HOMEWORK 1, DUE FEB 26, 2019

ANALYSIS II

(1) Suppose f is defined in the square $S = \{(x, y) : 0 \leq x \leq 1, 0 \leq y \leq 1\}$ by the formula

$$f(x,y) = \begin{cases} 1 & \text{if } x \text{ is irrational} \\ 4y^3 & \text{if } x \text{ is rational} \end{cases}$$

(a) Show that $\int_0^1 (\int_0^1 f(x,y)dy)dx$ exists and has the value 1.
(b) Show that $\int_S f$ does not exist.

(2) Do problem 48 on p 375 from Chapter 5 of the textbook "Real Mathematical Analysis".