

Introduction to Analysis II
Home Work 4, due Thursday, February 12.
Instructor: Prof. Artem Zvavitch

Problem 1. *If $f(x) = \cos x$ show that the remainder term in Taylor's Theorem converges to zero as $n \rightarrow \infty$ for each fixed x_0 and x*

Problem 2. *Calculate e correctly to 7 decimal place.*

Problem 3. *Determine whether or not $x = 0$ is a relative extremum for*

- $f(x) = x^3 + 2x^4$.
- $f(x) = \sin x - x$.

Problem 4. *Assume that $f(x) : I \rightarrow J$ and $g(x) : J \rightarrow \mathbb{R}$ are convex functions and I, J are open intervals in \mathbb{R} . Show that if g is increasing function then $g(f(x))$ is a convex function on I . Would this statement be true without assumption on g to be increasing?*

Problem 5. *Assume $f(-1) = f(0) = f(1) = 0$ and f is a convex function on \mathbb{R} . Please, find $f(.5)$. Can you say anything about $f(7)$?*