

# 16.2 Iterated Integrals

Name:

Date:

**P 2.** Sketch the region of integration.

$$\int_0^1 \int_{y^2}^y xy \, dx \, dy$$

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$$\int_0^2 \int_0^{y^2} y^2 x \, dx \, dy$$

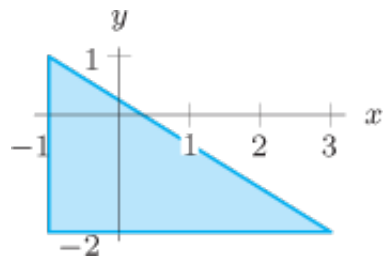
**P 11.** Evaluate.

$$\int_0^3 \int_0^y \sin x \, dx \, dy$$

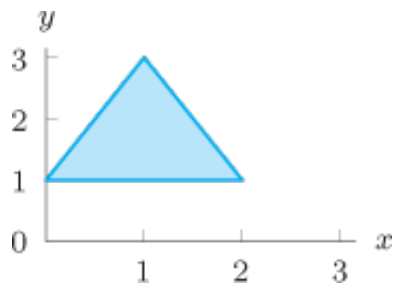
**P 15.** Evaluate.

$$\int_1^5 \int_x^{2x} \sin x \, dy \, dx$$

**P 19.** Write  $\int_R f \, dA$  as an iterated integral for the shaded region  $R$ .



**P 21.** Write  $\int_R f \, dA$  as an iterated integral for the shaded region  $R$ .



**P 27.** Evaluate

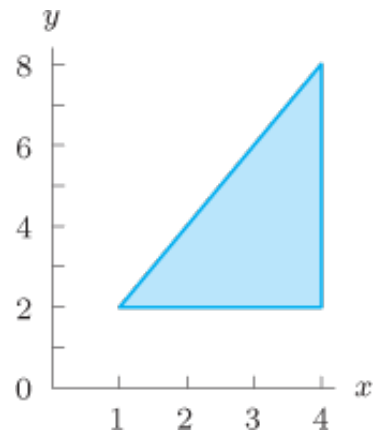
$$\int_R (2x + 3y)^2 dA,$$

where  $R$  is the triangle with vertices at  $(-1, 0)$ ,  $(0, 1)$ , and  $(1, 0)$ .

**P 37.** Evaluate.

$$\int_0^1 \int_{e^y}^e \frac{x}{\ln x} dx dy$$

**P 38.** Find the volume under the graph of the function  $f(x, y) = 6x^2y$  over the region shown below.



**P 39.**

- (a) Find the volume below the surface  $z = x^2 + y^2$  and above the  $xy$ -plane for  $-1 \leq x \leq 1$ ,  $-1 \leq y \leq 1$ .
- (b) Find the volume above the surface  $x^2 + y^2$  and below the plane  $z = 2$  for  $-1 \leq x \leq 1$ ,  $-1 \leq y \leq 1$ .

**P 43.** Find the average value of  $f(x, y) = x^2 + 4y$  on the rectangle  $0 \leq x \leq 3$  and  $0 \leq y \leq 6$ .

**P 45.** Set up, but do not evaluate, an iterated integral for the volume of the solid under the graph of  $f(x, y) = 25 - x^2 - y^2$  and above the  $xy$ -plane.

**P 49.** Find the volume of the solid region under the graph of  $f(x, y) = x^2 + y^2$  and above the triangle  $0 \leq y \leq x$ ,  $0 \leq x \leq 1$ .

**P 56.** Find the average distance to the  $x$ -axis for points in the region bounded by the  $x$ -axis and the graph of  $y = x - x^2$ .