---

**Homework 10**

---

**Exercise 1** *Compute the following integrals:*

$$\iint_\Omega x^2 y \,\mathrm{d}x\,\mathrm{d}y \quad \textit{with} \quad \Omega = [1,2]\times[-3,4],$$
$$\iiint_\Omega \sin(x) yz \,\mathrm{d}x\,\mathrm{d}y\,\mathrm{d}z \quad \textit{with} \quad \Omega = [0,\pi]\times[0,1]\times[0,2]$$

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