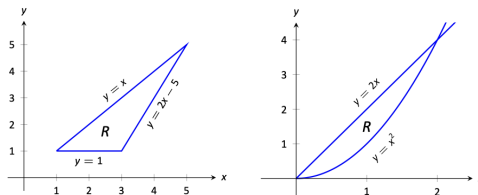


Math 203 — More double integrals

Problem 1. Let $f(x, y)$ be a given function. For each region R below, set up the double integral $\iint_R f(x, y) dA$ in two ways: using $dA = dydx$ and $dA = dx dy$.



Problem 2. Each double integral below represents the area of a region R in the xy -plane. Sketch R and then set up the integral again with the order of integration reversed.

- a. $\int_0^1 \int_x^{2x} 1 dy dx$
- b. $\int_0^{10} \int_{-10+y}^{10-y} 1 dx dy$
- c. $\int_{-1}^1 \int_{y^2}^1 1 dx dy$

Problem 3. Let D be the region inside the unit circle in \mathbb{R}^2 , let R be the right half of D , and let B be the bottom half of D . Determine whether each of the following double integrals is positive, negative, or zero by thinking about the (signed) volume that each represents and whether the function in the integrand is positive, negative, or zero over the region of integration. You might find it helpful to use CalcPlot3d.

- a. $\iint_D 1 dA$
- b. $\iint_D (1 - \sqrt{x^2 + y^2}) dA$
- c. $\iint_D (-1 + x^2 + y^2) dA$
- d. $\iint_R x dA$
- e. $\iint_R y dA$
- f. $\iint_B x dA$
- g. $\iint_B y dA$