

Show all work. 5 points each.

1) Show that the curvature κ is related to the tangent and normal vectors by the equation

$$\frac{d\mathbf{T}}{ds} = \kappa\mathbf{N}$$

2) Find the velocity vector and the speed of the particle with the given position function.

$$\mathbf{r}(t) = \langle t, t^2, t^3 \rangle$$