1. Change the Cartesian integral $\int_{\sqrt{2}}^{2}\int_{\sqrt{4-y^2}}^{y} dx\,dy$ into an equivalent polar integral. Then evaluate the polar integral.

2. Convert the integral $\int_{-2}^{2}\int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}}\int_{\sqrt{x^2+y^2}}^{2}(x^2+y^2)\,dz\,dy\,dx$ to an equivalent integral in cylindrical coordinates and evaluate the result.