Aalto university
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Hand-in exercises 1
Differential and integral calculus 3, MS-A0311.
Submit your solutions on MyCourses by **Wednesday, March 10th 2021 23.59**.

(1) Calculate

$$\iint_D x \, dA$$

where D is the triangle with vertices $(0,0)$, $(2,1)$ and $(0,1)$. (4p)

(2) Find the volume of the solid under $z = 1 - x^2 + y$ and above the region $0 \leq y \leq 1$, $0 \leq x \leq y^2$. (4p)

(3) Let $a > 0$. Compute

$$\iint_D x^2 + y^2 \, dA$$

where D is the disk $x^2 + y^2 \leq 2xa$. (*Hint:* Translate the origin to the center of the disk and introduce polar coordinates.) (4p)

(4) Let $a > 0$, $b > 0$, and

$$D = \left\{ (x, y) \in \mathbb{R}^2; \frac{x^2}{a^2} + \frac{y^2}{b^2} \leq 1 \right\}.$$

Calculate

$$\iint_D \sqrt{1 - \frac{x^2}{a^2} - \frac{y^2}{b^2}} \, dA.$$

(4p)