

Produktregel

$$q(x) = f(x) \cdot g(x)$$

$$q'(x) = \lim_{h \rightarrow 0} \frac{q(x+h) - q(x)}{h}$$

$$q(x+h) - q(x) = f(x+h)g(x+h) - f(x)g(x) =$$

$$= f(x+h)g(x+h) - f(x) \cdot g(x+h) + f(x)g(x+h) - f(x) \cdot g(x) =$$

$$= (f(x+h) - f(x)) \cdot g(x+h) + f(x) \cdot (g(x+h) - g(x))$$

$$q'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \cdot g(x+h) + \lim_{h \rightarrow 0} f(x) \cdot \frac{g(x+h) - g(x)}{h}$$

$$\Rightarrow q' = f'(x) \cdot g(x) + f(x) \cdot g'(x)$$

$$f(x) \cdot g(x) = f'(x) \cdot g(x) + f(x) \cdot g'(x)$$

Kvotregel

$$r(x) = \frac{f(x)}{g(x)} \quad (= f(x) \cdot g(x)^{-1})$$

$$r'(x) = f'(x) \cdot g(x)^{-1} + f(x) \cdot (-g(x)^{-2}) \cdot g'(x) =$$

$$= \frac{f'(x) \cdot g(x)^{-1} \cdot g(x)^2 - f(x) \cdot g'(x)}{g(x)^2} =$$

$$= \frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{g(x)^2}$$

$$\frac{f(x)}{g(x)} = \frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{g(x)^2}$$