16.2: Evaluating 1D and 2D Integrals

Calculus III

College of the Atlantic

1. Evaluate the following integrals:

$$\int_2^5 x^2\,dx \tag{1}$$

$$\int_2^5 y^2\,dy \tag{2}$$

$$\int_2^5 2x^2\,dx \tag{3}$$

$$\int_2^5 \ln(2)x^2\,dx \tag{4}$$

$$\int_2^5 yx^2\,dx \tag{5}$$

$$\int_2^y x^2\,dx \tag{6}$$

$$\int_2^x x^2\,dx \tag{7}$$

2. Evaluate the following integrals:

$$\int_2^3 \sqrt{1+2x}\,dx \tag{8}$$

$$\int_0^4 x^4 e^{-x}\,dx \tag{9}$$

3. Evaluate the following integrals and sketch the region of integration:

$$\int_1^4 \int_0^2 dx\, dy \tag{10}$$

$$\int_0^3 \int_1^2 xy^2\, dx\, dy \tag{11}$$

$$\int_0^3 \int_1^2 xy^2\, dy\, dx \tag{12}$$

4. Let R be a triangular region with corners at $(0,0)$, $(0,4)$, and $(2,0)$. Write

$$\int_R xy\, dA\ , \tag{13}$$

as an iterated integral in two different ways and evaluate it.

5. Let R be the triangular region with corners at $(0,3)$, $(1,1)$, and $(5,3)$. Write the integral

$$\int_R 3xy^2\, dA\ , \tag{14}$$

as an iterated integral and sketch the region of integration.

6. Let R be the region in the first quadrant bounded by the x and y-axes and the line $x+2y=6$. Write

$$\int_R \sqrt{x+2y}\, dA\ , \tag{15}$$

as an iterated integral in two different ways and evaluate it.

7. Let R be the region bounded by $y=\sqrt{x}$ and $y=x^3$. Evaluate

$$\int_R 4xy - y^3\, dA\ , \tag{16}$$

and sketch the region of integration.