

Problems to Introduction to Real Analysis, (Math447)

Due: 2/10/2005

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Problem 1. Define for $t \in [0, 1]$

$$f(t) = \begin{cases} t \sin(\frac{1}{t}) & \text{if } t \neq 0 \\ 0 & \text{if } t = 0. \end{cases}$$

Show that f is not of bounded variation, but that f^2 is of bounded variation.

Problem 2. Show that the graph of f , f defined as in Problem 1, is of infinite length. By graph of f we mean the curve:

$$[0, 1] \ni t \mapsto (t, f(t)) \in \mathbb{R}^2.$$

Problem 3. Problem 11 on page 140

Problem 4. Problem 12 on page 140

Problem 5. Problem 17 on page 140

Problem 6. Problem 19 on page 140