

Assignment 2 – All 2 parts – Math 241

Due in class: Tuesday, Jan. 23, 2018

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

Section 2.4: 2, 4, 12, 14, 18,

Other problems:

(Q1) Let

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

In class, we rigorously proved that

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

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?

(Q2) Evaluate the following limits.

(a) $\lim_{x \rightarrow 0} (1 + \cos(x))^2$

(b) $\lim_{x \rightarrow \pi/2} \sqrt{\cos(x) + \sin(x)}$

(c) $\lim_{x \rightarrow \pi/4} \tan(x) + \sec(x)$

(d) $\lim_{x \rightarrow 0} \frac{1}{\cos^3(x)}$