$$f(x) = \frac{x^2 - 3x + 5}{x - 2} = (x^2 - 3x + 5) : (x - 2) = x - 1 + \underset{\overset{\uparrow}{0}}{\frac{7}{x-2}}$$

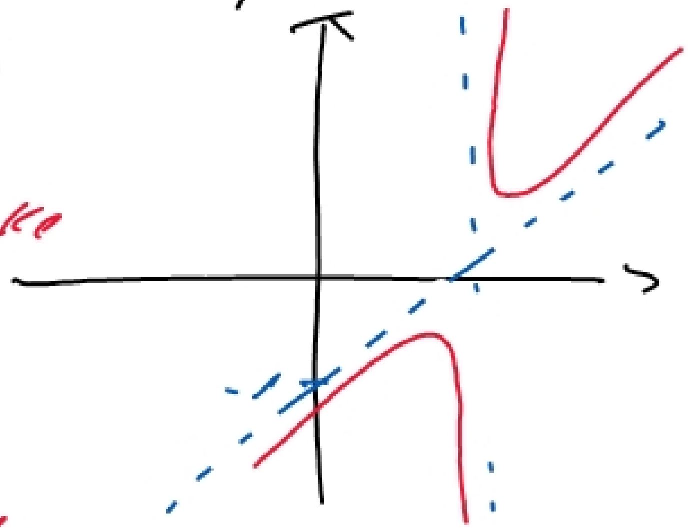
$$\begin{array}{l} -(x^2 - 2x) \\ \hline \quad -x + 5 \\ \quad (-x - 2) \\ \hline \qquad 7 \end{array}$$

$\lim\limits_{x \to k} f(x) = \infty$ senkrechte Asymptote

$\lim\limits_{x \to k} f(x) = K$ behebbare Lücke

$\lim\limits_{x \to \infty} f(x) = K$ waagerechte Asymptote

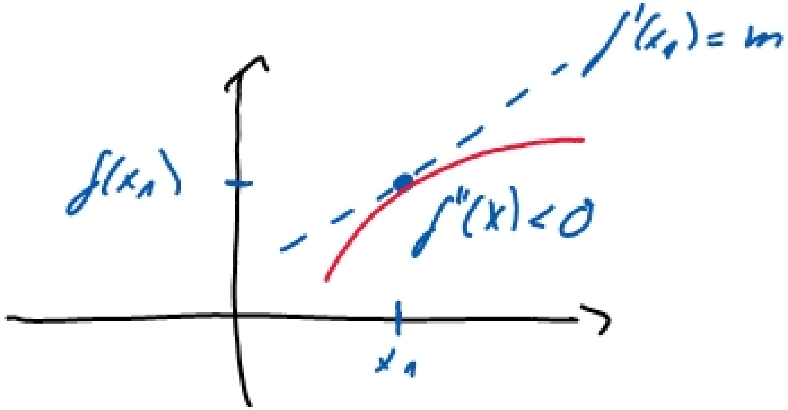
$\lim\limits_{x \to -\infty} f(x) = \infty$ diagonale Asymptote

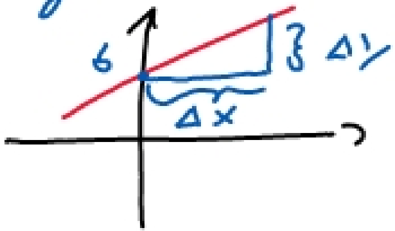


$f(x) \rightarrow$ y-Koordinate

$f'(x) \rightarrow$ Steigung

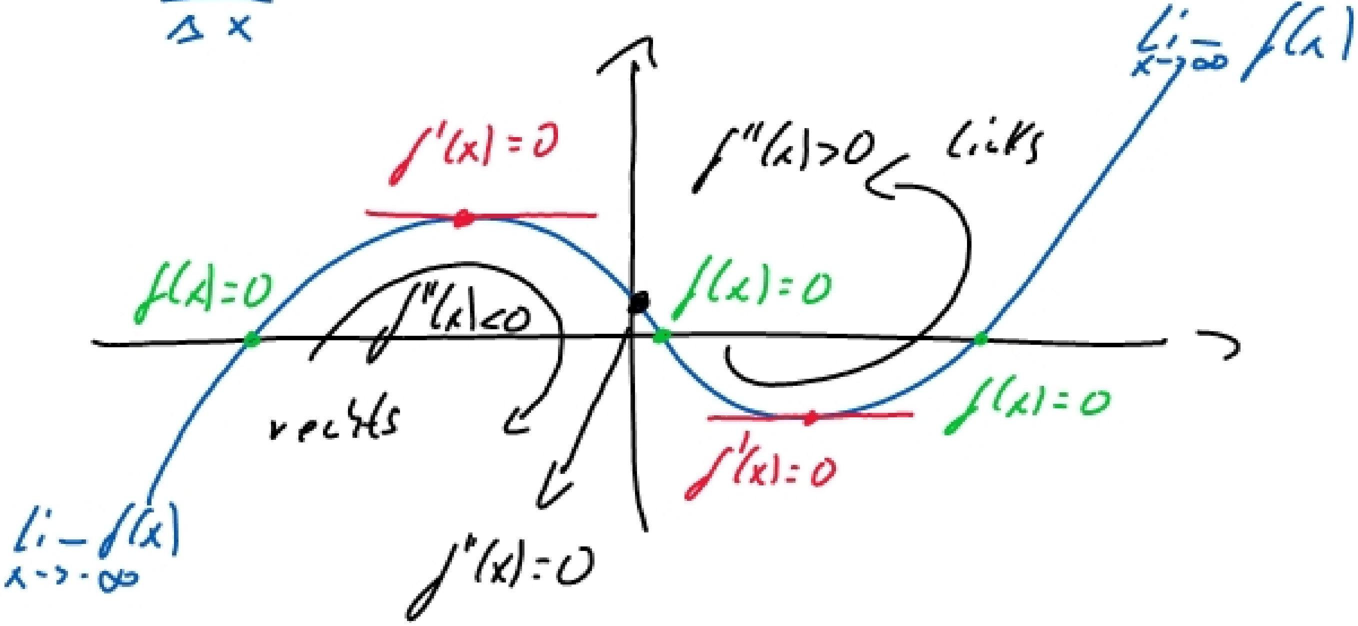
$f''(x) \rightarrow$ Krümmung





$y = m \cdot x + b$

↳ $\frac{\Delta y}{\Delta x}$



1) $f(x) = -x^3 + 3x^2 + 13x - 15$ $\longrightarrow$ Nullstellen + Skizze

2) $\frac{2}{5x} - \frac{3}{4} + \frac{5}{12} - 1\frac{1}{6} = \frac{4}{15x} - 0{,}3$

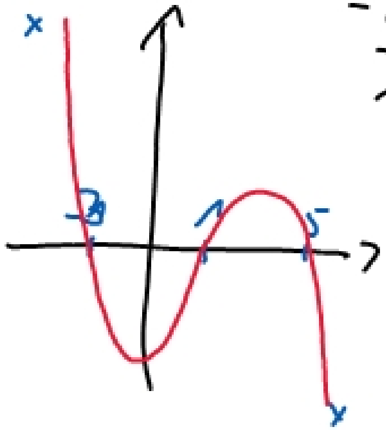
3) $\dfrac{\frac{a}{3} + 2 + \frac{3}{a}}{\frac{1}{6} + \frac{1}{2a}}$ $[\, x^4 - 4x^3 - 8x^2 + 29x + 12 = 0 \,]$

$M_{15} = \{\pm 1;\ \pm 3;\ \pm 5;\ \pm 15\}$

$f(x) = -(x^3 - 3x^2 - 13x + 15)$ $x = 1:\ f(1) = 0$ $(x-1)$

$$
\begin{aligned}
&(x^3 - 3x^2 - 13x + 15) : (x-1) = x^2 - 2x - 15 \\
&-(x^3 - x^2) \\
&\quad / \quad -2x^2 - 13x + 15 \\
&\quad -(-2x^2 + 2x) \\
&\qquad / \quad -15x + 15 \\
&\qquad -(-15x + 15) \\
&\qquad\quad / \qquad /
\end{aligned}
$$

$\underbrace{x^2 - 2x - 15}_{(x-5)(x+3)}$



$f(x) = -(x-1)(x-5)(x+3) = 0$

$\mathbb{L} = \{-3;\ 1;\ 5\}$

2) $\frac{2}{5x} - \frac{3}{4} + \frac{5}{12} - \frac{7}{6} = \frac{4}{15x} - \frac{3}{10} \quad | \cdot HN \,(60 \cdot x)$

$\frac{2 \cdot 60x}{5x} - \frac{3 \cdot 60x}{4} + \frac{5 \cdot 60x}{12} - \frac{7 \cdot 60x}{6} = \frac{4 \cdot 60x}{15x} - \frac{3 \cdot 60x}{10}$

$24 - 45x + 25x - 70x = 16 - 18x \quad | + 18x - 24$

$-72x = -8 \quad | : -72$

$x = \frac{-8}{-72} = \frac{1}{9} = 0,\overline{1}$

3) $\frac{\frac{a}{3} + 2 + \frac{3}{a}}{\frac{1}{6} + \frac{1}{2a}} = \frac{\frac{a^2 + 6a + 9}{3a}}{\frac{a+3}{6a}}$ $\rightsquigarrow (a+3)^2$

$\frac{(a+3)^2}{3a} \cdot \frac{6a}{a+3} = 2 \cdot (a+3) = 2a + 6$

$*\ (x+2)(x+1)(x-3)(x-4)$

$$\left(\left(\sqrt[3]{1/x^2}\right)^{-2} \cdot \sqrt{(x^3)^4} \cdot \sqrt[3]{x\sqrt{x^5}}\right)^2$$

$$\left[\left(\left(x^{-2}\right)^{1/3}\right)^{-2} \left((x^3)^4\right)^{1/2} \left(x \cdot x^{5/2}\right)^{1/3}\right]^2$$

$$\left(x^{4/3} \cdot x^{12/2} \quad x^{7/6}\right)^2$$

$$\left(x^{\frac{4}{3}+6+\frac{7}{6}}\right)^2$$

$$\left(x^{\frac{8+36+7}{6}}\right)^2 = x^{51/3} = x^{17}$$

$$\sqrt[3]{8^5}$$

$$\left(8^5\right)^{1/3}$$

$$8^{5 \cdot 1/3}$$

$$\left(8^{1/3}\right)^5$$

$$\left(\sqrt[3]{8}\right)^5$$

$$2^5 = 32$$

$$\sqrt[3]{x^2 \sqrt[4]{x^5} \cdot \frac{1}{\sqrt{x^3}}} = \left[x^2 \; x^{5/4} \; x^{-3/2}\right]^{1/3}$$

$$\left(x^{\frac{8+5-6}{4}}\right)^{1/3} = \left(x^{7/4}\right)^{1/3} = x^{7/12} = \sqrt[12]{x^7}$$