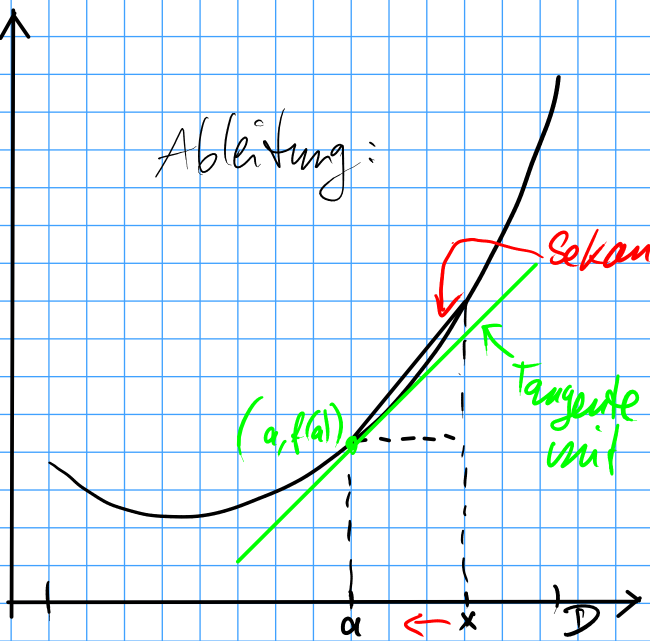
NOTIZEN

Ableitung:

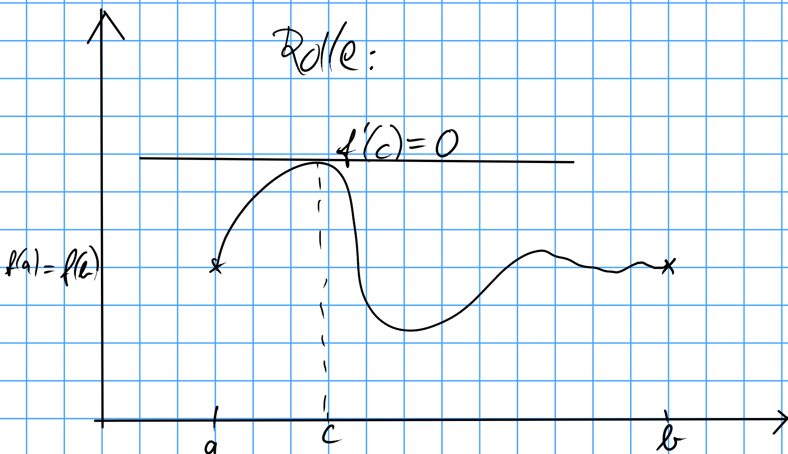


Sekante hat Steigung $\dfrac{f(x)-f(a)}{x-a}$

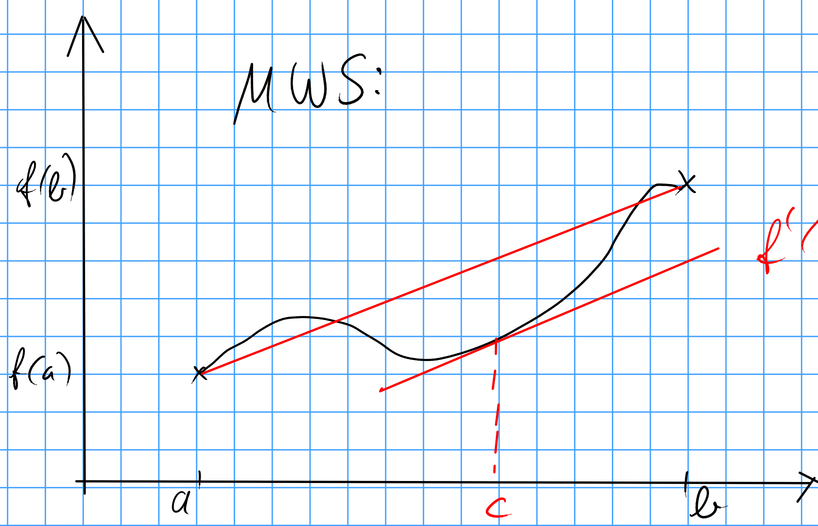
Tangente mit Steigung $f'(a) = c$,

Glg. $y = f(a) + c(x-a)$

Rolle:

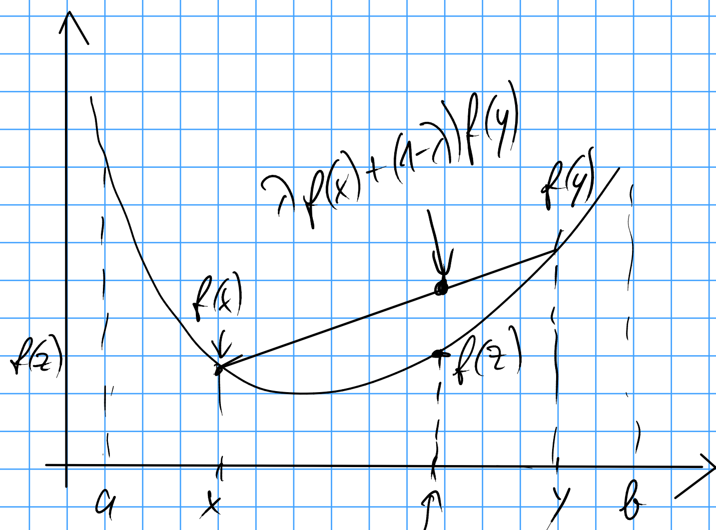


MWS:

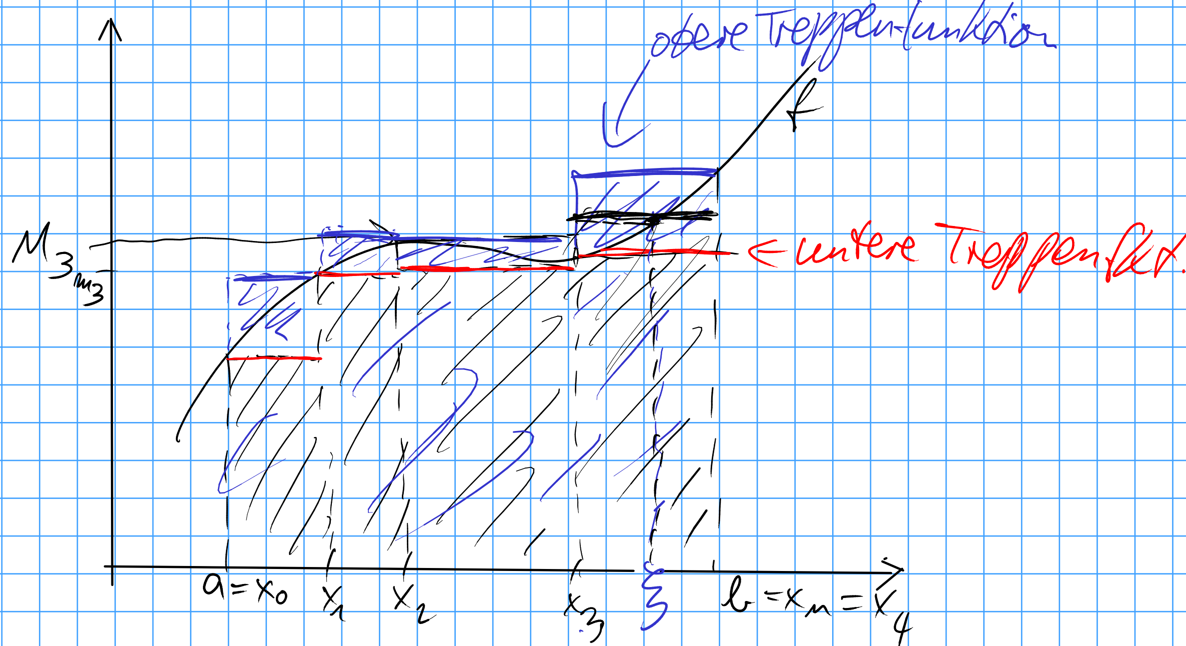


$f'(c) = \dfrac{f(b)-f(a)}{b-a}$

Konvexe Funktion:



$z = \lambda x + (1-\lambda) y, \quad \lambda \in [0,1]$



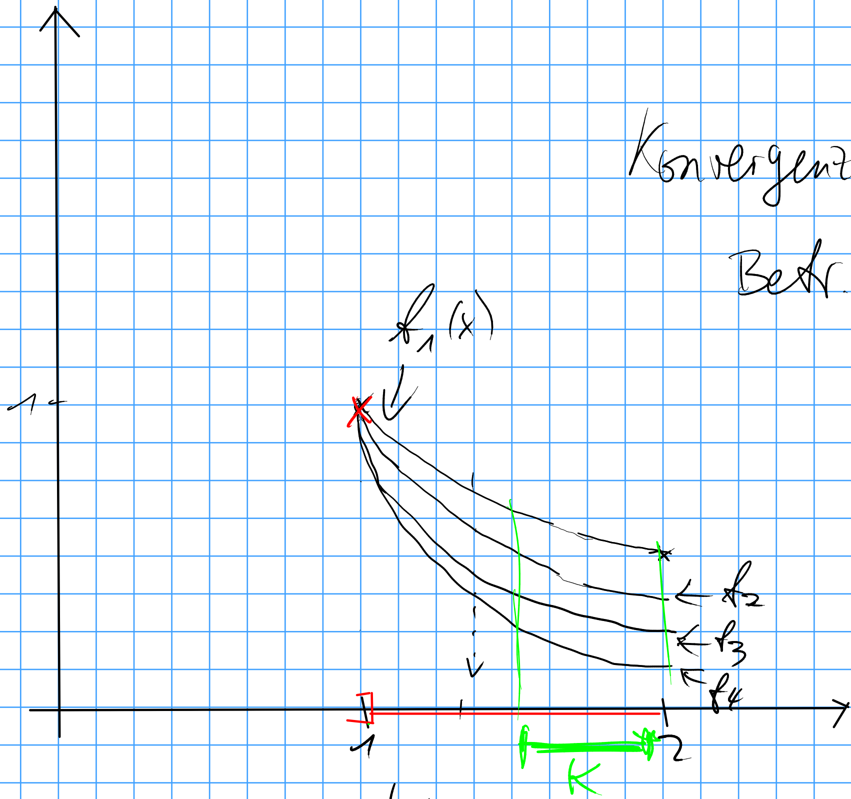
Bsp. für $\left| \int f(x)\,dx \right| \leq \int |f(x)|\,dx$:

$f(x) = x^2 \sin^4 \frac{1}{x} \quad \rightsquigarrow \quad \int_\varepsilon^1 x^2 \sin^4 \frac{1}{x}\,dx = ?$ (für $0 < \varepsilon < 1$)

Es gilt: $\left| \int_\varepsilon^1 x^2 \sin^4 \frac{1}{x}\,dx \right| \leq \int_\varepsilon^1 |x^2 \underbrace{\sin^4 \tfrac{1}{x}}_{|\cdot| \leq 1}|\,dx \leq \int_\varepsilon^1 x^2\,dx$

Konvergenz einer Funktionenfolge:

Betr. $f_n(x) = x^{-n}$



$f_1(x) = \frac{1}{x}$, $f_2(x) = \frac{1}{x^2}$
$\vdots$

$f_n(1) = 1$

$f_n \xrightarrow[n\to\infty]{\text{ptw.}} f$

$f(x) = \begin{cases} 0, & x > 1 \\ 1, & x = 1 \end{cases}$

glm.?

- auf $K = [1,2]$: $f_n \overset{\text{glm.}}{\not\rightrightarrows} f$
- auf $K = [\frac{3}{2}, 2]$: $f_n \rightrightarrows f$

Notizen:

$$f(x) = f(a) + f'(a)(x-a) + \frac{f''(a)}{2!}(x-a)^2$$
$$+ \frac{f'''(a)}{3!}(x-a)^3 + \ldots + \frac{f^{(n)}(a)}{n!}(x-a)^n + R_{n+1}(x)$$

<u>$n=0$:</u> $\quad f(x) = f(a) + \int_a^x f'(t)\,dt$

$$\exp(x) = \underbrace{\exp(0)}_{=1} + \underbrace{\exp'(0)}_{=1} x + \ldots + \underbrace{\exp^{(n)}(0)}_{=1} \cdot \frac{x^n}{n!} + \ldots$$