

## 習題集 7 簡答

(對應 [張旭微積分](#) 微分篇重點七：微分工具整合)

- $$\cos |x^2 + 2x + 2| \frac{x^2 + 2x + 2}{|x^2 + 2x + 2|} (2x + 2).$$
- $$(\ln 6) 6^{\frac{6x + \sin x}{\sin 6x + 6}} \frac{(6 + \cos x)(\sin 6x + 6) - 6 \cos 6x(6x + \sin x)}{(\sin 6x + 6)^2}.$$
- $$\cos(3u^2 - 5) \cdot 6u \cdot \frac{5}{(5x - 2) \ln 3}.$$
- $$\frac{(\log_2 3\sqrt[3]{2})^2 + 2(\log_2 3\sqrt[3]{2}) - 1}{3(\log_2 3\sqrt[3]{2} + 1)^2 \ln 2}.$$
- $$\frac{dy}{dx} = \frac{2x + y}{2y - x}, \quad \frac{d^2y}{dx^2} = \frac{\left[2 + \frac{2x + y}{2y - x}\right](2y - x) - \left[2 \frac{2x + y}{2y - x} - 1\right](2x + y)}{(2y - x)^2}.$$
- $$\frac{dy}{dx} = \frac{(x + y)^2}{2x^3} + \frac{y}{x},$$

$$\frac{d^2y}{dx^2} = \frac{2(x + y)(2x^3 + (x + y)^2 + 2x^2y) - 6x^2(x + y)^2}{4x^6} + \frac{(x + y)^2}{2x^4}.$$
- $$\frac{dy}{dx} = y \cdot x^x (\ln x + 1), \quad \frac{d^2y}{dx^2} = yx^x (\ln x + 1)^2 (x^x + 1) + yx^{x-1}.$$
- $$0, 0, \quad f'(x) = \begin{cases} 2x \cdot \sin \frac{1}{x} - \cos \frac{1}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}, \text{ No.}$$
1.
- $$\frac{dy}{dx} \Big|_{(x,y)=(2,16)} = 64 \ln 2 \ln 2e + 32, \quad \frac{d^2y}{dx^2} \Big|_{(x,y)=(2,16)}$$

$$= 256 \ln 2 \ln 2 \ln 2e \ln 2e + 64 \ln 2 \ln 2e \ln 2e + 256 \ln 2 \ln 2e + 32 \ln 8e + 80.$$