1. Use the Desmos to plot each of the following parametric curves. Observe how the curve is traced out.

   What is the period of each curve? i.e. When does $r(t)$ start "repeating"?

   (a) $r(t) = \langle \cos(t), -\sin(t) \rangle$

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

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

   (d) $r(t) = \langle \cos(t)\sin(3t), \sin(t)\sin(t) \rangle$

   (e) $r(t) = \langle \cos(t)\sin(3t), \sin(t)\sin(3t) \rangle$

   (f) Try other integer values for k in $r(t) = \langle \cos(t)\sin(kt), \sin(t)\sin(kt) \rangle$

2. Let $r(t) = \langle \cos(t), \sin(2t) \rangle$
   (a) Sketch the graph of $r(t)$ (*Note this is the same function from 1(b)*
   (b) Find $r'(t)$
   (c) On your sketch, label the point $r(0)$ and sketch the vector $r'(0)$
   Use $r(0)$ as the base point for $r'(0)$
   (d) Repeat (c) using $r(t)$ and $r'(t)$ for $t = \frac{\pi}{6}, \frac{\pi}{4}, \frac{3\pi}{2}, \frac{5\pi}{2}$
   (e) Use the Desmos file linked from the course webpage to verify your work

3. Use the Desmos file to explore the parametric curve

$$r(t) = \langle \cos(2t), \sin(t), \sin(t)^2 - \cos(3t) \rangle$$