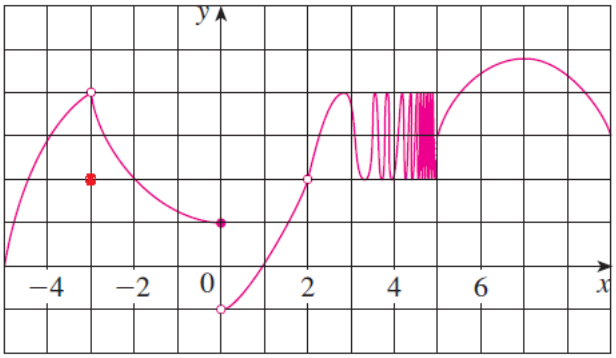
做完 2.2—3.2 節例題習題再來測驗。但不要看著解答來測驗，純然是自我欺騙，無意義。

1. (i) 求極限時 $x \to a$ ， x 會到達 a 嗎？

(ii) 什麼樣的題型，需要考慮單邊極限？

(iii) 單邊極限與(雙邊)極限有何關係？

2. 看圖求極限。會看圖嗎？



(a) $f(-3) =$ $\lim_{x\to -3} f(x) =$ (b) $\lim_{x\to -2} f(x) =$

(c) $\lim_{x\to 0^-} f(x) =$ $\lim_{x\to 0^+} f(x) =$ $\lim_{x\to 0} f(x) =$

(d) $f(2) =$ $\lim_{x\to 2} f(x) =$ (e) $\lim_{x\to 5^-} f(x) =$ $\lim_{x\to 5^+} f(x) =$

3. (i) $\lim_{x\to -2^-} (x+3)\dfrac{|x+2|}{x+2}$

(ii) $\lim_{x\to 0} \dfrac{2x}{\tan x}$ (Using $\lim_{\theta\to 0} \dfrac{\sin\theta}{\theta} = 1$) No L'Hopital's rule. (不可用羅必達法則)

(iii) $\lim_{x\to -\infty} \dfrac{\sqrt{x^2+1}}{x+1}$. No L'Hopital's rule. (不可用羅必達法則)

(iv) $\lim_{x\to 1^+} \dfrac{1}{x^2-3x+2}$ 注意答案寫法

4. (i) 敘述夾擠定理(Squeeze Theorem)

(ii) 哪些題型要用夾擠定理求極限？

(iii) 求 $\lim_{x\to 2}(x-2)^2\cos\dfrac{2}{x-2}$

5. (i) 敘述 f 在內點 c 連續的定義

(ii) 敘述 f 在內點 c 連續的三要件

(iii) 敘述 f 是連續函數的定義

6. Let $f(x)=\begin{cases}\sqrt{2x} & \text{if } x<8\\ 3 & \text{if } x=8\\ x/2 & \text{if } x>8\end{cases}$. (More details. 寫出計算過程)

Find

$\lim_{x\to 8} f(x)=$

Left limit

$\lim_{x\to 8^-} f(x)=$

Right limit

$\lim_{x\to 8^+} f(x)=$

Is f continuous at $x=8$? Why!

7. Let $f(x)=\begin{cases}\dfrac{x-1}{\sqrt{x+3}-2} & \text{if } x\neq 1\\ 1/2 & \text{if } x=1\end{cases}$. (More details. 寫出計算過程)

Find limit

$\lim_{x\to 1} f(x)$

Is f continuous at $x=1$? Why!

8. _____ Let $f(x)=\frac{1}{x}$. Which of the following is true ? (下列何者正確？)

(a) f is continuous at $x=0$, f is a continuous function.
(b) f is continuous at $x=0$, f is not a continuous function.
(c) f is not continuous at $x=0$, f is a continuous function.
(d) f is not continuous at $x=0$, f is not a continuous function.
(e) None of these (以上皆非)

9. (i) 斜漸近線的定義

(ii) Find the oblique of the graph of $f(x)=\frac{x^2+3x+2}{x-2}$. Why! (O.A.斜漸近線)

(iii) 水平漸近線及垂直漸近線的定義

(iv) Find the horizontal and vertical asymptotes of the graph of $f(x)=\frac{2x}{x-4}$.

Why! (H.A.水平漸近線及 V.A.垂直漸近線)

10.

(i). State the definition of $f(x)$ is differentiable at $x=c$.
(敘述 $f(x)$ 在 $x=c$ 可微分的定義)

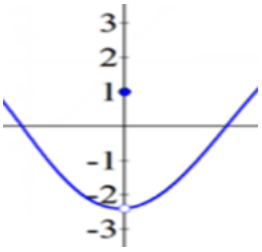
_____.

(ii). State three possibilities for a function can fail to be differentiable.
(可微分函數圖形不含哪三種點)

_____, _____, _____.

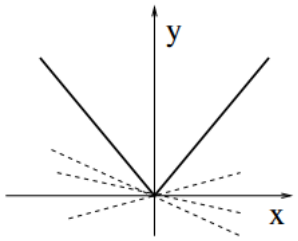
_____ (iii). At the point $(0,1)$, the graph of $y=f(x)$

(a) has no tangent line
(b) has two tangent lines
(c) has a tangent line
(d) has infinitely many tangent lines
(e) None of these (以上皆非)



_____ (iv). At the point $(0,0)$, the graph of $y=|x|$

(a) has no tangent line
(b) has two tangent lines
(c) has a tangent line
(d) has infinitely many tangent lines
(e) None of these (以上皆非)



11. (i) By definition of derivative, find $f'(x)$ if $f(x)=\frac{1}{x+1}$.

用導數定義計算 $f'(x)$.

(ii) Continue part (i), find an equation of tangent line of f at $x=1$.

(接續(i)小題，求 f 在 $x=1$ 之切線方程式)

12. (i) By definition of derivative, find $f'(x)$ if $f(x)=x^3$.

用導數定義計算 $f'(x)$.

(ii) Continue part (i), find the rate of change of f at $x=2$.

(接續(i)小題，求 f 在 $x=2$ 之變化率)