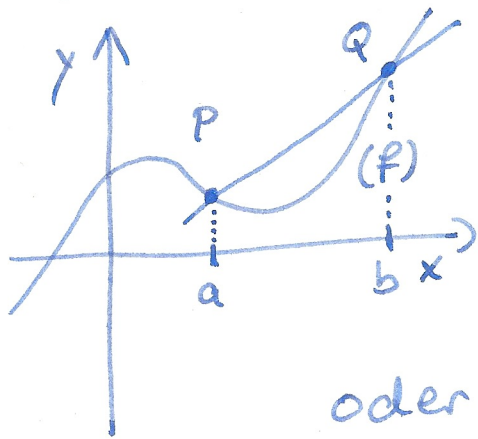


# Effektives Differenzieren

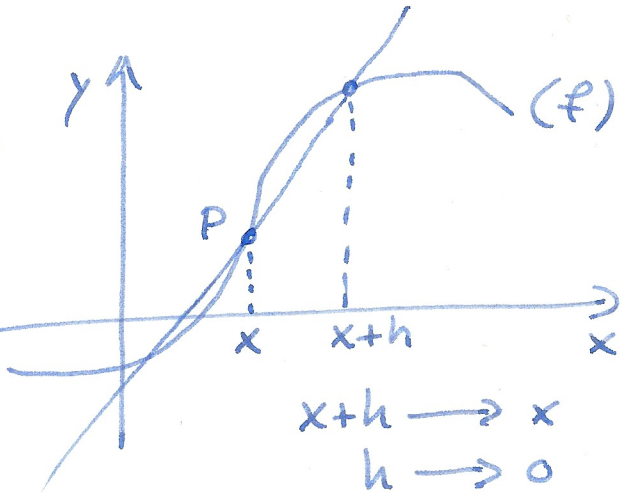
7D WOP



$$\left(\frac{df}{dx}\right)_P = \lim_{b \rightarrow a} \frac{f(b) - f(a)}{b - a}$$

oder auch

$$\left(\frac{df}{dx}\right)_P = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$



Bsp.

$$(1) f(x) = x^2 \Rightarrow f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} =$$

$$= \lim_{h \rightarrow 0} \frac{x^2 + 2xh + h^2 - x^2}{h} = \lim_{h \rightarrow 0} (2x + h) = 2x$$

$$(2) g(x) = x^3 \text{ dann } g'(x) = \lim_{h \rightarrow 0} \frac{(x+h)^3 - x^3}{h} =$$

$$= \lim_{h \rightarrow 0} \frac{x^3 + 3x^2h + 3xh^2 + h^3 - x^3}{h} =$$

$$= \lim_{h \rightarrow 0} (3x^2 + 3xh + h^2) = 3x^2$$

$$(3) \text{ Jetzt du: } k(x) = 3 \cdot x^2 \quad m(x) = 5 \cdot x^3$$

$$\text{und } p(x) = x^3 + x^2$$