Let $f(x) = x^2 + 4$, $g(f(x)) = x$

$f(1) = 5$

① $y = x^2 + 4$

$\updownarrow$ inv.

$x = y^2 + 4$

$y = \pm\sqrt{x-4}$

$y = \sqrt{x-4}$

Find $g'(5) = \frac{1}{f'(1)}$

$g(x) = \sqrt{x-4}$

$g' = \frac{1}{2}(x-4)^{-\frac{1}{2}}$

$= \frac{1}{2\sqrt{x-4}}\Big|_{x=5} = \frac{1}{2}$

If $f(a) = b$

$g(f(x)) = x$

$g'(f(x)) \cdot f'(x) = 1$

$g'(\underbrace{f(x)}) = \frac{1}{f'(\underset{a}{x})}$

$g'(f(a)) = \frac{1}{f'(a)}$

$g'(5) = \frac{1}{f'(1)} = \frac{1}{2x}\Big|_{x=1}$

$= \frac{1}{2}$

$\boxed{g'(b) = \frac{1}{f'(a)}}$

Let $f(x) = e^{2x-1} + x$, $f(0) = \frac{1}{e}$

If $g(f(x)) = x$, Find $g'\left(\frac{1}{e}\right)$

$$f' = e^{2x-1} \cdot 2 + 1 \Big|_{x=0} = \frac{2}{e} + 1 = \frac{2+e}{e}$$

$\frac{e}{e}$

$$g'\left(\frac{1}{e}\right) = \frac{1}{f'(0)} = \frac{1}{\frac{2+e}{e}} = \boxed{\frac{e}{2+e}}$$

24. $f(x) = x^2 \ln(x^2 + 3x)$ $\quad x^2+3x = x(x+3)$

$= x^2\left(\ln x + \ln(x+3)\right)$

$f' = 2x\left(\ln x + \ln(x+3)\right) + x^2\left(\frac{1}{x} + \frac{1}{x+3}\right)$

23. $f(x) = \dfrac{\left(e^{x}\right)^{4}}{x^{2}} = \dfrac{e^{4x}}{x^{2}}$

$$f' = \frac{4e^{4x} \cdot x^{2} - e^{4x} \cdot 2x}{x^{4}} = \frac{4xe^{4x} - 2e^{4x}}{x^{3}}$$

21. $f(x) = \dfrac{\log_{10}(x)}{x}$

$$f' = \frac{\frac{1}{x\ln 10}\cdot x - \log_{10} x}{x^2} = \frac{\frac{1}{\ln 10} - \log_{10} x}{x^2}$$

26. $f(x) = \frac{(2x)^2}{e^{2x}} = \frac{4x^2}{e^{2x}}$