

SPHERICAL COORDINATES

0.1. **Spherical Coordinate.** What is the equation of a the plane $z = 1$ in spherical coordinates?

Making Integrand Easier. Convert the following integral into one in spherical coordinates.

$$\int_0^1 \int_0^{\sqrt{1-x^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{2-x^2-y^2}} xy \, dzdydx$$

Setting Up Bounds. Find bounds of integrations for the following regions– using whichever coordinate systems work best for you:

0.2. **Changing Variables.** Use a change of valraible to evaluate the integral

$$\iint_R e^{x+y} dA$$

where R is the region given by $|x| + |y| \leq 1$.