18.022 Recitation Handout
5 November 2014

1. Rewrite $\int_0^1 \int_{\sqrt{x}}^1 \int_0^{1-y} f(x,y,z)\,dz\,dy\,dx$ using the order $dx\,dy\,dz$.

2. (5.4.15 in *Colley*) Integrate $f(x,y,z) = 1 - z^2$ over the tetrahedron W with vertices at the origin, $(1,0,0)$, $(0,2,0)$, and $(0,0,3)$.

3. (5.8.19 in *Colley*) Set up a quadruple integral that computes the volume of the sphere $\{w^2+x^2+y^2+z^2 \leq 1\}$ in $\mathbb{R}^4$.

4. (Fun/Challenge problem) For $(x, y) \neq (0, 0)$, we define

$$f(x, y) = \frac{xy(x^2 - y^2)}{(x^2 + y^2)^3}.$$

Calculate the iterated integrals of f over $[0, 2] \times [0, 1]$.