Math 60
HW 8
Thursday, May 26, 2016

5.2.{7, 14}, 5.3.{1, 13, 18}, 5.4.{4, 5, 18, 29ab}

Colley 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.

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

■

Colley 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.

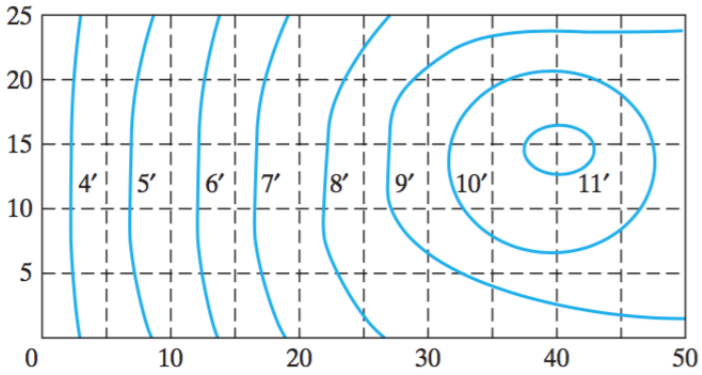

Figure 5.43

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Colley 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).

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Colley 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.

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

■

Colley 5.3.18 In Exercises 14-18, evaluate the given iterated integral.

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

■

Colley 5.4.4 Find the value of $\int\int\int_W z\, dV$, where $W = [-1, 2] \times [2, 5] \times [-3, 3]$, without resorting to explicit calculation.

■

Colley 5.4.5 Evaluate the iterated integrals given in Exercises 5-7.

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

■

Colley 5.4.18 In Exercises 11-20, integrate the given function over the indicated region W.

$f(x, y, z) = z$; W is the region bounded by $z = 0$, $x^2 + 4y^2 = 4$, and $z = x + 2$.

■

Colley 5.4.29ab Consider the iterated integral

$$\int_{-2}^{2} \int_{0}^{\frac{1}{2}\sqrt{4-x^2}} \int_{x^2+3y^2}^{4-y^2} (x^3 + y^3)\, dz\, dy\, dx.$$

(a) This integral is equal to a triple integral over a solid region W in $\mathbb{R}^3$. Describe W.

(b) Set up an equivalent iterated integral by integrating first with respect to z, then with respect to x, then with respect to y. Do not evaluate your answer.

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