

## Homework 02

1. Section 2.3: problems 35, 43, 49, 53, 54.
2. Section 2.3: Suppose that  $f(x)$  is defined on  $(c - a, c) \cup (c, c + a)$  for some  $a > 0$ . If  $f(x)$  satisfies the following statement, then is it true that  $\lim_{x \rightarrow c} f(x) = L$ ? Prove it if true, find a counter example if not true.

For any  $\varepsilon > 0$  and any  $\delta > 0$ , there exists a number  $x \in (c - \delta, c) \cup (c, c + \delta)$  such that  $|f(x) - L| < \varepsilon$ .

3. Section 2.3: Use the  $\varepsilon - \delta$  argument to prove the following statement:  
If  $\lim_{x \rightarrow c} f(x) = L$  and  $\lim_{x \rightarrow c} g(x) = M$ , then  $\lim_{x \rightarrow c} (4f(x) - 2g(x)) = 4L - 2M$ .  
Hint: Note that if  $a < b$  then  $-a > -b$ .
4. Section 2.4: Problems 25, 33, 39, 41, 47.
5. Chap 2, Additional and Advanced Exercises (page 136): Problems 25 (Hint:  $1 - \cos x = 2 \sin^2 \frac{x}{2}$ ), 26.