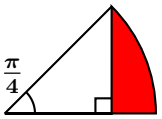
MATH 233 PRACTICE MT#2, VERSION #1

DISCLAIMER: This practice exam is intended to give you an *idea* about what a two-hour midterm is like. It is not possible for any one exam to cover every topic, and the *content, coverage and format of your actual exam could be different from this practice exam.*

You can leave answers in terms of fractions and square roots.
To earn full credit you must show your work.

#1. Find the volume of the solid obtained by intersecting the graph of $z = \sqrt{x^2 + y^2}$ and the graph of $z = 1 - \sqrt{x^2 + y^2}$.

#2. Find the center of mass of the shaded region shown on the right, where the radius of the wedge is 1, and the density at the point (x, y) is $\rho(x, y) = y$.



#3. Find the maximum and minumum value of $f(x, y) = x^3 + y$ along the ellipse $x^2 + 2y^2 = 1$.

#4. (a) Sketch the solid whose volume is given by the iterated integral

$$\int_0^2 \int_0^{2-z} \int_0^{4-y^2} dx\, dy\, dz$$

Do **not** evaluate this integral.

(b) Rewrite this integral in the order $dy\, dz\, dx$. Do **not** evaluate this integral.

#5. Compute the double integral $\iint_R x\, dA$ using the change of variables $x = \frac{1}{3}(v + u), y = \frac{1}{3}(2v - u)$, where R is the region bounded by the lines $2x - y = 0, 2x - y = 4, x + y = 0$, and $x + y = 3$.

#6. Find the area of the part of the sphere $x^2 + y^2 + z^2 = 2$ that lies above the plane $z = 1$.

#7. Evaluate the triple integral $\int_{-1}^{1} \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} \int_{x^2+y^2}^{2-x^2-y^2} (x^2 + y^2)^{3/2}\, dz\, dy\, dx$.
