1. Find the perpendicular projection $\mathbf{p}$ of the vector $\mathbf{v} = (1, 0)$ onto the line $y = 2x$, and then find the perpendicular projection of $\mathbf{p}$ onto the $y$-axis. Is this the same as the projection of $\mathbf{v}$ onto the $y$-axis?

2. Find the perpendicular projection $\mathbf{p}$ of the vector $\mathbf{v} = (1, 0, 0)$ onto the plane $y = z$, and then find the perpendicular projection of $\mathbf{p}$ onto the line $x = y = z$. Is this the same as the projection of $\mathbf{v}$ onto the line $x = y = z$?