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1Ste Mathe HÜ am 20.11.22

4.46a) $f(x) = 3x^4 + 7 \quad f'(x) = 4 \cdot 3x^3 = 12x^3$

4.47a) $z^2 = a \quad \frac{da}{dz} = 2z = f'(a)$ | b) $x = y^{11} \quad \frac{dy}{dx} = 11y^{10}$

$\frac{du}{dx} = 0$ $\qquad$ $\frac{dy}{dt} = 0$

4.49a) $y = \sqrt[3]{x} = x^{\frac{1}{3}} \quad f'(x) = \frac{1}{3}x^{-\frac{2}{3}}$

b) $y = \sqrt[5]{x^2} = x^{\frac{2}{5}} \quad f'(x) = \frac{2}{5}x^{-\frac{3}{5}}$

4.52 a-c) a)

$s(t) = 3t^2 - 5t + \frac{1}{t} \quad s'(t) = 2 \cdot 3t - 5 + -1t^{-2}$

$s'(t) = 6t - 5 - \frac{1}{t^2} \qquad t^{-2}$

$s''(t) = 6 + 2t^{-3} = 6 + \frac{2}{t^{-3}}$

4.52 b)

b) $v(t) = \frac{t^2}{4} - 3t + \frac{2}{t}$

$v'(t) = 2 \cdot \frac{t}{4} - 3 + -2t^{-2}$

$\frac{t}{2} - 3 - \frac{2}{t^2}$

$v''(t) = \frac{1}{2} + \frac{4}{t^3}$

4.52 c) $f(t) = \frac{2}{t^2} + 3t - \frac{1}{2t}$

$f'(t) = -2\frac{2}{t^3} + 3 + \frac{1}{2t^2}$

$f''(t) = -4t^{-3} + 3 + 2t^{-2}$

$f''(t) = -3 \cdot (-4)t^{-4} - 4t^{-3}$

$f''(t) = \frac{12}{t^4} - \frac{1}{t^3}$