

# Homework 3

Deadline: 15.3.2018 at 14:00

Justify every claim formally!

1. Let  $F, f$  be two continuous functions  $[a, b] \rightarrow \mathbb{R}$  satisfying  $F'(x) = f(x)$  for every  $x \in (a, b)$ . Prove that  $F$  is primitive to  $f$  on  $[a, b]$ .

You can use the following theorem: Let  $\delta > 0$  and  $g: [a, a + \delta) \rightarrow \mathbb{R}$  be a continuous function such that  $f'(x)$  exists and is finite for every  $x \in (a, a + \delta)$ . Then  $f'_+(a) = \lim_{x \rightarrow a^+} f'(x)$ , if the limit is defined.

2. Find a primitive function to the function  $\frac{x}{x^2+7+\sqrt{x^2+7}}$  with a maximal domain.
3. Find a primitive function to the function  $\frac{(\tan x + \cot x)^2}{\sin^2 x - \cos^2 x}$  with a maximal domain.