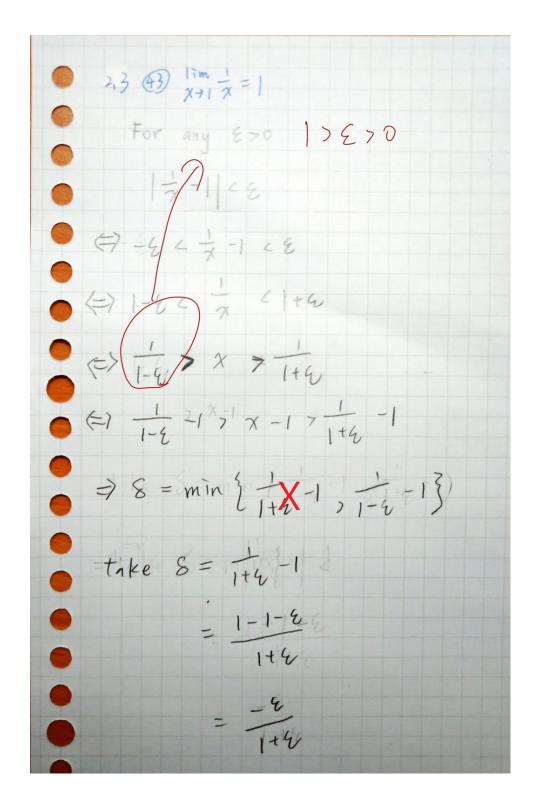
Thomas' Calculus Early Transcendentals 13ed

Study guide for quiz 01

Quiz problems include both the lecture contents and homework problems.

- 1. Review Limit laws, technique of rationalizing numerator or denominator to find the limit of the form $\frac{0}{0}$. Review statement and applications of Sandwich Theorem. Keep in mind typical examples of ' $\lim_{x\to c} f(x)$ does not exist'.
- 2. Memorize the precise definition of $\lim_{x\to c} = L$ using ε and δ .
- 3. Study how to prove $\lim_{x\to c} f(x) = L$ using standard tricks such as the $\epsilon/2$ argument.

1 Some common mistakes in section 2.3, problem 43



43.

$$0 < |x-1| < \delta$$

 $3 - \delta < x - 1 < \delta$
 $3 - \delta < x - 1 < \delta$
 $3 - \delta < x < \delta + 1$
 $|x - 1| < \epsilon$ (A)
 $< 3 - \epsilon < x < 1 < \epsilon$
 $< 3 - \epsilon < x < 1 < \epsilon$
 $< 3 - \epsilon < x < 1 < \epsilon$
 $< 3 - \epsilon + 1 < x < \epsilon + 1$ assume $0 < \epsilon < 1$
 $< 3 - \epsilon + 1 < x < \epsilon + 1$ assume $0 < \epsilon < 1$
 $< 3 - \epsilon + 1 < x < 1 - \epsilon$
 $< 1 - \epsilon + 1 < \epsilon = 1$
 $= 1 - \epsilon + 1 < \epsilon = 1$
 $\delta = 1 - \epsilon = 1$
 $\delta = 1 - \epsilon = 1$
 $\delta = 1 - \epsilon = 1$
Take $\delta = mm (t - \epsilon - 1, t - t - \epsilon)$
Basesing mig who delta of U(4).

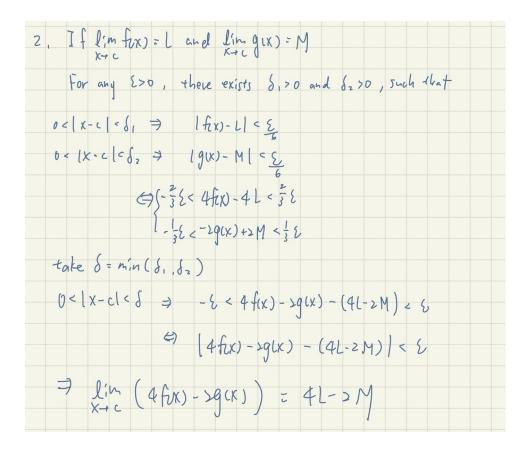
MON TUE WED THU FRI SAT SUN DATE: NO. 43. lin = 1 for any E>0, there exist 5>0 $0 < |x-1| < S \Rightarrow |\frac{1}{x} - 1| < E$ <=>-E< -1 < E <=> 1- E < 1/2 < 1+E $\langle = \rangle \frac{1 - (1 - \varepsilon)}{1 - \varepsilon} > \chi - 1 > \frac{1 - (1 + \varepsilon)}{1 + \varepsilon}$ <-> - 2 < x - 1 < - 2 1 - 2 < x - 1 < - 2 take $S = \min\left(\frac{\mathbf{X}\mathbf{E}}{1-\mathbf{G}}, \frac{\mathbf{E}}{1\mathbf{X}\mathbf{G}}\right)$ <=> 0< |x-1|< S => /= -1/< E

```
43.
 prove lim to=1
0$2-0128, 18-0-6/46.
Given 128 > 0, there exists 5>0
0< 12-0125, 1500-6126
  1 × -1 < Gr. (A)
€-66 $-166.
= - 6+1 < 1/2 ( G+1
=- 1 > x > 1 (B)
 -8124-168
 -8+119468+1
 51-8341
 日本
 : S= min ( fe, fe)
   = 14
因為要說明所選取的delta可以從(B)
```

推到(A),反向的箭頭是必須的

2 Problem 2 of homework week 03

2.1 Correct answer



2.2 common mistakes

The most common mistake is to start from

$$a , $b < q < B$.$$

to conclude that

$$a - b (Wrong!)$$

The correct number you should use in your proof is 4 + 2 = 6, not 4 - 2 = 2.

The second common mistake is to skip the derivation. You need to first 'break the absolute value', then do the correct addition or subtraction. Skipping the derivation can lead to wrong conclusion, and will lead to point deduction even if the conclusion happens to be correct.

$$\begin{array}{l} |H_{W}|_{W_{2}} = 1 \quad \text{if } \lim_{x \to c} f(x) = L \quad \text{if } \lim_{x \to c} g(x) = m. \\ \text{For any } & \text{Soc}, \text{ there exists } & \delta_{1} > 0 \quad \text{and } & \delta_{2} > 0, \text{ such that} \\ 0 < |x - c| < \delta_{1} = 3 - \frac{\varepsilon}{2} < f(x) - L < \frac{\varepsilon}{2} \\ 0 < |x - c| < \delta_{2} = 3 - \frac{\varepsilon}{2} < g(x) - M < \frac{\varepsilon}{2} \\ = 3 \quad \text{take } \delta = \min(\delta_{1}, \delta_{2}) \\ = 3 \quad \text{take } \delta = \min(\delta_{1}, \delta_{2}) \\ = 3 \quad \left\{ -2\xi < 4f(x) - 4L < 2\xi \right\} \quad \left\{ -\xi < 4f(x) - 2g(x) - 4L + 2M < \xi \right\} \\ = \frac{\varepsilon}{2} \quad \left\{ -\xi < 2g(x) - 2M < \xi \right\} \quad \left\{ -\xi < 2g(x) - 2M < \xi \right\} \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - (4L - 2M) \right\} \\ = 3 \quad \left\{ +\frac{\varepsilon}{2} - \frac{\varepsilon}{2} \right\} (x) - (4L - 2M) < \xi \\ = 3 \quad \left\{ +\frac{\varepsilon}{2} - \frac{\varepsilon}{2} \right\} (x) - (4L - 2M) < \xi \\ = 3 \quad \left\{ +\frac{\varepsilon}{2} - \frac{\varepsilon}{2} \right\} (x) - (4L - 2M) < \xi \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - (4L - 2M) \right\} \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - (4L - 2M) \right\} \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - (4L - 2M) \right\} \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - (4L - 2M) \right\} \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - (4L - 2M) \right\} \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - (4L - 2M) \right\} \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - (4L - 2M) \right\} \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - (4L - 2M) \right\} \\ = 3 \quad \left\{ -\xi < 2g(x) - 2g(x) - 2g(x) - 2g(x) - 2g(x) \right\} \\ = 4L \quad \left\{ -2M \right\} \\ = 3 \quad \left\{ -\xi < 2\xi - \xi < 4f(x) - 2g(x) - 2g(x) - 2g(x) - 2g(x) - 2g(x) \right\} \\ = 3 \quad \left\{ -\xi < 2\xi - \xi < 4f(x) - 2g(x) -$$

$$\frac{\lim_{x \to c} f(x) = L}{\sum_{x \to c} f(x) - L < \frac{y}{2}}$$

$$\frac{\int \langle x - c \rangle \cdot \delta_1 \cdot \rightarrow f(x) - L < \frac{y}{2}}{\lim_{x \to c} \log(x) = M}$$

$$\frac{\lim_{x \to c} g(x) = M}{\int \langle z - \rangle - \int g(x) - M < \frac{y}{2}}$$

$$\frac{\lim_{x \to c} \int \delta_2 - \int g(x) - M < \frac{y}{2}}{\int \langle z - \rangle - \log(x) - M < \frac{y}{2}}$$

$$\frac{\lim_{x \to c} \int \langle z - \rangle - \int g(x) - M < \frac{y}{2}}{\int \langle z - \rangle - \log(x) - \log(x) - \log(x) - \log(x) - \log(x)}$$

