1. A hyperboloid $\mathcal{H}$ is defined by $y = 3x^2 - 4z^2$: it can also be defined as a parametrically defined surface using

$$f(u, v) = (u, 3u^2 - 4v^2, v).$$

Let $(x, y, z)$ be a point on $\mathcal{H}$. Give a formula $\mathbf{n} = \mathbf{n}(x, y, z)$ for a vector normal to $\mathcal{H}$ at $(x, y, z)$. Your formula should be in terms of $x, y, z$. For full credit, choose the direction of $\mathbf{n}$ so that it faces upward from the surface. (However, $\mathbf{n}$ does not need to be a unit vector.)