1. If $\mathbf{f} : \mathbb{R}^3 \rightarrow \mathbb{R}^2$ is given by $\mathbf{f}(x, y, z) = (xe^y, zy \sin(x))$ and $\mathbf{g} : \mathbb{R}^2 \rightarrow \mathbb{R}^3$ is defined as $\mathbf{g}(s, t) = (\frac{\pi}{2} s - t, se^t, st)$, then what is $D(\mathbf{f} \circ \mathbf{g})$ when $(s, t) = (1, 0)$?

2. Find the directional derivative for the surface $3x + 4y^2 + 6xz = 1$ at the point $(1, 1, -1)$, in the direction of $\mathbf{u} = (2, 1, 1)$.

3. Find the equation for the plane, tangent to the surface $-x + 4y^2 + 3z^2 = 25$ at the point $(0, 1, 1)$. 