Box number: _____ (name on back)
Math 60: Section _____
Assignment 5
Due Date: 10/12/18

Section 5.2: 7, 14
Section 5.3: 1, 13, 18
Section 5.4: 4, 5
Section 5.5: 9, 20, 25, 31, 34, 38

Section 5.2 #7. In Exercises 4-13, evaluate the given iterated integrals. In addition, sketch the regions D that are determined by the limits of integration.

$$\int_{-1}^{3} \int_{x}^{2x+1} xy \, dy \, dx$$

Section 5.2 #14. Figure 5.43 shows the level curves indicating the varying depth (in feet) of a 25 ft by 50 ft swimming pool. Use a Riemann sum to estimate, to the nearest 100 ft^3, the volume of water that the pool contains.

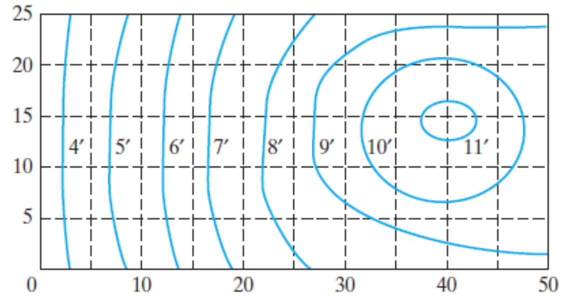

Figure 5.43

Section 5.3 #1. Consider the integral

$$\int_0^2 \int_{x^2}^{2x} (2x+1)\, dy\, dx.$$

(a) Evaluate this integral.

(b) Sketch the region of integration.

(c) Write an equivalent iterated integral with the order of integration reversed. Evaluate this new integral and check that your answer agrees with part (a).

Section 5.3 #13. In Exercises 12 and 13, rewrite the given sum of iterated integrals as a single iterated integral by reversing the order of integration, and evaluate.

$$\int_0^8 \int_0^{\sqrt{y/3}} y\,dx\,dy + \int_8^{12} \int_{\sqrt{y-8}}^{\sqrt{y/3}} y\,dx\,dy.$$

Section 5.3 #18. In Exercises 14-18, evaluate the given iterated integral.

$$\int_0^2 \int_{y/2}^1 e^{-x^2}\,dx\,dy$$

Section 5.4 #4. Find the value of $\iiint_W z\, dV$ where $W = [-1,2] \times [2,5] \times [-3,3]$, without resorting to explicit calculation.

Section 5.4 #5. Evaluate the iterated integrals given in Exercises 5-7.

$$\int_{-1}^{2}\int_{1}^{z^2}\int_{0}^{y+z} 3yz^2\,dx\,dy\,dz$$

Section 5.5 #9. Evaluate the integral

$$\int_0^2 \int_{x/2}^{(x/2)+1} x^5(2y-x)e^{(2y-x)^2}\,dy\,dx$$

by making the substitution $u = x$, $v = 2y - x$.

Section 5.5 #20. Find the total area enclosed inside the rose $r = \sin 2\theta$. (Hint: Sketch the curve and find the area inside a single leaf.)

Section 5.5 #25. Evaluate
$$\iint_D \cos\left(x^2+y^2\right) dA,$$
where D is the shaded region in Figure 5.106.

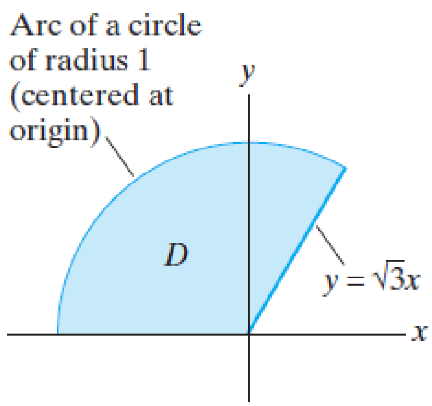

Figure 5.106 The region D of Exercise 25.

Section 5.5 #31. Determine

$$\iiint_W (x^2 + y^2 + 2z^2)\, dV,$$

where W is the solid cylinder represented by the inequalities $x^2 + y^2 \leq 4, -1 \leq z \leq 2$.

Section 5.5 #34. In Exercises 34 and 35, determine the values of the given integrals, where W is the region bounded by the two spheres $x^2 + y^2 + z^2 = a^2$ and $x^2 + y^2 + z^2 = b^2$, for $0 < a < b$.

$$\iiint_W \frac{dV}{\sqrt{x^2 + y^2 + z^2}}$$

Section 5.5 #38. Determine

$$\iiint_W \left(2 + \sqrt{x^2 + y^2}\right) \, dV$$

where $W = \{(x, y, z) | \sqrt{x^2 + y^2} \leq z/2 \leq 3\}$.