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**Homework 11**

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**Exercise 1** Compute the following integrals:

$$\iint_{\Omega} x^2 y \, dx \, dy \quad \text{with } \Omega = [1, 2] \times [-3, 4],$$
$$\iiint_{\Omega} \sin(x) y z \, dx \, dy \, dz \quad \text{with } \Omega = [0, \pi] \times [0, 1] \times [0, 2]$$

**Exercise 2** 1) Compute the integral  $\iint_{\Omega} e^{x+y} \, dx \, dy$  with  $\Omega$  the subset of  $\mathbb{R}^2$  defined by  $\{(x, y) \in \mathbb{R}^2 \mid |x| + |y| \leq 1\}$ ,

2) Compute the integral  $\iint_{\Omega} (x - y) \, dx \, dy$  with  $\Omega$  the subset of  $\mathbb{R}^2$  defined by the three lines of equation  $x = 0$ ,  $y = x + 2$ , and  $y = -x$ ,

3) Compute the integral  $\iint_{\Omega} xy \, dx \, dy$  with  $\Omega$  the subset of  $\mathbb{R}^2$  defined by the two functions of equation  $y = x^2$  and  $y = x^4$ .

**Exercise 3** Compute the integral  $\iiint_{\Omega} (x + y + z)^2 \, dx \, dy \, dz$  with  $\Omega$  the subset of  $\mathbb{R}^3$  defined by the four planes of equation  $x = 0$ ,  $y = 0$ ,  $z = 0$ , and  $x + y + z = 1$ .