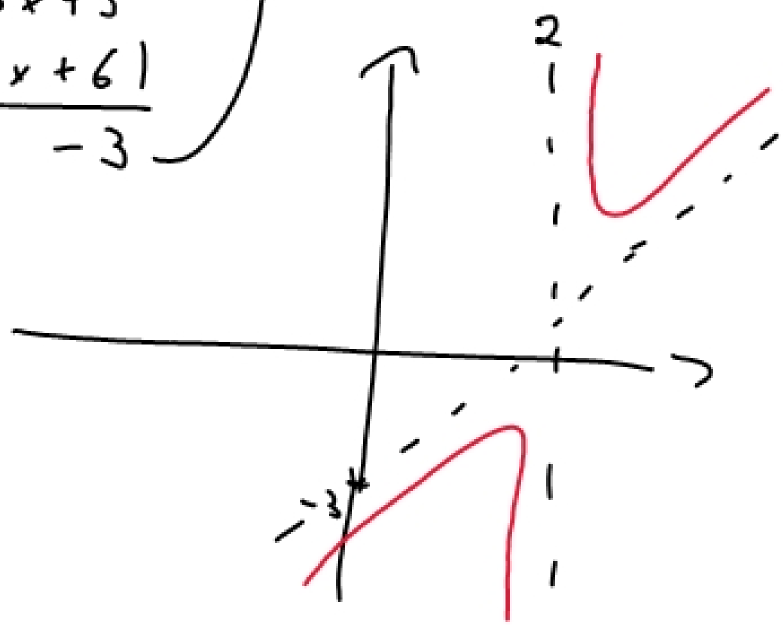
$$f(x) = \frac{x^2 - 5x + 3}{x - 2} \quad ; \quad \mathbb{D} = x \in \mathbb{R} \setminus \{2\}$$

$$\lim_{x \to \infty} f(x) = \frac{x^2 \cdot (1 - \overbrace{5/x + 3/x^2}^{0})}{x \cdot (1 - \underbrace{2/x}_{0})} = [x] = \infty$$

$$(x^2 - 5x + 3) : (x - 2) = \boxed{x - 3} - \underbrace{\frac{3}{x-2}}_{0}$$

$$\begin{array}{l} -(x^2 - 2x) \\ \hline \quad -3x + 3 \\ \quad -(-3x + 6) \\ \hline \qquad -3 \end{array}$$



$\lim_{x \to \infty} f(x) = k$ waagrecht

$\lim_{x \to \infty} f(x) = \infty$ diagonal

$\lim_{x \to k} f(x) = \infty$ senkrecht

$\lim_{x \to k} f(x) = k$ behebbar

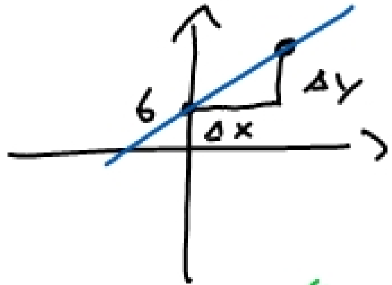
$f(x) \Rightarrow$ y-Koordinate

$f'(x) \Rightarrow$ Steigung

$f''(x) \Rightarrow$ Krümmung

$P(x_1|y_1) \quad Q(x_2|y_2)$

$$\underbrace{m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}}_{\text{Differenzenquotient}}$$



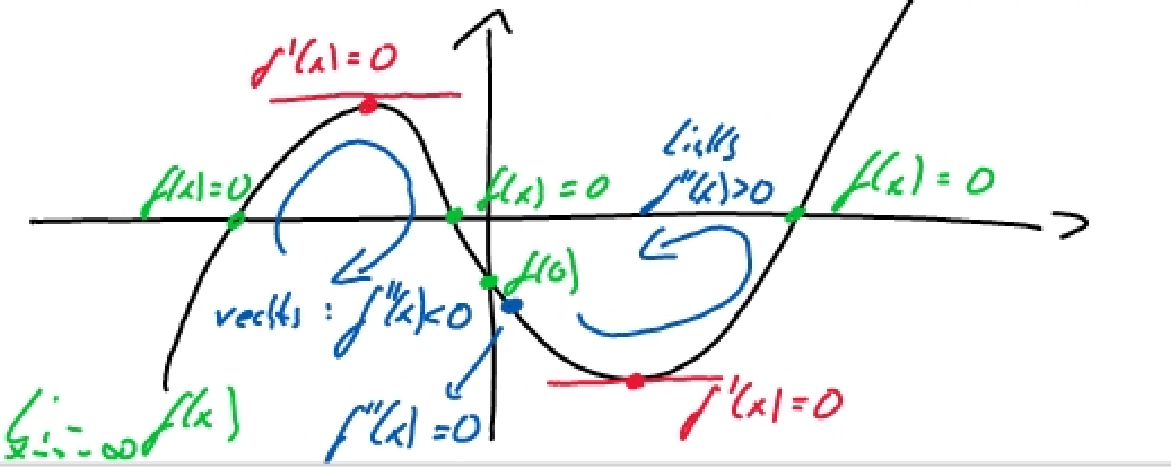
Wendetangente $\quad y = m \cdot x + b$

$f''(x_w) = 0 \Rightarrow x_w$

$f(x_w) = y$

$f'(x_w) = m$

$\perp: m_1 \cdot m_2 = -1$



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

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

3) $\dfrac{\frac{a}{3} + 2 + \frac{3}{a}}{\frac{1}{6} + \frac{1}{2a}}$

$x^4 - 4x^3 - 8x^2 + 29x + 12 = 0$

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

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

$(x^3 - 3x^2 - 13x + 15) : (x-1) = \underbrace{x^2 - 2x - 15}_{(x-5)(x+3)}$

$-(x^3 - x^2)$

$/ \quad -2x^2 - 13x + 15$

$-(-2x^2 + 2x)$

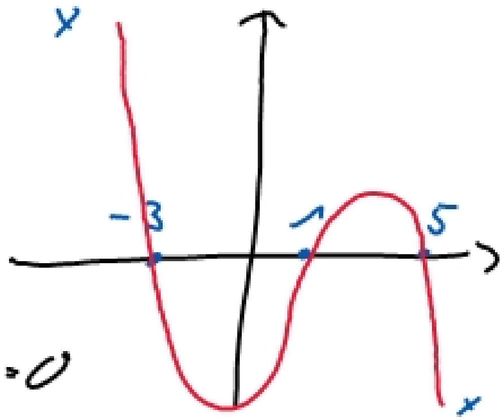
$/ \quad -15x + 15$

$-(-15x + 15)$

$/ \quad /$

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

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



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

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

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

$$-72x = -8 \quad | \cdot (-72)$$

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

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

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

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

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

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

$$\left(x^{-3/5} \cdot x^{6/4} \cdot x^{-5/6} \right)^2$$

$$\left(x^{-3/5 + 3/2 - 5/6}\right)^2 = \left(x^{\frac{-18+45-25}{30}} \right)^2$$

$$\left(x^{2/30}\right)^2 = x^{2/15} = \sqrt[15]{x^2}$$

$$\sqrt[3]{8^5} = (8^5)^{1/3} = 8^{5 \cdot 1/3} = 8^{1/3 \cdot 5} = (8^{1/3})^5$$

$$\left(\sqrt[3]{8}\right)^5 = 2^5 = 32$$