1.6 Homework

Exercise 1.12 (Homework) Compute the following double integrals:

1. $I = \iint_D (x+y)\,dx\,dy$, where
$$D = \{(x,y) \in \mathbb{R}^2 \mid x \le 1, y \le 1, x+y \ge 1\}.$$
2. $I = \iint_D |x+y|\,dx\,dy$, where
$$D = [-1,1] \times [-1,1].$$
3. $I = \iint_D xy\,dx\,dy$, where the region D is bounded by the parabolas $y = x^2$ and $x = y^2$.
4. $I = \iint_D \frac{1}{1+x^2+y^2}\,dx\,dy$, where
$$D = \{(x,y) \in \mathbb{R}^2 \mid x^2+y^2 \le 1\}.$$
5. $I = \iint_D \frac{dx\,dy}{(1+x^2+y^2)^2}$, where
$$D = \{(x,y) \in \mathbb{R}^2 \mid x \le x^2+y^2 \le 1\}.$$

Exercise 1.13 (Homework) Compute the following triple integrals:

1. $I = \iiint_D xyz\,dx\,dy\,dz$, where
$$D = \{(x,y,z) \in \mathbb{R}^3 \mid 0 \le x \le y \le z \le 1\}.$$
2. $I = \iiint_D z\,dx\,dy\,dz$, where
$$D = \{(x,y,z) \in \mathbb{R}^3 \mid \sqrt{x}+\sqrt{y}+\sqrt{z} \le 1\}.$$