1. $f(x) = \frac{1}{1+\exp(-x)}$ 을 미분하라.

$$\frac{d}{dx} f(x) = \frac{d}{dx}(1+e^{x})^{-1}$$

$$= (-1)(1+e^{x})^{-2} \frac{d}{dx}(1+e^{-x})$$

$$= (-1) \frac{1}{(1+e^{-x})^{2}} (-e^{-x})$$

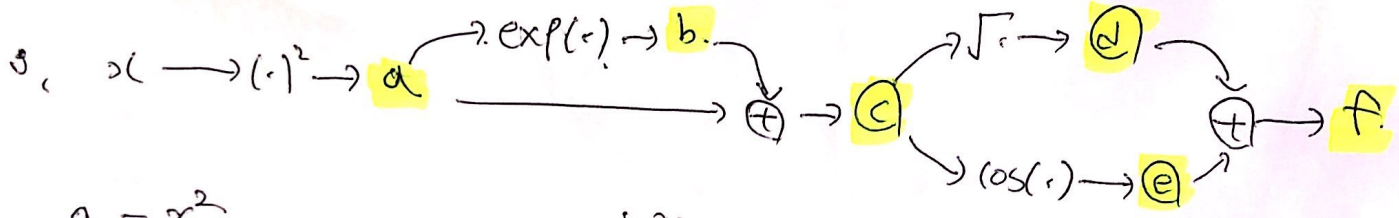
$$= \frac{e^{-x}}{(1+e^{-x})^{2}}$$

2. $f(x_1, x_2) = x_1^2 + 2x_2$, $x_1 = \sin t$ $x_2 = \cos t$ 일때 t에 대해 미분하라.

$$f(\sin t, \cos t) = (\sin t)^2 + 2\cos t$$

$$\frac{df}{dt} f(\sin t, \cos t) = 2\cos x \sin x + (-2\sin x)$$

$$= 2\sin x (\cos x - 1)$$



$a = x^2$

$b = e^{x^2}$

$c = x^2 + e^{x^2}$

$d = \sqrt{x^2+e^{x^2}}$

$e = \cos(x^2+e^{x^2})$

$f = \sqrt{x^2+e^{x^2}} + \cos(x^2+e^{x^2})$

$\frac{\partial a}{\partial x} = 2x$

$\frac{\partial b}{\partial a} = e^a$

$\frac{\partial c}{\partial a} = (a+e^a)' = e^a$

$\frac{\partial d}{\partial c} = (\sqrt{c})' = \frac{1}{2\sqrt{c}}$

$\frac{\partial e}{\partial c} = (\cos c)' = -\sin c$

$\frac{\partial f}{\partial d} = (d+\cos d)' = 1-\sin d$

$\frac{\partial f}{\partial c} = \frac{1}{2\sqrt{c}} - \sin c$

$\frac{\partial f}{\partial b} = \left(\sqrt{\ln b + b} + \cos(\ln b + b)\right)'$

$= \frac{x+1}{2x\sqrt{\ln b + b}} + \left(-\frac{(b+1)\sin(\ln b + b)}{b}\right)$

$\frac{\partial f}{\partial a} = \left(\sqrt{a+e^a} + \cos(a+e^a)\right)'$

$= \frac{e^a+1}{2\sqrt{e^a+a}} + \sin(e^a+a)(-e^a-1)$

$$\frac{\partial f}{\partial x} = \frac{x(e^{x^2}+x.}{\sqrt{e^{x^2}+x^2}} + 5\sin(e^{x^2}+x^2)(-2xe^{x^2}-2x)$$