

Show all work clearly and in order, and circle your final answers.
Justify your answers algebraically whenever possible. Unjustified work may not receive full credit.

- 1.** (2 points) Find a parametrization of the tangent line of the helix $\vec{r}(t) = \langle \cos(t), \sin(t), t \rangle$ at the point $\left(0, 1, \frac{\pi}{2}\right)$.

- 2.** (3 points) Find the arc length of the curve $\begin{cases} \vec{r}(t) = \langle t, -\log(\cos(t)) \rangle \\ -\frac{\pi}{4} \leq t \leq \frac{\pi}{4} \end{cases}$.

Note: you may find the trigonometric identity $\tan^2(t) + 1 = \sec^2(t)$ and the following integral formula useful:

$$\int \sec(t) dt = \log(\tan(t) + \sec(t)) + C$$