

1. Evaluate

$$\int_{-2}^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} \int_{\sqrt{x^2+y^2}}^2 x^2 + y^2 \, dz \, dy \, dx$$

2. Find the volume of the region lying between the planes  $z = 0$  and  $z = 4 - x$ , outside the cylinder with base  $r = 2 \cos \theta$ , and inside the cylinder with base  $(x - 2)^2 + y^2 = 4$ .

3. Set up the integral representing the volume of the solid region bounded between  $z = 4$ ,  $z = 1 - x^2 - y^2$ , which is inside  $x^2 + y^2 = 1$ .

4. HW #5 4b)

Sketch the solid whose volume is given by the integral and evaluate the integral

$$\int_0^{\pi/4} \int_0^{2\pi} \int_0^{\sec \varphi} \rho^2 \sin \varphi \, d\rho \, d\theta \, d\varphi$$

5. Graph the region of integration and convert to spherical coordinates in order to evaluate (but do not do so):

$$\int_0^3 \int_0^{\sqrt{9-y^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{18-x^2-y^2}} x^2 + y^2 + z^2 \, dz \, dx \, dy$$