Aalto University
Björn Ivarsson, 050-4067 832

Midterm 1, Wednesday 12.03.2014 16:00 - 18:00
Mathematics 2, MS-A0310.
Lecture notes, books, pocket calculators, smart phones or computers are not allowed during the midterm.

Explain your solutions! If you only give the answer you will not get any points.

(1) Let $F(x,y) = (2xy, x^2)$ and let γ be the curve $x^2 + 4y^2 = 4$ oriented counterclockwise. Calculate

$$\oint_\gamma F(x,y) \cdot d\gamma.$$

(6p)

(2) Find the area of the piece of the surface $x^2 + y + z^2 = 2$ that is contained in the half-space $y \geq 0$. (6p)

(3) Find the flux of $F(x,y,z) = (x,y,0)$ upwards through the part of the surface $z = 2 - x^2 - 2y^2$ that lies above the xy-plane. (6p)

Good luck!