1. Evaluate the double integral.

(a) \( \iint_D x \cos y \, dxdy \), \( D \) is bounded by \( y=0, y=x^2, x=1 \).

(b) \( \iint_D y^3 \, dxdy \), \( D \) is the triangular region with vertices (0,2), (1,1), (3,2).

(c) \( \iint_D (2x - y) \, dxdy \), \( D \) is bounded by the circle with center the origin and radius 2.

2. Find the volume of the given solid.

(a) Under the surface \( z=xy \) and above the triangle with vertices (1,1), (4,1), and (1,2).

(b) Enclosed by the surfaces \( z = x^2 \), \( y=x^2 \) and the planes \( z=0 \) and \( y=4 \).

(c) Bounded by the cylinder \( x^2 + y^2 = 1 \) and the planes \( y=z \), \( x=0, z=0 \) in the first octant.

3. Sketch the region of integration and change the order of integration.

(a) \( \int_0^3 \int_{-\sqrt{9+y^2}}^{\sqrt{9+y^2}} f(x,y) \, dxdy \)

(b) \( \int_0^2 \int_0^{\ln x} f(x,y) \, dy dx \)

4. Evaluate the integral by reversing the order of integration.

(a) \( \int_0^1 \int_{3y}^{3} e^{x^2} \, dxdy \)

(b) \( \int_0^1 \int_{\sqrt[3]{y}}^{\sqrt{y}} (\sqrt{y^3 + 1}) \, dxdy \)

(c) \( \int_0^1 \int_{\sin^{-1}(y)}^{\pi} (\cos x) \sqrt{1 + (\cos x)^2} \, dxdy \)

5. In evaluating a double integral over a region \( D \), a sum of iterated integrals was obtained as follows

\[ \iint_D f(x,y) \, dxdy = \int_0^1 \int_0^{2y} f(x,y) \, dxdy + \int_0^3 \int_0^{3-y} f(x,y) \, dxdy \]

Sketch the region \( D \) and express the double integral as an iterated integral with reversed order of integration.