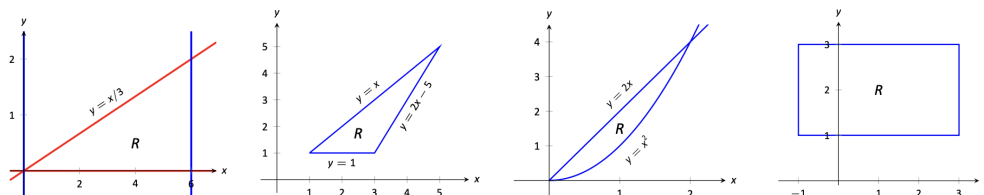


## Math 203 — Double integrals

**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.  $\int_{-\sqrt{2}}^{\sqrt{2}} \int_0^{2-x^2} 1 dy dx$

b.  $\int_0^1 \int_x^{2x} 1 dy dx$

c.  $\int_0^{10} \int_{-10+y}^{10-y} 1 dx dy$

d.  $\int_{-1}^1 \int_{y^2}^1 1 dx dy$

**Problem 3.** Compute the following double integrals.

a.  $\int_0^3 \int_0^1 (5x^3 + 3xy - 4y^2) dy dx$

b.  $\int_0^\pi \int_0^{\pi/2} (x^2 \sin y + \cos x) dx dy$

c.  $\int_0^1 \int_{x^2}^x (x + y) dy dx$

d.  $\int_0^1 \int_0^y e^x dx dy$