MA 213 Worksheet #15

Sections 15.3 and 15.6

1 *15.3.6* Sketch the region whose area is given by the following integral. Evaluate the integral.

$$\int_{\pi/2}^{\pi}\int_{0}^{2\sin\theta} r\ dr\ d\theta$$

2 *15.3.9* Evaluate the integral by changing to polar coordinates: $\iint_R \sin(x^2+y^2)\ dA$, where R is the region in the first quadrant between the circles centered at the origin and radii 1 and 3.

3 Use a double integral to find the area of the given region.

15.3.15 One loop of the rose $r = \cos(3\theta)$.

15.3.17 inside the circle $(x-1)^2 + y^2 = 1$ and outside the circle $x^2 + y^2 = 1$.

4 *15.6.3* Evaluate the iterated integral: $\int_0^2 \int_0^{z^2} \int_0^{y-z} (2x-y)\ dx\ dy\ dz$

5 *15.6.9* Evaluate the triple integral:

$$\iiint_E y\ dV, \text{ where } E = \{(x,y,z) \mid 0 \le x \le 3,\ 0 \le y \le x,\ x-y \le z \le x+y\}.$$

6 *15.6.27* Sketch the solid whose volume is given by the integral $\int_0^1 \int_0^{1-x} \int_0^{2-2z} dy\ dz\ dx$

Additional Recommended Problems

7 *15.3.19* Use polar coordinates to find the volume of the solid under the paraboloid $z = x^2 + y^2$ and above the disk $x^2 + y^2 \le 25$

8 *15.3.23* Use polar coordinates to find the volume of a sphere of radius a.

9 *15.3.29* Evaluate the iterated integral by converting to polar coordinates.

$$\int_0^2 \int_0^{\sqrt{4-x^2}} e^{-x^2-y^2}\ dy\ dx.$$

10 *15.6.35* Write the five other iterated integrals that are equal to the iterated integral,

$$\int_0^1 \int_y^1 \int_0^y f(x,y,z)\ dz\ dx\ dy.$$