$$\frac{d\sum_{i=1}^{m}(\varnothing x_i + b)^2}{d\,b} = \sum_{i=1}^{m}\frac{d(\theta x_i + b)^2}{db}, \quad (\theta x_i + b) = h_i$$

$$= \sum_{i=1}^{m}\frac{dh_i^2}{dh_i}\cdot\frac{dh_i}{db} = 2\sum_{i=1}^{m}(\theta x_i + b)\cdot\frac{(\overset{0}{\cancel{\theta x_i}} + \overset{1}{\cancel{b}})}{db}$$

$$= 2\sum_{i=1}^{m}(\theta x_i + b)\cdot 1 = 2\sum_{i=1}^{m}(\theta x_i + b) \;\#$$

$$\frac{d\sum_{i=1}^{m} -(y_i\log h_i + (1-y_i)\log(1-h_i))}{d\,h_i}$$

$$\boxed{\frac{d\log x}{dx} = x'/x = 1/x}$$

$$= -1\sum_{i=1}^{m}\frac{d(y_i\cdot\log h_i + (1-y_i)\cdot\log(1-h_i))}{dh_i}$$

$$= -1\sum_{i=1}^{m}\left[\frac{d(y_i\cdot\log h_i)}{dh_i} + \frac{d(1-y_i)\cdot\log(1-h_i)}{dh_i}\right]$$

$$= -1\sum_{i=1}^{m}\left[y_i/h_i + (1-y_i)\cdot\frac{-1}{(1-h_i)}\right]$$

$$= \sum_{i=1}^{m}\left[-y_i/h_i + \frac{(1-y_i)}{(1-h_i)}\right] \#$$

$$\frac{d\, e^{(1-x^2)}}{d\, x}$$

, 設 $(1-x^2)=k$

$$\boxed{\frac{de^x}{d^x} = e^x \cdot x'}$$

$$= \frac{de^k}{dx} = e^k \cdot \frac{d(1-x^2)}{dx} = e^{1-x^2} \cdot (-2x) \#$$

$$\frac{d\left(\frac{1-3x^2}{1-x}\right)}{d\, x}$$

$$\begin{cases} f(x) = 1-3x^2 \\ g(x) = 1-x \end{cases}$$

$$\frac{d\, f(x)/g(x)}{dx} = \frac{g(x)\cdot f'(x) - f(x)\cdot g'(x)}{g(x)^2}$$

$$= \frac{[(1-x)\cdot(-6x)] - [(1-3x^2)\cdot(-1)]}{(1-x)^2}$$

$$= \frac{(6x^2-6x) - (3x^2-1)}{(1-x)^2}$$

$$= \frac{3x^2-6x+1}{(1-x)^2} \#$$