

Recitation 10

1. a.  $\vec{T}(1) = \left\langle \frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, 0 \right\rangle$   $\vec{N}(1) = \left\langle -\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, 0 \right\rangle$

b.  $\kappa = \frac{1}{2\sqrt{2}}$

c.  $v = \sqrt{40}$

2. a.  $a_T = 0$

b.  $a_N$  can never be zero since there is no straight line part to an ellipse. If  $a_N$  were constant, then curvature would be constant which would mean the curve is a circle. This is an ellipse, so  $a_N$  is not constant.

c.  $a_N$  could be constant only if  $v^2 = \frac{c}{\kappa}$ .  $a_T$  can be constant when it is zero with constant speed or when the speed is increasing linearly.