

# MAT320 Problem Set 5

Due Oct 31, 2024

Please write your homework on paper neatly or type it up in LaTeX, and hand it in at the beginning of class next Thursday.

Royden  $X.Y.Z$  refers Problem  $Z$  in Royden-Fitzpatrick, found in the collection of problems at the end of section  $X.Y$ .

**Problem 1.** Royden 3.1.1.

**Problem 2.** Royden 4.1.2

**Problem 3.** Royden 4.1.5.

**Problem 4** Royden 4.2.10.

**Problem 5** Royden 4.3.19. *(Please note that the whole point of this problem is that  $f$  is unbounded for  $0 < \alpha < 1$ , and so it is not Riemann integrable. You have to figure out how to use the definition of the Lebesgue integral to relate this function to a bunch of functions which are actually Riemann integrable, and justify taking some kind of limit.)*

**Extra credit 1: (1/2 problem)** Royden 4.1.6.

**Extra credit 2: (1 problem)** Royden 3.2.21.