Instructions. Show all work, with clear logical steps. No work or hard-to-follow work will lose points.

Consider the curve

$$\mathbf{r}(t) = \langle e^t, e^{-t}, \sqrt{2}t \rangle, \quad 0 \le t \le \ln 2.$$

- **1.)** (10 points) Find the velocity, speed and acceleration of $\mathbf{r}(t)$.
- **2.)** (10 points) Find the length of $\mathbf{r}(t)$.