1. Show that the following are equivalent:
   (a) $|r(t)|$ is constant.
   (b) $r(t) \perp r'(t)$.
   Interpret this in terms of a circle.

2. Show that the following are equivalent:
   (a) $|r'(t)|$ is constant.
   (b) $r'(t) \perp r''(t)$.
   Interpret this in terms of a car driving on a curvy road.

3. Suppose that your speed is constantly 1. Show that the formula for curvature cleans up a lot.

4. Suppose that $r(t)$ is a curve and $u(t)$ is an increasing function. Then $r(u(t))$ is another curve. What does it have to do with $r(t)$? To get started, consider $u(t) = 2t$.

5. Show that the unit tangent, unit normal, binormal, curvature, and torsion for the curve $r(u(t))$ at time $t$ are the same as for the curve $r(t)$ at time $u(t)$.