

King Fahd University of Petroleum & Minerals
Department of Mathematical Sciences

MATH-533: Complex Variables I
Spring Semester 2004 (032)

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Homework 3

Due 5.4.2004

- Q1.** Find the real and imaginary parts of $\exp(e^z)$ and z^z .
- Q2.** Show how to define “angles” in a triangle and show that the sum of the angles is π .
- Q3.** Show that a discrete set in a separable metric space is countable.
- Q4.** Let \mathcal{S} be the set of all sequences $x = \{x_n\}_{n=1}^{\infty}$ of real numbers such that only a finite number of the x_n are $\neq 0$. Define $d(x, y) := \max\{|x_n - y_n| : n \in \mathbb{N}\}$. Is (\mathcal{S}, d) complete? Show that the δ -neighborhoods are not totally bounded.
- Q5.** Which of the following functions is uniformly continuous on the whole real line: $\sin(x)$, $x \sin(x)$, $x \sin(x^2)$, $|x|^{\frac{1}{2}} \sin(x)$?

GOOD LUCK