r(t)$ and find its arclength.

2. Let $r(t) = \langle t \cos(t), t \sin(t), t \rangle$.

   (a) Show that the graph of $r(t)$ lies on the surface $z^2 = x^2 + y^2$.

   (b) Plot the curve and surface on the same set of axes to demonstrate this.