MTH 265, Quiz #12, Fall 2018

Instructions: Show all work. Use exact answers unless otherwise asked to round.

- 1. Consider the space curve $\vec{r}(t) = t\hat{i} + e^t\hat{j} + e^{-t}\hat{k}$. a. Find $\vec{r}'(t)$
 - b. Find $\|\vec{r}'(t)\|$.
 - c. Are there any points at which $\|\vec{r}'(t)\|$ reaches an extremum? (minimum or maximum?)

d. Find the unit tangent vector $\vec{T}(t)$.

2. Find the unit normal vector of $\vec{r}(t) = \cos 4t \,\hat{\iota} + t\hat{\jmath} - \sin 4t \,\hat{k}$.

3. Find the directional derivative for the function $f(x, y) = x^2 y - e^{x-y}$ at the point (1,1) in the direction of (2, -5).