

$$\textcircled{1} \quad y = x+3 \quad w = 2(x+3)+1 \quad \frac{dw}{dx} = 2 \\ w = 2y+1 \quad \frac{dw}{dy} = 2$$

$$\textcircled{2} \quad y = 3x-4 \quad w = -2(3x-4)+10 \quad \frac{dw}{dx} = -6 \\ w = -6x+18 \quad \frac{dw}{dy} = -2$$

$$\textcircled{3} \quad y = x^2+1 \quad \frac{dy}{dx} = 2x \quad \frac{dw}{dx} = \frac{dw}{dy} \cdot \frac{dy}{dx} = 2x \cdot 4 = 8x \\ w = 4y-4 \quad \frac{dw}{dy} = 4$$

$$\textcircled{4} \quad y = x+1 \quad \frac{dy}{dx} = 1 \quad \frac{dw}{dx} = \frac{dw}{dy} \cdot \frac{dy}{dx} = 2y = 2x+2 \\ w = y^2-9 \quad \frac{dw}{dy} = 2y$$

$$\textcircled{5} \quad f(x) = x^{3/4} \rightarrow f'(x) = \frac{3}{4} x^{-1/4}$$

$$\textcircled{6} \quad f(x) = \sqrt{x} = x^{1/2} \rightarrow f'(x) = \frac{1}{2} x^{-1/2} = \frac{1}{2\sqrt{x}}$$

$$\textcircled{7} \quad f(x) = 5x^{6/5} - 3x^{2/3} \rightarrow f'(x) = \frac{6}{5} \cdot 5x^{1/5} - \frac{2}{3} \cdot 3x^{-1/3} = 6x^{1/5} - 2x^{-1/3}$$

$$\textcircled{8} \quad w = (x^3+1)^{1/3} \quad \frac{dw}{dx} = \frac{dw}{du} \cdot \frac{du}{dx} = \frac{1}{3} u^{-2/3} \cdot 3x^2 = x^2 (x^3+1)^{-2/3} \\ \text{mis.: } u = x^3+1 \quad w = u^{1/3} \quad \frac{dw}{du} = \frac{1}{3} u^{-2/3} \quad \frac{du}{dx} = 3x^2 \quad \frac{dw}{dx} = (3x^2) \cdot \frac{1}{3} (x^3+1)^{-2/3}$$

$$\textcircled{9} \quad y = f(x) = 3x+5 \rightarrow f^{-1}(y) = \frac{y-5}{3}$$

$$\textcircled{9} \quad y = 3x+5 \quad (f^{-1})'(y) = \frac{1}{3} \\ \frac{y-5}{3} = x = f^{-1}(y)$$

$$\textcircled{10} \quad y = e^x \rightarrow \frac{dy}{dx} = \frac{d}{dx}(e^x) = e^x \cdot \frac{d}{dx}(x) = e^x$$

$$\textcircled{11} \quad y = e^{-2x} \rightarrow \frac{dy}{dx} = \frac{d}{dx}(e^{-2x}) = e^{-2x} \cdot \frac{d}{dx}(-2x) = e^{-2x} \cdot -2 = -2e^{-2x}$$

$$\textcircled{12} \quad y = e^{x^2+3x} \rightarrow \frac{dy}{dx} = \frac{d}{dx}(e^{x^2+3x}) = e^{x^2+3x} \cdot \frac{d}{dx}(x^2+3x) = e^{x^2+3x} (2x+3)$$

$$(13) y = 2 \ln x$$

$$y' = 2 \cdot \frac{d}{dx}(\ln x) = \frac{2}{x}$$

$$(14) y = \ln(3x), \text{ misal: } z = 3x \rightarrow \frac{dz}{dx} = 3, y = \ln z \rightarrow \frac{dy}{dz} = \frac{1}{z}$$

$$y' = \frac{dy}{dz} \cdot \frac{dz}{dx} = \frac{1}{z} \cdot 3 = \frac{3}{3x}$$

$$(15) y = {}^4 \log x \rightarrow \frac{dy}{dx} = \frac{1}{x \ln 4}$$

$$(16) y = 2x+3$$

$$u = 2y+3$$

$$\frac{dy}{dx} = 2$$

$$\frac{du}{dy} = 2$$

$$\frac{du}{dx} = \frac{du}{dy} \cdot \frac{dy}{dx} = 2 \cdot 2 = 4 \rightarrow \frac{du}{dx} \text{ konstan di semua } x, \text{ sehingga } \frac{du}{dx}(1) = 4$$

$$(17) y = \sqrt{x^2+9} = (x^2+9)^{1/2}$$

$$\text{mis. } u = x^2+9 \quad y = u^{1/2}$$

$$\frac{du}{dx} = 2x \quad \frac{dy}{du} = \frac{1}{2} u^{-1/2}$$

$$\frac{dy}{dx} = \frac{du}{dx} \cdot \frac{dy}{du} = 2x \cdot \frac{1}{2} u^{-1/2}$$

$$\frac{dy}{dx} = x \cdot (x^2+9)^{-1/2} = \frac{x}{\sqrt{x^2+9}}$$

$$\text{saat } x=4 \rightarrow \frac{dy}{dx} = \frac{4}{\sqrt{4^2+9}} = \frac{4}{5} = 0.8 //$$

$$(18) f(x) = y = x^3 - 2x$$

$$\frac{dy}{dx} = 3x^2 - 2$$

saat  $x=2, y=4$ , maka  $(f^{-1})(4) = 2$ , atau invers  $f(x)$  di  $x=2$

$$\text{sehingga } (f^{-1})'(4) = \frac{1}{f'(2)} = \frac{1}{3(2)^2 - 2} = \frac{1}{10} = 0.1 //$$

$$(19) f(x) = 2e^x$$

$$f'(x) = 2 \cdot \frac{d}{dx}(e^x) = 2e^x \rightarrow f'(0) = 2e^{(0)} = 2 \cdot 1 = 2$$

$$(20) y = \left(\frac{1}{2}\right)^{x+1}$$

$$\text{mis } u = \frac{1}{2}, u' = 0 \quad \frac{d}{dx}(u^v) = u^v \left( v' \ln u + \frac{v}{u} \cdot u' \right)$$

$$v = x+1$$

$$v' = 1$$

$$= u^v \left( \ln u + \frac{v}{u} \cdot (0) \right)$$

$$= u^v \ln u$$

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

$$\frac{dy}{dx} \text{ saat } x=1 = \left(\frac{1}{2}\right)^{1+1} \cdot (\ln 1 - \ln 2)$$

$$= \left(\frac{1}{2}\right)^2 \cdot (0 - 0.693)$$

$$= \frac{1}{4} \cdot (-0.693) = -0.173 //$$