

Section 13.1: Additional Problems

1. Example: Given $\mathbf{r}(t) = \left\langle t\sqrt{t+5}, t^2 + 2, \frac{e^t - 1}{t} \right\rangle$

- (a) Find the domain of $\mathbf{r}(t)$.
 - (b) Find all t where $\mathbf{r}(t)$ is continuous.
 - (c) Compute $\lim_{t \rightarrow 0} \mathbf{r}(t)$.
2. At what points does the the curve $\mathbf{r}(t) = \langle 2 \sin t, 4t, \cos t \rangle$ intersect the ellipsesoid $x^2 + y^2 + 4z^2 = 10$? If there are none, explain why you know this.
3. Find the points where the line through the points $(1, 0, 2)$ and $(5, -1, 2)$ intersects the surface $x = y^2 + z^2$.
4. Find a vector function that represents the curve of intersection of the two surfaces.

$$x = y^2 - z^2$$

$$y^2 + z^2 = 4$$