18.100B : Fall 2010 : Section R2
Homework 11

Due Tuesday, November 23, 1pm

Reading: Tue Nov.16 : Quiz 3 (covering Rudin 4, 5);
Riemann integrability and continuity almost everywhere
Thu Nov.18 : Stieltjes integral, fundamental theorem of calculus, Rudin 6.13-22

1 . Problem 3, page 138 in *Rudin*.

2 . Problem 7, page 138 in *Rudin*.

3 . Use the definitions in Problems 7 and 8 of *Rudin* to answer the following questions:

(a) For which $\alpha \in \mathbb{R}$ does the integral

$$\int_0^1 \frac{\sin t}{t^\alpha}\, dt$$

converge (absolutely)?
(*Hint*: First try to understand the convergence of the integral of $\frac{1}{t^\gamma}$ on the interval $[0, 1]$).

(b) For which $\beta \in \mathbb{R}$ does the integral

$$\int_1^\infty \frac{e^{-t}}{t^\beta}\, dt$$

converge (absolutely)?
(*Hint*: First try to understand the convergence of the integral of $\frac{1}{t^\gamma}$ on the interval $[1, \infty)$).

4 . Problem 17, page 141 in *Rudin*.

18.100B Analysis I
Fall 2010