Assignment 2 – Part 1 – Math 241

These exercises are taken from the textbook (Hass, Weir, and Thomas' *University calculus alternate edition* or *UH Mānoa custom edition*).

Section 2.2: $28, 40, 42, 44, 68, 70a$

Section 2.3: $16, 24$

Other problems:

(Q1) Let

$$f(x) = \begin{cases} 1 & x > 0, \\ -1 & x < 0. \end{cases}$$

In class, we rigourously proved that

$$\lim_{x \to 0} f(x) \text{ does not exist.}$$

Nevertheless, show that for $\epsilon = 2$ and $L = 1/2$, there is a $\delta > 0$ such that for all x satisfying

$$0 < |x| < \delta$$

we have that

$$|f(x) - L| < \epsilon.$$

Why doesn't this contradict the fact that the limit does not exist?