Name: _____

Math 253 Calculus III (Bueler) Wednesday 18 April 2018

Quiz #10

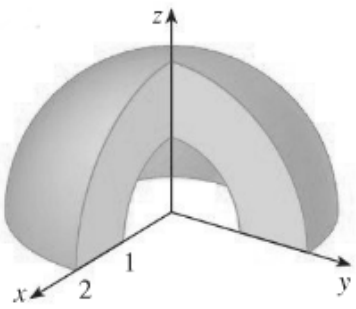
In class. 25 minutes. No textbook or notes or calculator. 30 points total.

1. **(a)** (*5 pts*) Suppose E is the solid region which is below the plane $z = x$ and above the triangular region with vertices $(0, 0, 0)$, $(0, \pi, 0)$, $(\pi, 0, 0)$. Sketch E. (*Hint.* A three-dimensional sketch is required but a supplementary two-dimensional sketch can help.)

(b) (*10 pts*) Evaluate the triple integral over the region in **(a)**:

$$\iiint_E y \, dV$$

2. (*5 pts*) Completely set up the triple integral, in spherical coordinates, of an arbitrary continuous function $f(x, y, z)$ over the solid shown at right.



3. (*10 pts*) Suppose E is the portion of the unit ball $x^2 + y^2 + z^2 \leq 1$ that lies in the first octant. (*The first octant is the set where all coordinates x, y, z are positive.*) Evaluate

$$\iiint_E x^2 + y^2 + z^2 \, dV$$