1. Suppose that the position of a car on a track with respect to time $t$ is $x = 80 \cos(t)$, $y = 80 \sin(t)$.

   (a) Find the unit tangent $T(t)$ and unit normal $N(t)$ vectors. On a graph with the car’s position, sketch the velocity, acceleration, unit tangent, and unit normal vectors at $t = 0, \pi/4, \pi/2, \pi$. 

Please hand in one worksheet per group.
(b) Find the tangential component of acceleration, $a_T$, and the normal component of acceleration, $a_N$. Interpret your results physically.

(c) Show that $\mathbf{a}(t) = a_T \mathbf{T}(t) + a_N \mathbf{N}(t)$