

POTENSSIFUNKTION DERIVAATTI

$$f(x) = x^a, \quad x > 0, \quad a \in \mathbb{R}$$

esim.

$$x^2$$

$$x^{\frac{1}{2}}$$

$$x^{-2}$$

$$x^{-\frac{1}{2}}$$

$$f(x) = x^a = (e^{\ln x})^a = e^{a \cdot \ln x}$$

$$D x^a = D e^{a \cdot \ln x} = \underbrace{e^{a \cdot \ln x}}_{x^a} \cdot \frac{a}{x}$$

$$= x^a \cdot \frac{a}{x}$$

$$= a \cdot \frac{x^a}{x}$$

$$= a \cdot x^{a-1}$$

sisä-f.

$$g(x) = a \cdot \ln x$$

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

$$D x^a = a \cdot x^{a-1}$$

cm

Derivati

a) x^{-5}

$$D x^{-5} = -5 x^{-6}$$

b) $x^{2,316}$

$$D x^{2,316} = 2,316 x^{1,316}$$

c) $\sqrt[5]{x^3}$

$$D x^{\frac{3}{5}} = \frac{3}{5} x^{-\frac{2}{5}} = \frac{3}{5\sqrt[5]{x^2}}$$

d) $x^{\sqrt{3}}$

$$D x^{\sqrt{3}} = \sqrt{3} x^{\sqrt{3}-1}$$

$$= \frac{x^{\frac{1}{5}}}{x^{\frac{2}{5}}}$$