

Section 16.1 and 16.2 Review

Section 16.1 Additional Exercises

1. What is the integral of the constant function $f(x, y) = 7$ over the rectangle $[2, 4] \times [-2, 3]$?

2. Evaluate

$$\int_{-1}^1 \int_0^\pi x^2 \sin y \, dy dx.$$

3. Evaluate

$$\int_0^1 \int_0^1 y \sqrt{1 + xy} \, dy dx.$$

Hint: Change the order of integration.

4. Let $f(x, y) = mxy^2$ where m is a constant. Find a value of m such that

$$\int \int_R f(x, y) dA = 1,$$

where $R = [0, 1] \times [0, 2]$.

Section 16.2 Additional Exercises

1. Compute the double integral

$$\iint_R x^2 y \, dA$$

where R is the region described by $1 \leq x \leq 3$, and $x \leq y \leq 2x + 1$.

2. Sketch the domain of integration. Then change the order of integration and evaluate. Explain the simplification achieved by changing the order.

$$\int_0^4 \int_{\sqrt{y}}^2 \sqrt{x^3 + 1} \, dx dy.$$

3. Calculate the average height above the x -axis of a point in the region $0 \leq x \leq 1$, $0 \leq y \leq x^2$.