(1) Rudin, Chapter 9, Problem 12.
(2) Rudin, Chapter 9, Problem 30.
(3) Rudin, Chapter 9, Problem 31.
(4) Rudin, Chapter 10, Problem 1.
(5) (a) Rudin, Chapter 10, Problem 2.
    (b) Find a continuous, bounded function $f : \mathbb{R}^2 \to \mathbb{R}$ so that

\[
\int_{-\infty}^{\infty} \int_{-\infty}^{\infty} f(x, y) \, dx \, dy \neq \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} f(x, y) \, dy \, dx
\]

with a naive definition of the double integral.