

# Logics and Mathematics – 12<sup>th</sup> lecture

## Exercise sheet

Preining Norbert

**Problem 1** Draw the graph of the following functions, as well as the graph of the inverse function, if it exists:

- $f(x) = 3$
- $f(x) = x^2 - 1$
- $f(x) = x^3 + 2x^2 - x - 2$
- $f(x) = \tan(1/x)$

**Problem 2** Show that the following functions are continuous:

- $f(x) = \begin{cases} 1 & \text{if } 0 \leq x < 1 \\ x^2 & \text{if } x \geq 1 \end{cases}$
- $f(x) = |x| = \begin{cases} x & \text{if } x > 0 \\ 0 & \text{if } x = 0 \\ -x & \text{if } x < 0 \end{cases}$
- $f(x) = \begin{cases} \sin x - \cos x & \text{if } x \neq 0 \\ -1 & \text{if } x = 0 \end{cases}$