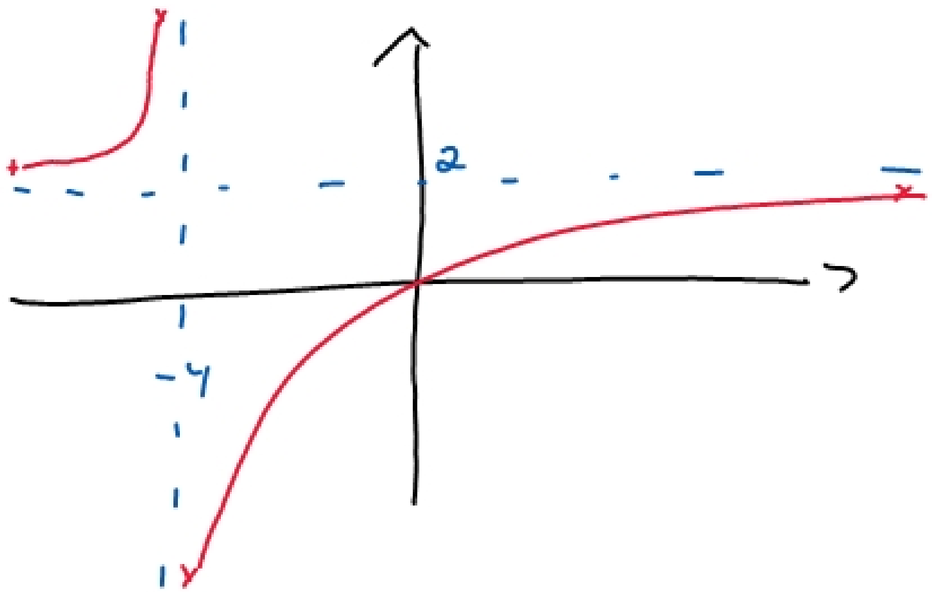
$$f(x) = 2 - \frac{3}{x+4} \quad ; \quad \mathbb{D} = \mathbb{R} \setminus \{-4\} \quad ; \quad \mathbb{W} = \mathbb{R} \setminus \{2\}$$

$$\lim_{x \to -4^+} f(x) = -\infty \quad ; \quad \lim_{x \to -4^-} f(x) = +\infty$$

$$\lim_{x \to \infty} f(x) = 2^- \quad ; \quad \lim_{x \to -\infty} f(x) = 2^+$$



$$f(x) = \frac{x+5}{4-\sqrt{6-2x}} \qquad \mathbb{D} = \mathbb{R}^{\leq 3} \setminus \{-5\}$$

$$6-2x = 0 \iff x = 3$$

$> \; 10 : \; 6-2\cdot 10 < 0$

$< \; 0 : \; 6-2\cdot 0 > 0$ ✓

$$4-\sqrt{6-2x} = 0 \qquad 1+\sqrt{6-2x}$$

$$4 = \sqrt{6-2x} \qquad |\,\uparrow^2$$

$$16 = 6-2x \qquad |-6$$

$$10 = -2x \qquad |\cdot(-\tfrac{1}{2})$$

$$x = -5$$

Nullstelle: $f(x)=0 \qquad x+5=0 \qquad x=-5$ ↯

Achsenschnittpunkt $\quad f(0) = \frac{5}{4-\sqrt{6}} \approx \frac{10}{3}$

$$f(x) = \frac{x+5}{4-\sqrt{6-2x}} \quad ; \quad \mathbb{D} = \mathbb{R}^{\leq 3} \setminus \{-5\}$$

$$\boxed{\frac{k}{\infty} = 0 \quad \Big| \quad \frac{k}{0} = \infty}$$

$$\lim_{x \to 3^-} f(x) = f(3) = 8/4 = 2$$

$$\lim_{x \to -\infty} f(x) = \frac{\cancel{x} \cdot (1 + \underbrace{5/x}_{0})}{\cancel{x} \cdot (\frac{4}{x} - \sqrt{\frac{6-2x}{x^2}})} = [1/0] = \infty$$

$$0 - 0$$

$$\lim_{x \to -5} f(x) = 0/0 \quad \longrightarrow \quad (x+5)$$

$$\underline{NR:} \quad \frac{x+5}{4-\sqrt{6-2x}} \cdot \frac{4+\sqrt{6-2x}}{4+\sqrt{6-2x}} = \frac{(x+5) \cdot (4+\sqrt{6-2x})}{16-(6-2x)}$$

$$10 + 2x$$

$$2 \cdot (x+5)$$

$$\lim_{x \to -5} \frac{4+\sqrt{6-2x}}{2} = 4 \rightarrow \text{behebare Lücke } (-5|4)$$

$f(x) = 2 - \frac{5}{1-x}$ (Hyperbel)

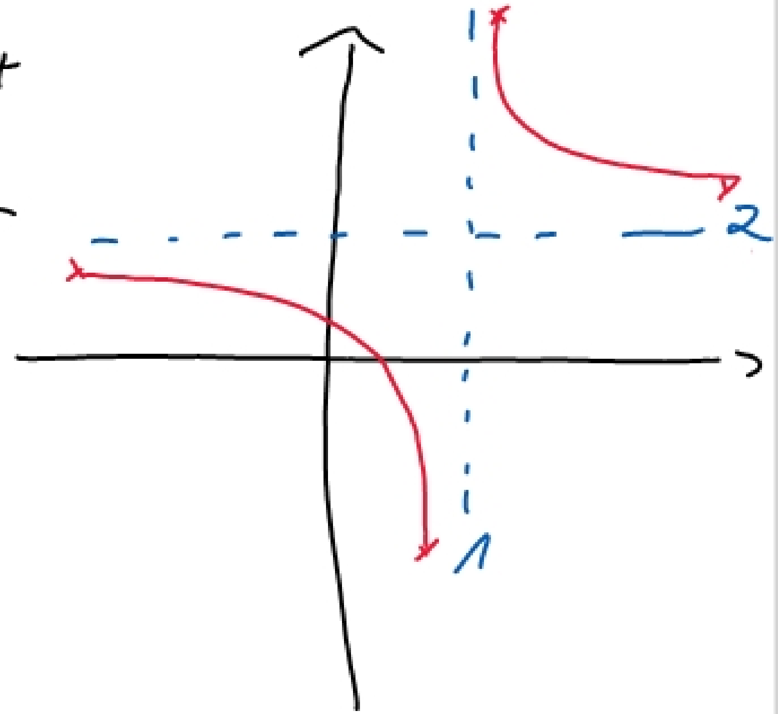
$\mathbb{D} = \mathbb{R} \setminus \{1\}$; $\mathbb{W} = \mathbb{R} \setminus \{2\}$

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

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

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

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



Polynomdivision

$21346 : 12 = 177$

-12

9346

-84

946

84

106

$M_z = \{\pm 1; \pm 2; \pm 3; \pm 4; \pm 6; \pm 8; \pm 12; \pm 24\}$

$f(x) = x^3 - 5x^2 - 2x + 24 = 0$

$x_1 = 3 : f(x) = 0 \Rightarrow (x-3)$

$$(x^3 - 5x^2 - 2x + 24) : (x-3) = \underbrace{x^2 - 2x - 8}_{(x-4)\cdot(x+2)}$$

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

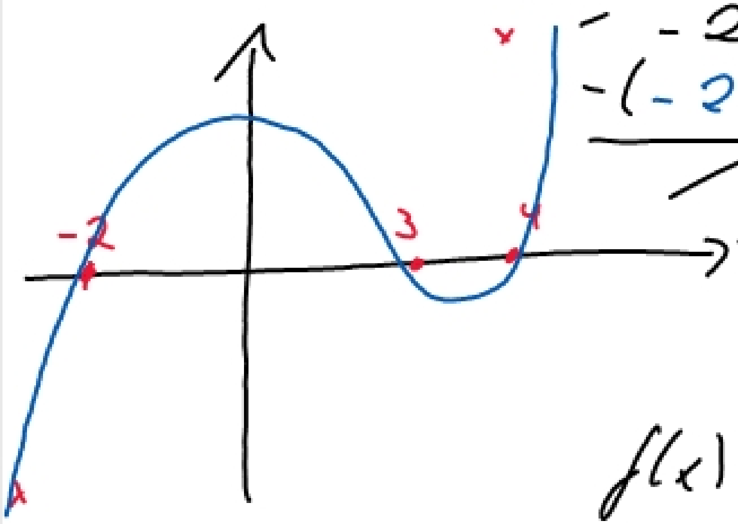
$-2x^2 - 2x + 24$

$-(-2x^2 + 6x)$

$-8x + 24$

$-(-8x + 24)$

Satz v. Vieta



$f(x) = (x-3) \cdot (x-4) \cdot (x+2)$

$f(x) = x^3 - 2x^2 - 5x + 6 \quad \to \mathbb{D};\ \mathbb{W},\ NS,\ \text{Skizze}$

↳ ganzrationales Polynom vom Grade 3

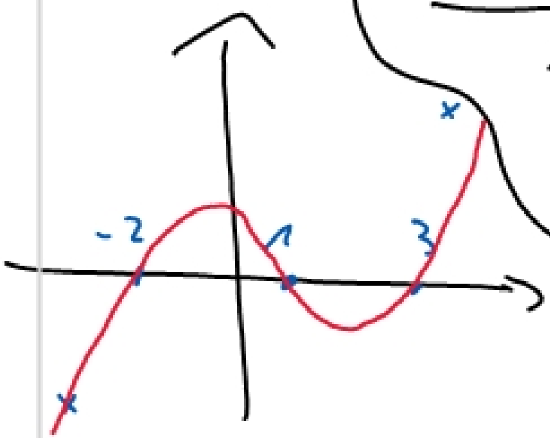
$$\mathbb{D} = \mathbb{R} \qquad \left.\begin{array}{l} \lim_{x\to\infty} f(x) = \infty \\ \lim_{x\to-\infty} f(x) = -\infty \end{array}\right\} \mathbb{W} = \mathbb{R}$$

$f(x) = 0$:

$$(x^3 - 2x^2 - 5x + 6)(x-1) = \underbrace{x^2 - x - 6}_{(x-3)(x+2)}$$

$$\begin{array}{l} -(x^3 - x^2) \\ \hline \quad -x^2 - 5x + 6 \\ \quad -(-x^2 + x) \\ \hline \qquad -6x + 6 \\ \qquad -(-6x+6) \\ \hline \qquad\quad - \end{array}$$

$$f(x) = (x-1)\cdot(x-3)\cdot(x+2)$$



$$x^2 + 4x + 3 = 0$$
$$(x+3)\cdot(x+1) = 0$$
$$\mathbb{L} = \{-3; -1\}$$

Dominanzprinzip

$$\begin{tikzcd}
 & \infty \cdot 0 \quad ? \arrow[dl, "x \to \infty"'] \arrow[d, "x \to \infty"] \arrow[dr, "x \to \infty"] & \\
\underline{e}^{x} \cdot \frac{1}{x} \arrow[d] & e^{x+2} \cdot \frac{1}{e^{x}} \arrow[d] & x^{2} \cdot \frac{1}{\underline{e}^{x}} \arrow[d] \\
\infty & e^{2} & 0
\end{tikzcd}$$