

習題集 5

(對應 [張旭微積分](#) 微分應用篇重點五：漸近線)

1. Find vertical asymptotes of $y = \frac{x^2 + 1}{(x-2)^2 - 3}$.
2. Find horizontal asymptotes of $y = \frac{2-3x}{x^2+1}$.
3. Find the Oblique Asymptote (斜漸近線) of $y = \frac{x^3+1}{x^2+1}$.
4. Find all asymptotes of $y = \frac{x^2+x+2}{3-x^2}$.
5. Find all asymptotes of $y = \frac{x+2}{1-x^2} \cdot \frac{1}{x-2}$. [Note. The solutions of $x^3 + 2x^2 = 4x + 2$ are $x \approx -3.0861$, $x \approx -0.42801$, and $x \approx 1.5141$, which you may learn in Newton method (section 8) or, alternatively, use I.V.T repeatedly as in previous exercise.]
6. Find all asymptotes of $y = \frac{5x^2 - \sin x}{x^2 - 4}$.

底下的第 7~9 題，有時候會放在 [去零因子求極限](#)，但它實質上是在考漸近線：

7. If $\lim_{x \rightarrow \infty} [ax + b + \sqrt{x^2 + 3x}] = 0$, find a, b .
8. If $\lim_{x \rightarrow \infty} [\sqrt[3]{x(x-6)^2} - (ax+b)] = 0$, find a, b .
9. If $\lim_{x \rightarrow \infty} \left[\frac{x^2+1}{x+1} - ax - b \right] = 0$, find a, b .
10. Let $y = ax + b$ be an asymptotes of the Folium of Descartes $x^3 + y^3 = \frac{9}{2}xy$. Find a, b .