

N 4

$$f(x_0 + \delta x) - f(x_0) = f'(x_0) \delta x$$

$$f(x_0 + \delta x) = f(x_0) + f'(x_0) \delta x$$

$$f(x) = \sqrt[3]{x} \quad f'(x) = \frac{1}{3} x^{-\frac{2}{3}}$$

$$\sqrt[3]{64+1} \approx \frac{1}{3} \cdot \frac{1}{16} \cdot 1 + 4 = 4 + \frac{1}{48}$$

N 5

$$\text{Zerf\u00fchrung} \quad f(x) = f(-x)$$

$$\left. \frac{df}{dx} \right|_x = - \left. \frac{df}{dx} \right|_{-x}$$

$$\text{Merkf\u00fchrung} \quad f(x) = -f(-x)$$

$$\left. \frac{df}{dx} \right|_x = \left. \frac{df}{dx} \right|_{-x}$$

N 6

$$y = 2x - \cos \frac{x}{2}, \quad y_0 = -1$$

$$\cos \frac{x}{2} = 2x - y$$

$$\frac{x}{2} = \arccos(2x - y)$$

$$x = 2 \arccos(2x - y)$$

$$\frac{dy}{dx} = 2 + \frac{1}{2} \cdot \sin \frac{x}{2}$$

$$\frac{dx}{dy} = \frac{1}{2 + \frac{1}{2} \sin \frac{x}{2}} = \frac{1}{2} \quad \Big|_{x=0}$$

$$2x - \cos \frac{x}{2} - y = 0$$

$$\cos(0) = 1$$

$$2dx + \frac{1}{2} \sin \frac{x}{2} dx - dy = 0$$

$$-1 = 2x - \cos \frac{x}{2}$$

N 7

$$y'_x = ?$$

$$\begin{cases} x = t^2 + 6t + 5 \\ y = \frac{t^3 - 5t}{t} \end{cases}$$

$$\frac{dx}{dt} = 2t + 6$$

$$\frac{dy}{dt} = 2t + \frac{5t}{t^2} = \frac{2t^3 + 5t}{t^2}$$

$$\frac{dy}{dx} = \frac{2t^3 + 5t}{2t^3 + 6t^2}$$

$$\begin{cases} x = \cos 2t = \frac{p}{\sin 2t} & \frac{dx}{dt} = -1 \cdot \frac{p}{(\sin 2t)^2} \cdot \frac{p}{(\cos 2t)^2} \cdot 2 = -2 \cdot \left(\frac{\cos 2t}{\sin 2t} \right)^2 \cdot \frac{p}{(\cos 2t)^2} = -2 \cdot \frac{p}{\sin^2 2t} \\ y = \frac{2 \cos 2t - 1}{2 \cos t} & \frac{dy}{dt} = \frac{-2 \cdot 2 \cdot \sin 2t \cdot (2 \cos t) - 2 \cdot (-\sin t) \cdot (2 \cos 2t - 1)}{(2 \cos t)^2} \\ & = \frac{-8 \sin 2t \cdot \cos t + 2 \sin t (\cos(2t) - 1)}{(2 \cos t)^2} \end{cases}$$

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a) $y = u^3 v$

$$\frac{\partial y}{\partial u} = 3v \cdot u^2$$

$$\frac{\partial y}{\partial v} = u^3$$

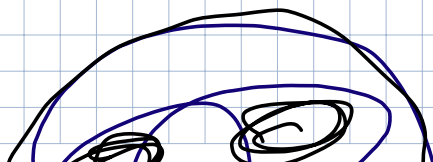
$$dy = 3v u^2 \cdot du + u^3 dv$$

c) $y = \frac{u^2}{v - u^3}$

$$\frac{\partial y}{\partial u} = \frac{2u(v - u^3) - u^2 \cdot (-3u^2)}{(v - u^3)^2} = \frac{2uv - 2u^4 + 3u^4}{(v - u^3)^2} = \frac{u^4 + 2uv}{(v - u^3)^2}$$

$$\frac{\partial y}{\partial v} = \frac{0 - u^2 \cdot v}{(v - u^3)^2} = -\frac{uv}{(v - u^3)^2}$$

$$dy = \frac{u^4 + 2uv}{(v - u^3)^2} du - \frac{uv}{(v - u^3)^2} dv$$





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