Second Homework: MATH 410
Due Wednesday, 12 September 2018

1. Exercise 1 of Section 2.1 in the text.
2. Exercise 2 of Section 2.1 in the text.
3. Exercise 16 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 4 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