MA 213 Worksheet #15

Section 15.3
03/05/19

1 *15.3.5* Sketch the region whose area is given by the following integral. Evaluate the integral.

$$\int_{\pi/4}^{3\pi/4} \int_{1}^{2} r \, dr \, d\theta$$

2 Evaluate the given integral by changing to polar coordinates.

(a) *15.3.7* $\iint_D x^2 y \, dA$, where D is the top half of the disk with center at the origin and radius 5.

(b) *15.3.9* $\iint_R \sin(x^2 + y^2) \, dA$, where R is the region in the first quadrant between the circles centered at the origin and radii 1 and 3.

3 *15.3.17* Use a double integral to find the area of the region inside the circle $(x-1)^2 + y^2 = 1$ and outside the circle $x^2 + y^2 = 1$.

4 *15.3.23* Use polar coordinates to find the volume of a sphere of radius a.

5 *15.3.35* A swimming pool is circular with a 40 foot diameter. The depth of the water is constant along east-west lines and increases linearly from 2 feet at the south end to 7 feet at the north end. Find the volume of water in the pool.

6 15.2 Review Find the volume of the solid by subtracting two volumes.

(a) *15.2.35* The solid enclosed by the parabolic cylinders $y = 1 - x^2$ and $y = x^2 - 1$, and the planes $x + y + z = 2$ and $2x + 2y - z + 10 = 0$.

(b) *15.2.37* The solid under the plane $z = 3$, above the plane $z = y$, and between the parabolic cylinders $y = x^2$ and $y = 1 - x^2$.