

$$\mathbb{R} \supset \mathfrak{h} \xrightarrow[\text{diff}]{\gamma} \mathbb{R} \Rightarrow \begin{cases} \mathfrak{h} \ni o \text{ loc extr} \Rightarrow {}^o\gamma = 0 \\ {}^o\gamma \neq 0 \Rightarrow \text{kein loc extr} \end{cases}$$

$${}^o\gamma \neq 0$$

$$\overline{x-o} \underset{*}{<} {}^o\left(\overline{{}^o\gamma}\right) \Rightarrow {}^o\gamma - \overline{{}^o\gamma} < \frac{x\gamma - {}^o\gamma}{x-o} < {}^o\gamma + \overline{{}^o\gamma}$$

$$\overline{\frac{x\gamma - {}^o\gamma}{x-o} - {}^o\gamma} \underset{*}{<} \overline{{}^o\gamma} \Rightarrow -\overline{{}^o\gamma} < \frac{x\gamma - {}^o\gamma}{x-o} - {}^o\gamma < \overline{{}^o\gamma}$$

$$o \text{ kein loc extr}$$

$$\begin{cases} {}^o\gamma > 0 & \Rightarrow 0 < \frac{x\gamma - {}^o\gamma}{x-o} \Rightarrow \begin{cases} x < o \Rightarrow x-o < 0 \Rightarrow x\gamma - {}^o\gamma < 0 \Rightarrow x\gamma < {}^o\gamma & \Rightarrow {}^o\gamma \text{ kein loc min} \\ x > o \Rightarrow x-o > 0 \Rightarrow x\gamma - {}^o\gamma > 0 \Rightarrow x\gamma > {}^o\gamma & \Rightarrow {}^o\gamma \text{ kein loc max} \end{cases} \\ {}^o\gamma < 0 & \Rightarrow \frac{x\gamma - {}^o\gamma}{x-o} < 0 \Rightarrow \begin{cases} x < o \Rightarrow x-o < 0 \Rightarrow x\gamma - {}^o\gamma > 0 \Rightarrow x\gamma > {}^o\gamma & \Rightarrow {}^o\gamma \text{ kein loc max} \\ x > o \Rightarrow x-o > 0 \Rightarrow x\gamma - {}^o\gamma < 0 \Rightarrow x\gamma < {}^o\gamma & \Rightarrow {}^o\gamma \text{ kein loc min} \end{cases} \end{cases}$$

$${}^x\gamma = x^3 - 3x^2 + 1 \Rightarrow {}^{-1}\overset{\circ}{3}\gamma = -3\overset{\circ}{1}$$

$${}^x\gamma = 3x^2 - 6x = 3x\underline{x-2} \Rightarrow \text{crit pts } \begin{cases} 0 & {}^0\gamma = 1 \\ 2 & {}^2\gamma = -3 \end{cases}$$

$$\text{end pts } \begin{cases} -1 & {}^{-1}\gamma = -3 \\ 3 & {}^3\gamma = 1 \end{cases}$$

$$\begin{array}{ccc}
 a \overset{\circ}{\mid} b & \begin{array}{c} \nearrow \gamma \\ \text{stet} \\ \searrow \gamma \end{array} & \mathbb{R} \\
 \cup & & \\
 a \underset{\circ}{\mid} b & \begin{array}{c} \nearrow \text{diff} \\ \gamma \end{array} &
 \end{array}
 \qquad
 \begin{array}{c}
 {}^a\gamma = {}^b\gamma \xRightarrow{\text{Rolle}} \bigvee_{\bar{x}} {}^a \underset{\circ}{\mid} {}^b \bar{x} \gamma = 0
 \end{array}$$

$$\bigvee_{\pm x} {}^a \overset{\circ}{\mid} {}^b \left\{ \begin{array}{l} {}^{+x}\gamma = {}^a \overset{\circ}{\mid} {}^b \dot{\gamma} \\ {}^{-x}\gamma = {}^a \overset{\circ}{\mid} {}^b \dot{\gamma} \end{array} \right.$$

$$\text{If both } {}_{\pm x} \in \{a{:}b\} \Rightarrow {}^a \overset{\circ}{\mid} {}^b \dot{\gamma} = {}^{a{:}b}\gamma = {}^a \overset{\circ}{\mid} {}^b \dot{\gamma} \Rightarrow \gamma = \text{cst} \Rightarrow \dot{\gamma} = 0$$

$$\text{If ein } {}_{\pm x} \in a \underset{\circ}{\mid} b \Rightarrow {}_{\pm x} \text{ extr von } {}^a \overset{\circ}{\mid} {}^b \gamma \Rightarrow {}^{\pm x} \dot{\gamma} = 0$$