NINTH HOMEWORK

Feel free to work with others, but the final write-up should be entirely your own and based on your own understanding.

1. (10 pts) (5.2.13)
2. (10 pts) (5.2.14)
3. (10 pts) (5.3.4)
4. (10 pts) (5.3.13)
5. (10 pts) (5.4.13)
6. (10 pts) (5.4.14)
7. (10 pts) (5.4.21)
8. (10 pts) (5.5.3)
9. (10 pts) (5.5.4)
10. (10 pts) (5.5.9)
11. (10 pts) (5.5.11)
12. (10 pts) (5.5.12)

Just for fun: Find a bounded region $D \subset \mathbb{R}^2$ of type 3, so that

$$D = \{\, (x,y) \in \mathbb{R}^2 \,|\, a \le x \le b, \gamma(x) \le y \le \delta(x) \,\} = \{\, (x,y) \in \mathbb{R}^2 \,|\, c \le y \le d, \alpha(y) \le x \le \beta(y) \,\}$$

and a function $f\colon D \longrightarrow \mathbb{R}$ such that

$$\int_a^b \left(\int_{\gamma(x)}^{\delta(x)} f(x,y)\,\mathrm{d}y \right) \mathrm{d}x,$$

exists but

$$\int_c^d \left(\int_{\alpha(y)}^{\beta(y)} f(x,y)\,\mathrm{d}x \right) \mathrm{d}y,$$

does not.

Is the function f integrable over D?

18.022 Calculus of Several Variables
Fall 2010