

習題集 10

(對應 [張旭微積分](#) 極限篇重點十：老大比較法)

1. Evaluate $\lim_{x \rightarrow \infty} (\sqrt{x^2 + 5x - 1} - x)$

2. Evaluate $\lim_{x \rightarrow \infty} (\sqrt{x^2 + x} - \sqrt{x^2 + 5x - 1} - x)$

3. Evaluate $\lim_{x \rightarrow \infty} \frac{\sqrt{2x^{16} - 77777}}{x^8 + 1}$

4. Evaluate $\lim_{x \rightarrow \infty} \frac{\sqrt[3]{x+7} + 2\sqrt{3x+1} - 6}{(\sqrt[4]{x} - 1)\sqrt[4]{x}}$

5. Evaluate $\lim_{t \rightarrow -\infty} \frac{2 \times 7^t - 66666 \times 3^t}{7^t}$.

6. Evaluate $\lim_{x \rightarrow +\infty} \frac{1 \times (\frac{2}{3})^x + 4 \times (\frac{5}{6})^x}{(\frac{1}{3})^x \times 2 + (\frac{4}{6})^x \times 5 + (\frac{7}{9})^x \times 8 + (\frac{10}{12})^x \times 11}$.

7. Evaluate $\lim_{x \rightarrow \infty} \frac{\log_3 50x}{\sqrt[50]{x}}$, $\lim_{x \rightarrow \infty} \frac{n!}{4n^3}$, and $\lim_{n \rightarrow \infty} \frac{2^n \cdot 3^n}{n!}$.

8. $\lim_{x \rightarrow \infty} \frac{\sqrt[n]{x} + \sqrt[n]{x^2} - 2}{3^x - 3000000^{777}}$

9. Evaluate $\lim_{x \rightarrow \infty} \frac{\log(n^{500})}{(n!)!} \frac{n!}{4n^3}$

10. Let $P(x) = x^n + a_{n-1}x^{n-1} + \dots + a_1x + a_0$ be a polynomial. Show that there is an $x_0 > 0$ so that $P(x_0) > 10^{1000}$.