Reading:

- For this homework: 3.4-3.5
- For Wedneday, April 13: 3.2-3.4
- For Monday, April 18: 3.4-3.5

Problem 1.

Folland, Chapter 3, Problem 28

Problem 2.

Folland, Chapter 3, Problem 36
(one of the midterm problems is close to this problem)

Problem 3.

Folland, Chapter 3, Problem 37

Problem 4.

Folland, Chapter 3, Problem 41
Note: you may assume the existence of such an A for this problem. It is a consequence of a combination of Problem 1 on HW7, Problem 4 on the midterm, and the Baire Category theorem.

Problem 5.

Folland, Chapter 3, Problem 42

Problem 6.

Let $a < b$ be real numbers and let $1 \leq p \leq +\infty$. Let X be the set of functions $f\colon [a,b] \to \mathbb{C}$ which are absolutely continuous and such that $f' \in L^p([a,b])$. Fix $x_0 \in [a,b]$. For $f \in X$, define

$$\|f\| = |f(x_0)| + \|f'\|_p.$$

Show that $\|\cdot\|$ is a norm which turns X into a Banach space.

Problems to think about, do not turn in

Problem 7.

Folland, Chapter 3, Problem 31-32, 38-39.

Problem 8.

Folland, Chapter 3, Problem 40
Note: you can try first proving Problem 39 as the problem suggests (if you do so, you must prove this problem). Alternatively, we characterized in class when an increasing function has zero derivative a.e. in terms of the corresponding measure on the real line. You could use this instead.