$$\frac{k}{\infty} \to 0$$

$$\frac{k}{0} \to \infty$$

$$f(x) = \frac{3}{x-2} + 4 \quad ; \quad D = x \in \mathbb{R} \setminus \{2\}$$

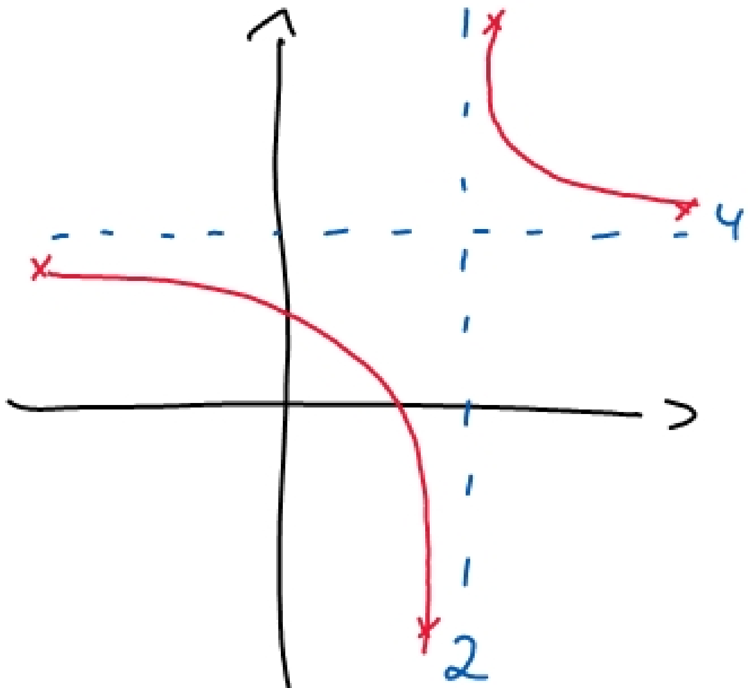
$$W = y \in \mathbb{R} \setminus \{4\}$$

$$\lim_{x \to \infty} f(x) = \left[\frac{3}{\infty} + 4\right] = 4^{+}$$

$$\lim_{x \to -\infty} f(x) = \left[\frac{3}{-\infty} + 4\right] = 4^{-}$$

$$\lim_{x \to 2^{+}} f(x) = \left[\frac{3}{0^{+}} + 4\right] = \infty$$

$$\lim_{x \to 2^{-}} f(x) = \left[\frac{3}{0^{-}} + 4\right] = -\infty$$



Hiperbol

d) $f(x) = \dfrac{2-x}{2x - \sqrt{10+3x}}$ $\qquad \mathbb{D} = x \in \mathbb{R}^{\geq -10/3} \setminus \{2; -5/4\}$

$$10 + 3x = 0 \iff x = -\tfrac{10}{3} \begin{cases} > \; x = 0: \; 10 + 3\cdot 0 > 0 \; ✓ \\ < \; x = -10: \; 10 + 3\cdot(-10) < 0 \end{cases}$$

$$\begin{aligned} 2x - \sqrt{10+3x} &= 0 && \mid + \sqrt{10+3x} \\ 2x &= \sqrt{10+3x} && \mid (\;)^2 \\ 4x^2 &= 10 + 3x && \mid -10 - 3x \\ 4x^2 - 3x - 10 &= 0 && \mid \cdot \tfrac{1}{4} \\ x^2 - \tfrac{3}{4}x - \tfrac{5}{2} &= 0 \end{aligned}$$

$x^2 + p\cdot x + q = 0$

$x_{1/2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$

$$x_{1/2} = \tfrac{3}{8} \pm \sqrt{\left(\tfrac{3}{8}\right)^2 + \tfrac{5}{2}} = \tfrac{3}{8} \pm \sqrt{\frac{9+160}{64}} = \frac{3}{8} \pm \sqrt{\frac{169}{64}}$$

$$x_1 = \frac{3}{8} + \frac{13}{8} \quad \vee \quad x_2 = \frac{3}{8} - \frac{13}{8}$$

$$x_1 = 2 \quad \vee \quad x_2 = -\frac{10}{8} = -\tfrac{5}{4}$$

$$\lim_{x\to\infty} f(x) = \frac{\cancel{x}\cdot\left(\frac{2}{x}-1\right)}{\cancel{x}\cdot\left(2-\frac{\sqrt{10+3x}}{x}\right)}$$

$\to 0$

$\to 0 \to -1/2$

L'Hospital

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

$$\lim_{x\to 2} f(x) = 0/0 \quad \to (x-2)$$

$$\frac{2-x}{2x-\sqrt{10+3x}} \cdot \frac{2x+\sqrt{10+3x}}{2x+\sqrt{10+3x}}$$

$$\frac{-(x-2)\cdot(2x+\sqrt{10+3x})}{4x^2-(10+3x)}$$

$$4x^2-3x-10$$

$$4\cdot(x-2)(x+5/4)$$

$$\lim_{x\to -5/4} f(x) = \frac{g^{+}}{0} = \infty$$

$$\lim_{x\to 2} \frac{-(2x+\sqrt{10+3x})}{4\,(x+5/4)} = \frac{-2}{13/4} = -8/13$$

5) $f(x) = \frac{4}{10+2x} + 2$

$\mathbb{D} = x \in \mathbb{R} \setminus \{-5\}$

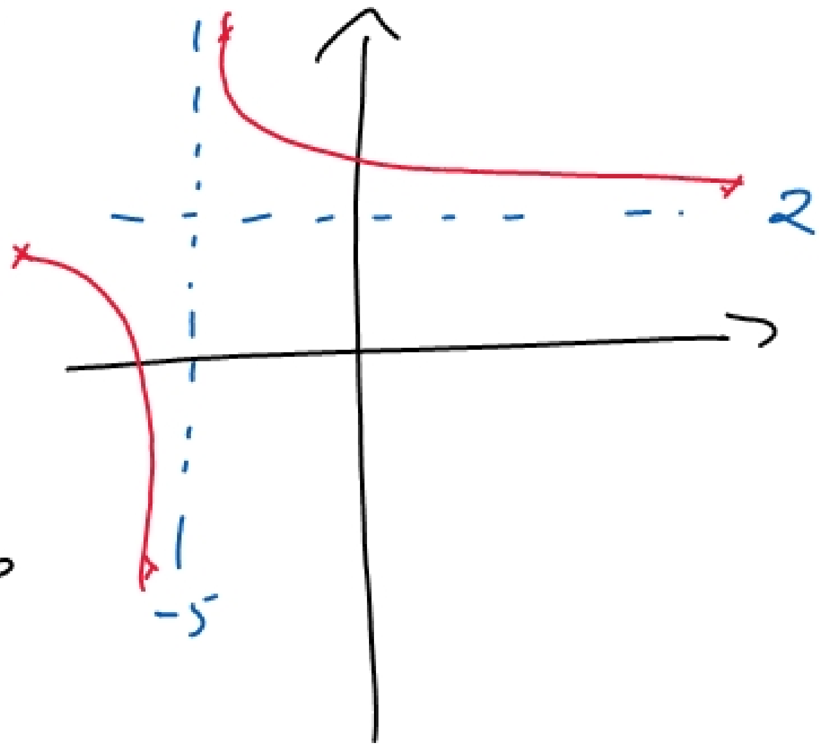
$\mathbb{W} = y \in \mathbb{R} \setminus \{2\}$

$$\lim_{x \to \infty} f(x) = \left[\frac{4}{\infty} + 2\right] = 2^+$$

$$\lim_{x \to -\infty} f(x) = \left[\frac{4}{-\infty} + 2\right] = 2^-$$

$$\lim_{x \to -5^+} f(x) = \left[\frac{4}{0^+} + 2\right] = \infty$$

$$\lim_{x \to -5^-} f(x) = \left[\frac{4}{0^-} + 2\right] = -\infty$$



Dominanzprinzip

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

$$\infty \cdot 0 \to \begin{cases} e^x \cdot 1/x^2 \to \infty \\ 2^{x+3} \cdot 1/2^x \to 2^3 = 8 \\ x^2 \cdot 1/10^x \to 0 \end{cases}$$

Polynomdivision

$$63124 : 12 = 5260 \text{ Rest } 4$$

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

$5260 + 4/12$

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

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

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

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

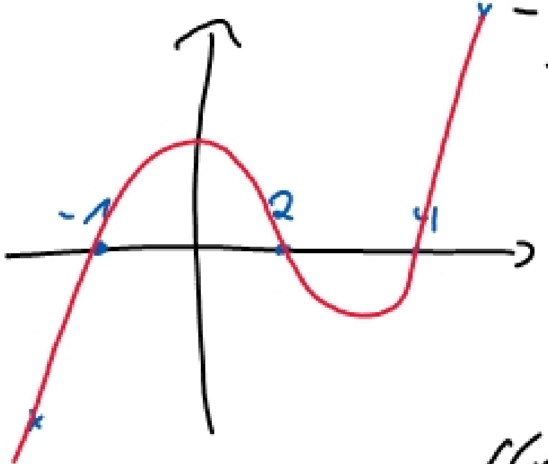
$$\begin{array}{l} -(x^3 + x^2) \\ \hline \quad / \quad -6x^2 + 2x + 8 \\ \quad -(-6x^2 - 6x) \\ \hline \qquad\qquad 8x + 8 \\ \qquad\quad -(8x + 8) \\ \hline \qquad\qquad / \quad / \end{array}$$

Satz v. Vieta

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

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

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



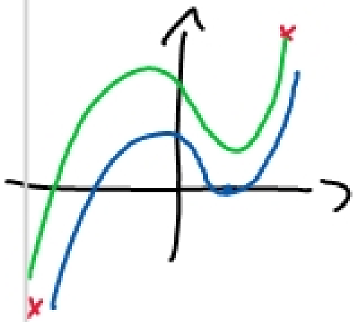
$$f(x) = -x^3 + 2x^2 + 11x - 12 = -(x^3 - 2x^2 - 11x + 12)$$

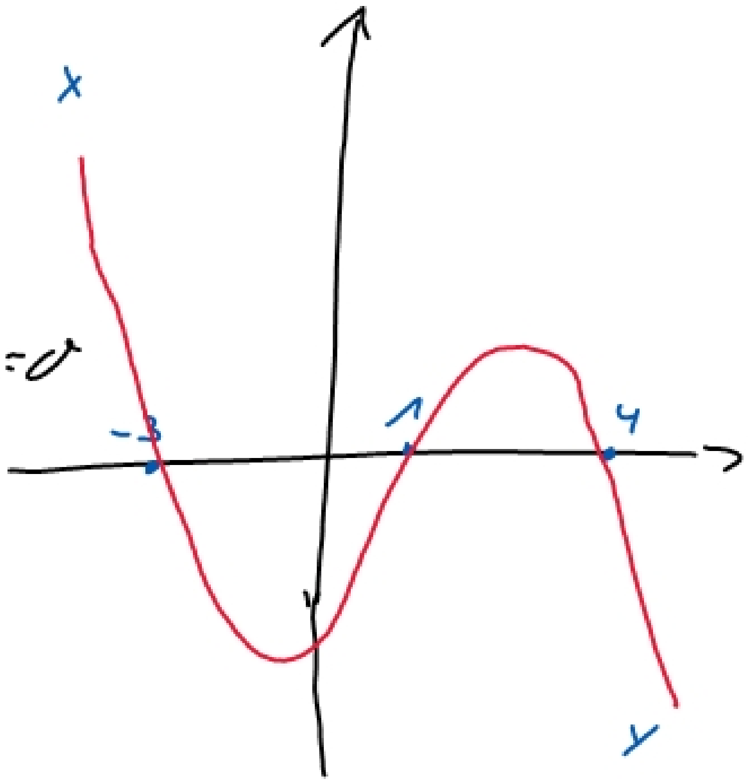
$$x = 1$$

$$(x^3 - 2x^2 - 11x + 12) : (x - 1) = x^2 - x - 12$$

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

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





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

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