

exercise 1:

Using properties 1, 2, and 3 of the absolute value function on  $\mathbb{Q}$  stated in class, show that for all  $x, y$  in  $\mathbb{Q}$ :

- (i). if  $x \neq 0$ ,  $|\frac{1}{x}| = \frac{1}{|x|}$ ,
- (ii)  $||x| - |y|| \leq |x - y| \leq |x| + |y|$ .

exercise 2:

Let  $T = (0, 1) \cup \{2\}$ . Find, with proof,  $\sup T$ .

exercise 3:

Let  $S$  and  $T$  be two bounded above subsets of  $\mathbb{R}$ . Define the subset

$$S + T = \{x + y : x \in S, y \in T\}.$$

Show that  $S + T$  is bounded above.

exercise 4:

From Abbott's textbook: exercise 1.4.4.

exercise 5:

Using the definition of convergent sequences show that  $b_n = \frac{1}{\sqrt{n}}$  converges to zero.

exercise 6:

Using the definition of convergent sequences show that any constant sequence is convergent.