

**Second Homework: MATH 410**  
**Due Wednesday, 11 September 2019**

1. Exercise 1 of Section 2.1 in the text.
2. Exercise 3 of Section 2.1 in the text.
3. Exercise 18 of Section 2.1 in the text.
4. Exercise 1 of Section 2.3 in the text.
5. Exercise 3 of Section 2.3 in the text.
6. Exercise 7 of Section 2.3 in the text.
7. Exercise 1 of Section 2.4 in the text.
8. Exercise 2 of Section 2.4 in the text.
9. Exercise 3 of Section 2.4 in the text.
10. Show that  $\cos(k) > .5$  frequently, but not eventually. Hint: Consider the size of the intervals in the sets

$$\{x \in \mathbb{R} : \cos(x) > .5\} \quad \text{and} \quad \{x \in \mathbb{R} : \cos(x) < .5\}.$$

11. Let  $\{a_k\}$  be a monotonic sequence in  $\mathbb{R}$ . Show that  $\{a_k\}$  is convergent if and only if it has a convergent subsequence.
12. Prove Proposition 2.7 in the notes.
13. Prove Proposition 2.18 in the notes
14. Prove Proposition 2.19 in the notes
15. Prove Proposition 2.21 in the notes