

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  $u = x, v = 2y - x$ .

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

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Evaluate

$$\iint_D \cos(x^2 + y^2) \, dA,$$

where  $D$  is the shaded region in Figure 5.106.

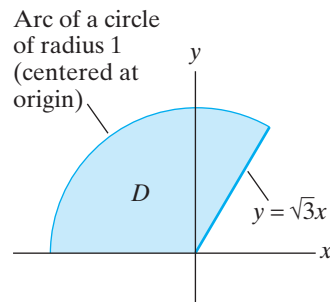


FIGURE 5.106. The region  $D$  of Exercise 25.

Determine

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

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

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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  $0 < a < b$ .

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

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Determine

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

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

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