Department of Mathematics, University of Hamburg **WiSe 2023/24**
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Analysis III for Engineering Students

Homework sheet 7

Exercise 1:

Verify Green's theorem for the vector field

$$\boldsymbol{f}\,(x,y) = (x^2 + y, \sin x)^T$$

and the area G enclosed by the function $y = 1 - (x-1)^2$ and the x axis.

Exercise 2:

Given the saddle area

$$S = \left\{(x,y,z)^T \in \mathbb{R}^3 \mid x^2 + y^2 \le 4\,,\ z = xy\right\}$$

a) derive a parameterization of S,

b) plot S using the MATLAB function 'ezgraph3' and

c) calculate the area of S using a surface integral.

Submission deadline: 2.2.2024