Homework 1

Due to: 10/3(四) 助教課上課前

繳交紅色部份即可，論述與計算過程須完整論述，只有最終答案該題不給分。

1-3 (New Functions from Old Functions):#1, 29, 31, 33, 35, 39, 43, 45, 47, 49, 51, 53

1-4 (Exponential Functions): #17, 19

1-5 (Inverse Functions and Logarithms): #1, 3, 5, 7, 15, 17, 21, 25, 31, 33, 41, 55, 57, 63, 65, 67, 69

2-1 (The Tangent and Velocity Problems): 無

2-2 (The Limit of a Function): #1, 2, 5, 6, 9, 31, 35, 37

2-3 (Calculating Limits Using the Limit Laws):

#3, 5, 10, 11, 13, 15, 19, 21, 23, 25, 29, 32, 37, 39, 41, 43, 53, 57, 59, 62, 63, 65

2-4 (The Precise Definition of a Limit):

如果你有興趣練習，可以練 #1, 3, 13, 23, 25。

2-5 (Continuity): #11, 15, 17, 23, 25, 29, 35, 37, 48, 51, 69, 72

2-6 (Limits at Infinity; Horizontal Asymptotes): #15, 17, 19, 21, 27, 31, 33, 35, 47, 49, 56

2-7 (Derivatives and Rates of Change): #5, 7, 35, 37, 41, 59, 60

2-8 (The Derivative as a Function): #3, 21, 27, 41, 42, 43, 44, 59, 61, 64

續第二頁

額外補充題（也須繳交）：

(1) Suppoe $\lim_{x\to c}[f(x)+g(x)]=5$ and $\lim_{x\to c}[f(x)-g(x)]=1$. Compute $\lim_{x\to c} f(x)g(x)$.

(2) Construct a function f such that $\lim_{x\to 0} f(x)$ does not exist, while $\lim_{x\to 0}|f(x)|$ exist.

(3) Prove that if $\lim_{x\to c} f(x)$ exists and $\lim_{x\to c} g(x)$ does not exist, then $\lim_{x\to c}\big(f(x)+g(x)\big)$ must not exist.

(4) Evalute $\lim_{x\to 0}\sin x\cos(\frac{1}{x^2})$ by applying the Squeeze Theorem.

(5) Does $\lim_{x\to 0}\left(\sin\frac{1}{x}+\sin x\cos(\frac{1}{x^2})\right)$ exist? Explain your reason.

(6) Construct a function $f:\mathbb{R}\to\mathbb{R}$ such that $f(x)>0$ for every $x\in\mathbb{R}$, whereas $\lim_{x\to 0} f(x)=0$.