

S. 104 Nr. 1)

$$f(x) = \frac{3 \cdot (x^3 - 5x^2 - x + 5)}{-2(x^3 - 6x^2 + 3x + 10)}$$

$$D = \mathbb{R} \setminus \{ \underline{-1; 2; 5} \}$$

$$\begin{array}{r} (x^3 - 6x^2 + 3x + 10) : (x+1) = x^2 - 7x + 10 \\ \underline{-(x^3 + x^2)} \\ -7x^2 + 3x + 10 \\ \underline{-(-7x^2 - 7x)} \\ 10x + 10 \\ \underline{-(10x + 10)} \\ 0 \end{array} \quad \underbrace{\hspace{10em}}_{(x-5)(x-2)}$$

$$\underline{-(10x + 10)}$$

$$10x + 10$$

$$\underline{-(10x + 10)}$$

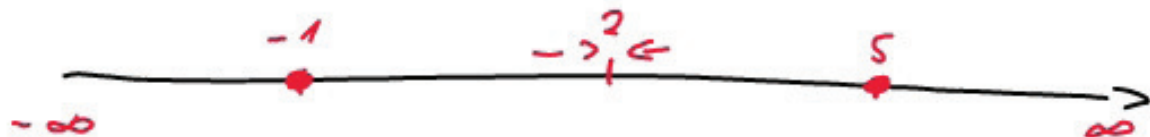
$$\begin{array}{r} (x^3 - 5x^2 - x + 5) : (x+1) = x^2 - 6x + 5 \\ \underline{-(x^3 + x^2)} \\ -6x^2 - x + 5 \\ \underline{-(-6x^2 - 6x)} \\ 5x + 5 \\ \underline{-(5x + 5)} \\ 0 \end{array} \quad \underbrace{\hspace{10em}}_{(x-1)(x-5)}$$

$$\underline{-(5x + 5)}$$

$$5x + 5$$

$$\underline{-(5x + 5)}$$

$$f(x) = \frac{3(x+1)(x-1)(x-5)}{-2(x+1)(x-2)(x-5)} = \frac{3(x-1)}{-2(x-2)} ; \mathbb{D} = \mathbb{R} \setminus \{2\}$$



$$\begin{aligned} \text{I. } \lim_{x \rightarrow -1} f(x) &= f_e(-1) = \frac{-6}{6} = -1 \\ \lim_{x \rightarrow 5} f(x) &= f_e(5) = \frac{12}{-6} = -2 \end{aligned} \left. \vphantom{\lim_{x \rightarrow -1} f(x)} \right\} \begin{array}{l} \text{behebbarer} \\ \text{Lücken} \end{array}$$

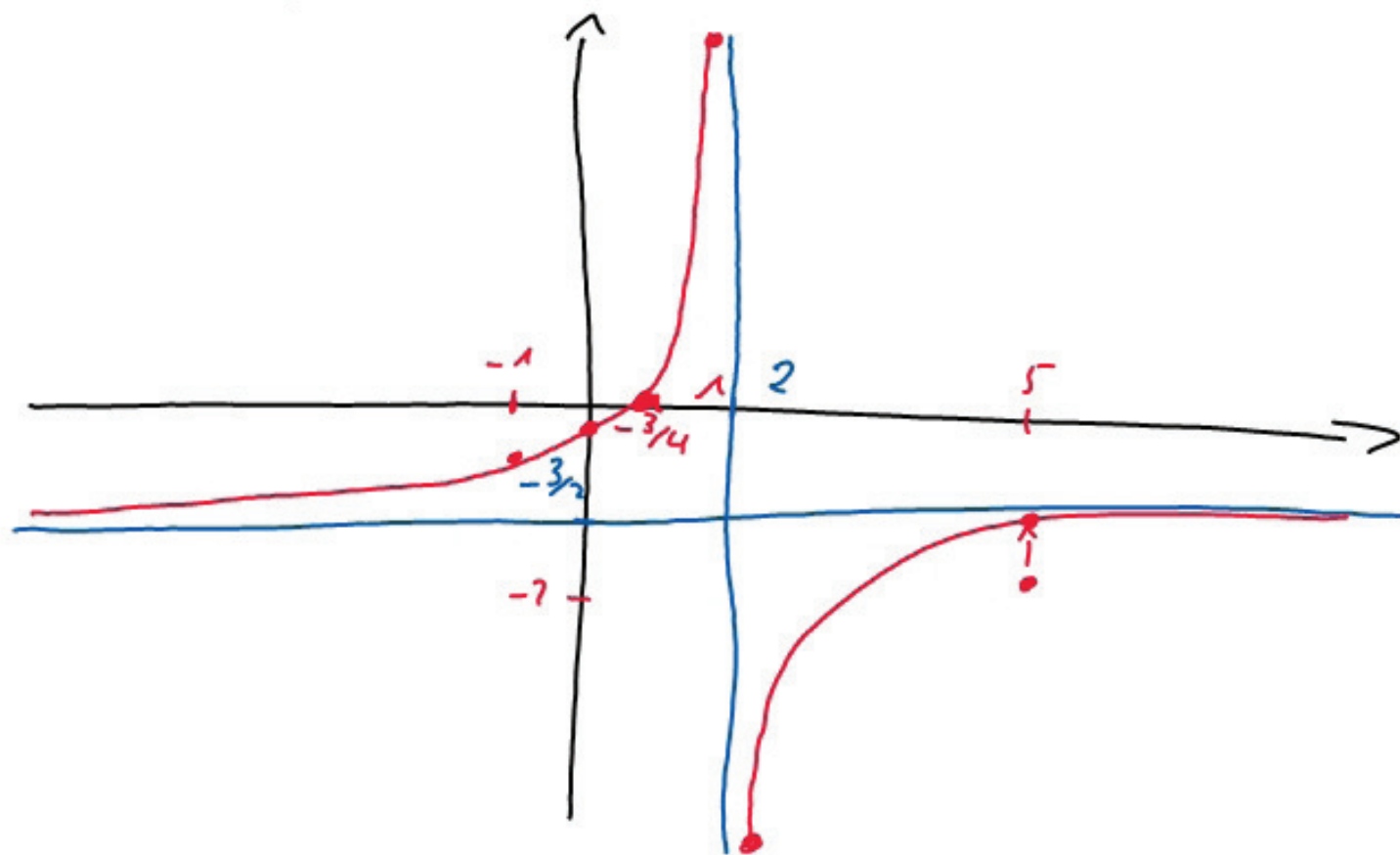
$$\begin{aligned} \text{II. } \lim_{x \rightarrow 2^+} f(x) &= \left[\frac{3}{0^-} \right] = -\infty \\ \lim_{x \rightarrow 2^-} f(x) &= \left[\frac{3}{0^+} \right] = \infty \end{aligned} \left. \vphantom{\lim_{x \rightarrow 2^+} f(x)} \right\} \text{senkrechte Asym.}$$

$$\text{III. } \lim_{x \rightarrow \infty} f(x) = \lim_{x \rightarrow \infty} \frac{x(3 - \cancel{3/x})}{x(-2 + \cancel{4/x})} = -\frac{3}{2} = \lim_{x \rightarrow -\infty} f(x)$$

$$f(x) = \frac{3(x-1)}{-2(x-2)}, \quad D = \mathbb{R} \setminus \{2\}$$

y-Achse: $x=0$
 $f(0) = \frac{-3}{4} = -\frac{3}{4}$

x-Achse: $f(x)=0$
 $x=1$



S 109 Nr. 1)

$$\begin{aligned} \text{I. } \lim_{x \rightarrow 2^+} f(x) &= 2 - 4 = f(2) = -2 \\ \lim_{x \rightarrow 2^-} f(x) &= -4a + 1 \end{aligned} \quad \left. \vphantom{\lim_{x \rightarrow 2^+} f(x)} \right\} \Rightarrow -2 = -4a + 1$$
$$a = 3/4$$

\Rightarrow stetig

$$\text{II. } f'(x) = \begin{cases} -2ax & ; x < 2 \\ 1 & ; x \geq 2 \end{cases}$$

$$\begin{aligned} \lim_{x \rightarrow 2^+} f'(x) &= 1 \\ \lim_{x \rightarrow 2^-} f'(x) &= -4a \end{aligned} \quad \left. \vphantom{\lim_{x \rightarrow 2^+} f'(x)} \right\} \Rightarrow 1 = -4a$$
$$a = -1/4$$

$$1 = -3$$

$f \Rightarrow$ nicht differenzierbar

\neq

S 109 Nr. 2

$$f(x) = \begin{cases} ax + 5 & ; x < 1 \\ x - ax^2 & ; x \geq 1 \end{cases}$$

$$\Rightarrow f'(x) = \begin{cases} a & ; x < 1 \\ 1 - 2ax & ; x \geq 1 \end{cases}$$

$$\left. \begin{aligned} \lim_{x \rightarrow 1^-} f(x) &= a + 5 \\ \lim_{x \rightarrow 1^+} f(x) &= 1 - a \end{aligned} \right\} \textcircled{=} \text{ continuity condition}$$

$$\lim_{x \rightarrow 1^+} f(x) = 1 - a$$

$$a + 5 = 1 - a$$

$$5 = 1 - 2a$$

$$5 = 1/3$$

$$\left. \begin{aligned} \lim_{x \rightarrow 1^-} f(x) &= a \\ \lim_{x \rightarrow 1^+} f'(x) &= 1 - 2a \end{aligned} \right\} = \text{differentiability condition}$$

$$\lim_{x \rightarrow 1^+} f'(x) = 1 - 2a$$

$$a = 1 - 2a$$

$$a = 1/3$$