1. (2pts) Compute the following two limits.
   (a) \( \lim_{t \to 1^-} \langle \sqrt{t-1}, te^t \rangle \)  
   (b) \( \lim_{t \to 1^-} \langle \ln(t-1), \sqrt{t-1}, te^t \rangle \)

2. (3pts) Let \( \vec{r}'(t) = \langle 3 \sin(t), 4e^{-2t} \rangle \). Find \( \vec{r}(t) \) if we know \( \vec{r}(0) = \langle 1,-1 \rangle \)

3. (4pts) Let \( \vec{r}(t) = \langle \cos(\pi t), e^{-2t}, t^2 - t \rangle \).
   (1) Compute the tangent vector \( \vec{r}'(t) \).
   (2) Determine if the tangent vector is orthogonal to \( \vec{r}(t) \) when \( t = 0 \).
   (3) Find all possible real values of \( t \) at which the tangent vector is parallel to the \( xy \)-plane.

4. (3pts) The curve \( C \) traced out by \( \vec{r}(t) \) is given below.
   (1) Sketch the vectors: \( \vec{r}'(t_0) \) and \( \vec{r}'(t_1) \).
   (2) Sketch the vectors: \( \vec{T}(t_0) \) and \( \vec{T}'(t_0) \).
   (3) Determine graphically if \( \kappa(t_0) > \kappa(t_1) \).