Exercise 1. Using double integrals, compute the volume of the **prism** under the plane with equation $z = x + (1/2)y - (1/2)$ over the rectangle

$$R := \left\{(x, y) \in \mathbb{R}^2 \,:\, 1 \leq x \leq 2,\, 1 \leq y \leq 3\right\}$$

(see Figure 1).

Exercise 2. Using double integrals, compute the area of the surface in 3D (coordinates $\{x, y, z\}$) with equation $x^2 + z^2 = 1$, over the rectangle

$$R := \left\{(x, y) \in \mathbb{R}^2 \,:\, -1 \leq x \leq 1,\, 0 \leq y \leq 2\right\}.$$

(**Recall:** Some(!) solutions require to know that

$$\int \frac{1}{\sqrt{1-x^2}}\, dx = \sin^{-1}(x), \qquad \sin^{-1}(1) = \pi/2,\ \sin^{-1}(-1) = -\pi/2,$$

but it might not be necessary...)

Exercise 3. Evaluate

$$\int_S \left(2 - \sqrt{x^2 + y^2}\right) \, dxdy,$$

where S is the region in the plane

$$S := \left\{(x, y) \in \mathbb{R}^2 \, : \, 1 \leq x^2 + y^2 \leq 4\right\}$$

(see Figure 2).