1. Let $\mathcal{C}$ be the curve parameterized by $\mathbf{r}(t) = \sin(\pi t)\mathbf{i} + t^2\mathbf{j} + \cos(\pi t)\mathbf{k}$, $t \geq 0$. Find the parametric equations of the line tangent to $\mathcal{C}$ at the point $(0, 1, -1)$.

2. A particle's position is given by $\mathbf{r}(t) = t\mathbf{i} + t^2\mathbf{j} + t^2\mathbf{k}$. Find the tangential and normal components of acceleration, $a_T(t)$ and $a_N(t)$.