

1. Stewart

Evaluate

$$\int_0^2 \int_{-\sqrt{4-x^2}}^0 \frac{2}{1+x^2+y^2} dy dx$$

2. Folland

Find the area of the region inside the cardioid $r = 1 + \cos \theta$

3. University of Wisconsin - Madison Midterm

Use a triple integral to find the volume of the tetrahedron in the first octant ($x \geq 0$, $y \geq 0$, $z \geq 0$) bounded by the coordinate planes passing through the points $(1, 0, 0)$, $(0, 2, 0)$, $(0, 0, 3)$.

4. Folland

Let $S \subset \mathbb{R}^3$ be the region between the paraboloid $z = x^2 + y^2$ and the plane $z = 1$. Express the triple integral $\iiint_S f dV$ as an iterated integral with the order of integration:

(a) $dV = dz dy dx$

(b) $dV = dy dz dx$

(c) $dV = dx dy dz$