$\frac{K}{0} \to \infty \qquad \frac{K}{\infty} \to 0$

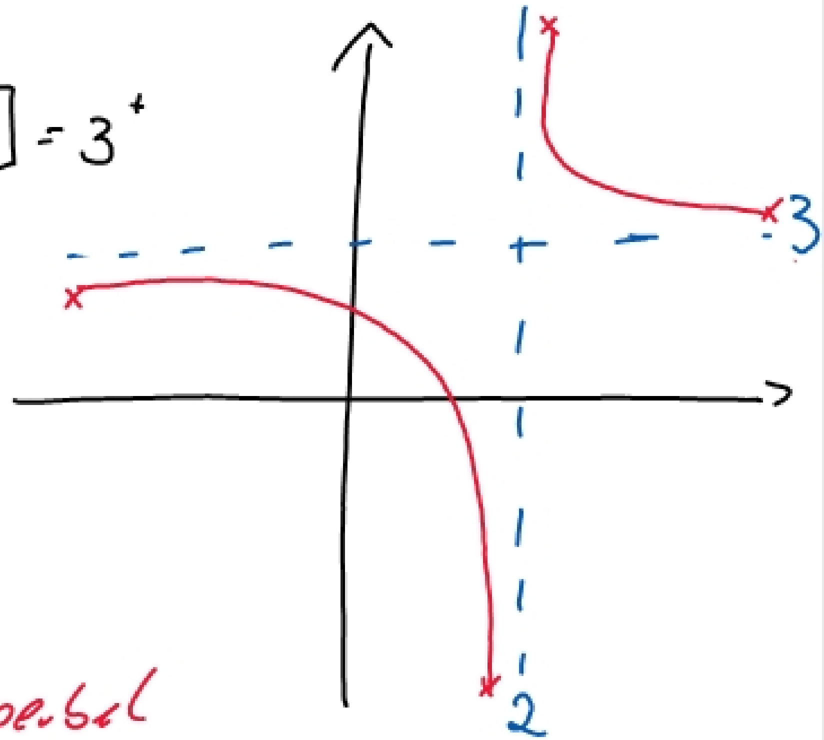
$$f(x) = 3 - \frac{2}{2-x} \quad ; \; \mathbb{D} = x \in \mathbb{R} \setminus \{2\} \quad , \; \mathbb{W} : y \in \mathbb{R} \setminus \{3\}$$

$$\lim_{x \to -\infty} f(x) = \left[3 - \frac{2}{\infty}\right] = \left[3 - 0^+\right] = 3^-$$

$$\lim_{x \to \infty} f(x) = \left[3 - \frac{2}{-\infty}\right] = \left[3 - 0^-\right] = 3^+$$

$$\lim_{x \to 2^+} f(x) = \left[3 - \frac{2}{0^-}\right] = \infty$$

$$\lim_{x \to 2^-} f(x) = \left[3 - \frac{2}{0^+}\right] = -\infty$$



Hyperbel

c) $f(x) = \dfrac{x-4}{8 - 2\underbrace{\sqrt{3x+4}}}$ $\qquad \mathbb{D} = x \in \mathbb{R}^{\geq -4/3} \setminus \{4\}$

$\nearrow\ 0: \quad 3 \cdot 0 + 4 > 0 \quad ✓$

$3x + 4 = 0 \iff x = -\frac{4}{3}$

$\searrow\ -10 \quad 3 \cdot (-10) + 4 < 0$

$8 - 2 \cdot \sqrt{3x+4} = 0 \qquad | + 2 \cdot \sqrt{3x+4}$

$8 = 2 \cdot \sqrt{3x+4} \qquad | ()^2$

$64 = 4 \cdot (3x+4) \qquad | T$

$64 = 12x + 16 \qquad | -16$

$48 = 12x \qquad | : 12$

$x = 4$

$\lim_{x \to -4/3^-} f(x) = f\left(-\frac{4}{3}\right) = \dfrac{-\frac{4}{3} - 4}{8} = \dfrac{-\frac{16}{3}}{8} = -\frac{2}{3}$

$$\lim_{x \to \infty} f(x) = \frac{\cancel{x} \cdot (1 - 4/x) \to 0}{\cancel{x} \cdot \left[\frac{8}{x} - \frac{2 \cdot \sqrt{3x+4}}{x} \right]} = \left[\frac{1}{0} \right] = \infty$$

$$\frac{8}{x} \to 0 \qquad \frac{2 \cdot \sqrt{3x+4}}{x} \to 2 \cdot \sqrt{\frac{3x+4}{x^2}} \to 0$$

$$\lim_{x \to 4} f(x) = 0/0 \quad \to (x-4) \quad \Rightarrow \text{L'Hospital:}$$

$$\lim \frac{g(x)}{h(x)} = \lim \frac{g'(x)}{h'(x)}$$

$$\underline{\text{NR:}} \quad \frac{x-4}{8 - 2 \cdot \sqrt{3x+4}} \cdot \frac{8 + 2 \cdot \sqrt{3x+4}}{8 + 2 \cdot \sqrt{3x+4}}$$

$$\frac{\cancel{(x-4)} \cdot (8 + 2 \cdot \sqrt{3x+4})}{64 - 4 \cdot (3x+4)} \qquad 64 - 4 \cdot (3x+4) = 64 - 12x - 16 = 48 - 12x = -12 \cdot \cancel{(x-4)}$$

$$\lim_{x \to 4} \frac{8 + 2 \cdot \sqrt{3x+4}}{-12} = 16/-12 = -4/3$$

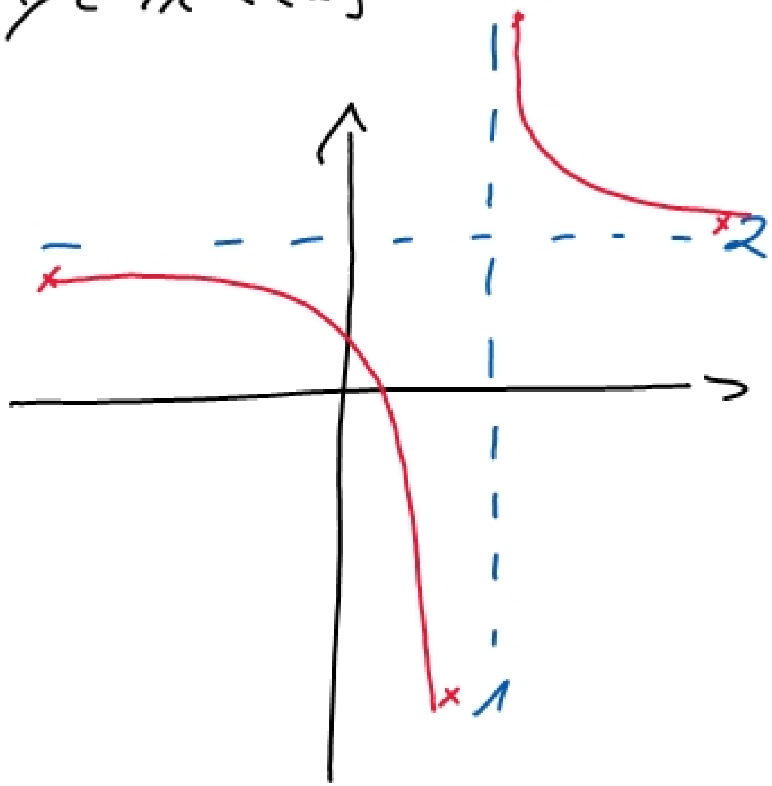
a) $f(x) = 2 - \frac{5}{1-x}$; $\mathbb{D} = x \in \mathbb{R} \setminus \{1\}$
$\mathbb{W} = y \in \mathbb{R} \setminus \{2\}$

$$\lim_{x \to \infty} f(x) = \left[2 - \frac{5}{-\infty}\right] = 2^+$$

$$\lim_{x \to -\infty} f(x) = \left[2 - \frac{5}{\infty}\right] = 2^-$$

$$\lim_{x \to 1^+} f(x) = \left[2 - \frac{5}{0^-}\right] = \infty$$

$$\lim_{x \to 1^-} f(x) = \left[2 - \frac{5}{0^+}\right] = -\infty$$



Polynomdivision

$$63124 : 12 = 526 + \frac{4}{12} \quad R\,4$$

$$\begin{array}{l} 63124 \\ -60 \\ \hline \;\;3124 \\ -24 \\ \hline \;\;\;724 \\ -72 \\ \hline \;\;\;\;\;4 \end{array}$$

$M_8 = \{\pm 1; \pm 2; \pm 4; \pm 8\}$

$f(x) = x^3 - 5x^2 + 2x + 8 = 0$

$x = -1: f(x) = 0 \longrightarrow (x+1)$

$$(x^3 - 5x^2 + 2x + 8) : (x+1) = x^2 - 6x + 8$$

$$\begin{array}{l} -(x^3 + x^2) \\ \hline \;/\;\; -6x^2 + 2x + 8 \\ \;\;\; -(-6x^2 - 6x) \\ \hline \;\;\;\;\;\; /\;\; 8x + 8 \\ \;\;\;\;\;\;\;\; -(8x + 8) \\ \hline \;\;\;\;\;\;\;\;\; / \;\; / \end{array}$$

$(x-2)(x-4)$

$\mathbb{L} = \{-1; 2; 4\}$

$f(x) = (x+1) \cdot (x-2) \cdot (x-4) = 0$

$$f(x) = -x^3 + 2x^2 + 11x - 12$$

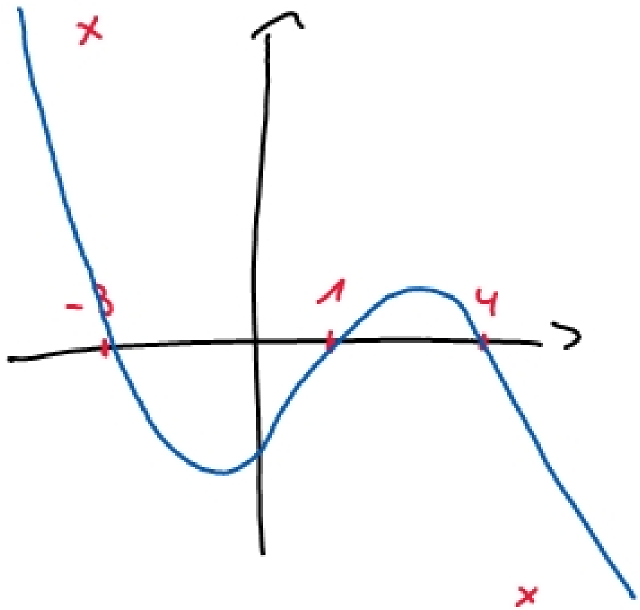
$$-(x^3 - 2x^2 - 11x + 12) \qquad x = 1 : f(x) = 0$$

$$(x^3 - 2x^2 - 11x + 12)(x-1) = \underbrace{x^2 - x - 12}_{(x-4)(x+3)}$$

$$\begin{array}{l}
-(x^3 - x^2) \\
\hline
\quad - \quad -x^2 - 11x + 12 \\
\quad -(-x^2 + x) \\
\hline
\qquad - \quad -12x + 12 \\
\qquad -(-12x + 12) \\
\hline
\qquad\quad - \quad -
\end{array}$$

$$f(x) = -(x-1)(x+3)(x-4) = 0$$

$$\mathbb{L} = \{-3 ; 1 ; 4\}$$



Dominanzprinzip

$x \to \infty$ $\qquad$ $\infty \cdot 0$

$$\infty \cdot 0$$

$$e^x \cdot 1/x^2 \to \infty$$

$$2^{4+x} \cdot \frac{1}{2^x} \to 2^4$$

$$x^2 \cdot 1/10^x \to 0$$