

習題集 6

(對應 [張旭微積分](#) 微分篇重點六：萊布尼茲微分符號與隱函數微分法)

1. Find $\frac{d^3}{dx^3} 2^{3x}$.
2. Find $\frac{d^2}{dx^2} \tan^{-1}(2x)$.
3. Find $\frac{d^3}{dx^3} 3x \ln x$.
4. Find $\frac{d^3}{dx^3} \sin^2(2x^2)$.
5. Find $\frac{d^3}{dx^3} (\sin x + \cos 2x + \tan 3x)$.
6. Let $x_0 > 0$. For $x^2 y = 1$, find $\frac{d^2 y}{dx^2}, \frac{d^3 y}{dx^3}$ at $(x, y) = (x_0, \frac{1}{x_0^2})$.
7. Let $x_0 > 0, m, n \in \mathbb{N}$. For $x^n y^m = 1$, find $\frac{d^2 y}{dx^2}$ at $(x, y) = (x_0, \frac{1}{x_0^{\frac{n}{m}}})$.
8. Let $x^2 - 3xy^2 + 5x = 3$. Find $\frac{dy}{dx} \Big|_{x=1}$.
9. Let $2x + 3y = \sin(7x - y)$. Find $\frac{dy}{dx} \Big|_{(x,y) = (\frac{3\pi}{23}, \frac{-2\pi}{23})}$.
10. Find $\frac{df}{dx}, \frac{d^2 f}{dx^2}$ of the function $f(x) = e^{-\frac{1}{x}}$ for $x > 0$ and $\frac{dB}{dx}, \frac{d^2 B}{dx^2}$ of the function $B(x) = e^{\frac{-1}{1-x^2}}$ for $-1 < x < 1$.