習題集 $\boxed{3}$

(對應 張旭微積分 連續篇重點三:極限和連續的聯手)

1. Find $\lim\limits_{x \to 6}(6x+6)^{66}$.

2. Find $\lim\limits_{x \to 6\pi}\sqrt[6]{\sin(6x+\dfrac{\pi}{6})+6}$.

3. Find $\lim\limits_{x \to 0}\sin(\pi\cos(\pi\tan(\pi x)))$.

4. Find $\lim\limits_{x \to \frac{\pi}{2}}\sin(\pi(\sin(x)+1))$.

5. Find the limit $\lim\limits_{x \to 1}x^{x}$ and $\lim\limits_{x \to 1}e^{x^{x}}$.

6. Find $\lim\limits_{x \to 0}3^{\sqrt{\sin^{2}(2x^{3}-5\pi)}}$.

7. Find the limit $\lim\limits_{x \to 2}\log_{3}(\sqrt{\sin(\pi\cos(\pi x))+1})$.

8. Let $g(x)$ be a continuous function so that $g(k)=k$ for all $k \in \mathbb{N}$. Find
$$\lim\limits_{x \to 1}g(\dfrac{x^{5}+x^{6}+x^{7}+x^{8}}{x+x^{2}+x^{3}+x^{4}}9^{\sqrt{x^{10}+x^{11}+x^{12}+x^{13}}}).$$

9. Find $\lim\limits_{x \to 2}f(x)$ if $f(x)=\log_{2}(\dfrac{x^{2}-4}{x-2})$.

10. Find $\lim\limits_{x \to \sqrt{3}}2^{\left|\,|x|+\frac{1}{2}\,\right|}$.