

Solutions for HW 4

Problem 1.2: 14.

- a. $(0, 1)$
- b. $[0, 1]$
- c. $[0, \infty)$
- d. $(0, \infty)$

Problem 1.2: 17. Let $x \in (a-\epsilon, b+\epsilon)$ for all $\epsilon > 0$. Then $a-\epsilon < x < b+\epsilon$ for all $\epsilon > 0$. Thus $a < x + \epsilon$ and $x < b + \epsilon$ for all $\epsilon > 0$. Assume that it is not true that $x \leq b$. Then $b < x$, so if we take $\epsilon = \frac{x-b}{2}$, then $\epsilon > 0$ and $b + \epsilon < x$. Contradiction. Thus $x \leq b$. Similarly $a \leq x$. Thus $x \in [a, b]$.