4c) We can compute a 3d point from a 2d point via the eq before

$$r \cdot \vec{n} = h$$

then we are given (x, y) in 2d to find $(\tilde{X}, \tilde{Y}, \tilde{Z})$

let $\tilde{X} = \frac{x\tilde{Z}}{f}$ $\tilde{Y} = \frac{y\tilde{Z}}{f}$ $\tilde{Z} = \tilde{Z}$

then using $r \cdot \vec{n} = h$

$$\left(\frac{x\tilde{Z}}{f}, \frac{y\tilde{Z}}{f}, \tilde{Z}\right) \cdot \vec{n} = 170$$

$$\tilde{Z} = \frac{f \cdot (170)}{(u, v, f) \cdot \vec{n}} \qquad \tilde{X} = \frac{x\tilde{Z}}{f} \qquad \tilde{Y} = \frac{y\tilde{Z}}{f}$$

to find (X, Y, Z)