Babeş-Bolyai University, Faculty of Mathematics and Computer Science Bachelor, Computer Science, Groups 911-917, Academic Year 2019-2020

Mathematical Analysis Seminar 1

Before we start: Do you know how to sketch the graph of the following functions $ax^2 + bx + c$, $e^{\pm x}$, $\ln x$, \sqrt{x} , |x|?

Sketch the graph of

1.
$$f:[0,\infty)\to \mathbb{R}, f(x)=x^2e^{-x}$$
.

2.
$$f: \mathbb{R} \to \mathbb{R}, f(x) = \frac{x^2}{1+x^2}.$$

3.
$$f[0,\infty) \to \mathbb{R}, f(x) = \frac{x^3}{1+x^2}.$$

Homework

4. Let $f: \mathbb{R} \to \mathbb{R}$, $f(x) = \frac{x^4}{1+x^2}$. Sketch the graph of f and find a polynomial function P(x) (of minimal degree) such that

$$|f(x) - P(x)| \to 0$$
 as $x \to \infty$.

5. Sketch the graph of $f:[0,\infty)\to\mathbb{R},\ f(x)=e^{-x}\sin(x)$. [This function describes damped oscillations.]