Name:

1. Let $\mathcal{E}$ be the 3-d region bounded determined by the inequalities $x^2 + y^2 \le 4$ and $0 \le z \le x + 2$.

    a.   Write down an iterated integral in terms of x, y and z variables that is equivalent to

$$\iiint_{\mathcal{E}} z \, dV.$$

Do NOT compute the value of the integral.

    b.   Write down an interated intergral in terms of cylindrical coordinates r, θ and z that is equivalent to the integral from part **a**. Do NOT compute the value of the integral.

2. Consider the **upper half** sphere $\mathcal{E}$ given by $z \geq 0$ and $x^2 + y^2 + z^2 \leq 1$.

a. Write down an iterated integral in **spherical coordinates** that could be used to compute the value of

$$\iiint_{\mathcal{E}} z \, dV.$$

b. Compute the value of the integral. You might find a substitution is helpful to deal with the ϕ variable.