

# Exam test D

for Mathematics 2, SS 2017/18

1. (15 points) Find all solutions of the following system of equations

$$\begin{aligned}2u + 3v + x + 5z &= 0 \\2u + 6v + 2x + y + 2z &= 0 \\2v + 3x - y - z &= 0 \\2u - v + 2x - 3y + 10z &= 0.\end{aligned}$$

2. (15 points) Compute the Riemann integral

$$\int_1^5 \frac{x-7}{\sqrt{3x+1}+5} dx.$$

3. (20 points) Find supremum and infimum (and maximum and minimum if they exist) of the function  $f$  on the set  $M$ , where

$$f(x, y) = x + y - 3, \quad M = \{[x, y] \in \mathbb{R}^2 : x^2 + y^2 \leq 1, y \geq 1 - x^2\}.$$

Explain in detail why maximum and minimum exist (if they exist).