Exercises given with a numbering are from *Basic Analysis: Introduction to Real Analysis (Vol I)* by J. Lebl.

Reading Sections 2.2, 2.3, 2.4, 2.5 (**Lebl**)

Exercises

1. Exercise 2.2.9

2. Exercise 2.3.5

3. Exercise 2.3.6

4. Exercise 2.3.7

5. Let $\{x_n\}$ be a bounded sequence of real numbers. Prove

$$\lim_{n\to\infty} x_n = 0,$$

if and only if

$$\limsup_{n\to\infty} |x_n| = 0.$$

6. Does there exist a sequence $\{x_n\}$ such that

$$\liminf_{n\to\infty} x_n = -1, \quad \lim_{n\to\infty} x_n = 0, \quad \limsup_{n\to\infty} x_n = 1?$$

Either give an example, or explain why no such example exists.

7. Exercise 2.4.8

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