S117

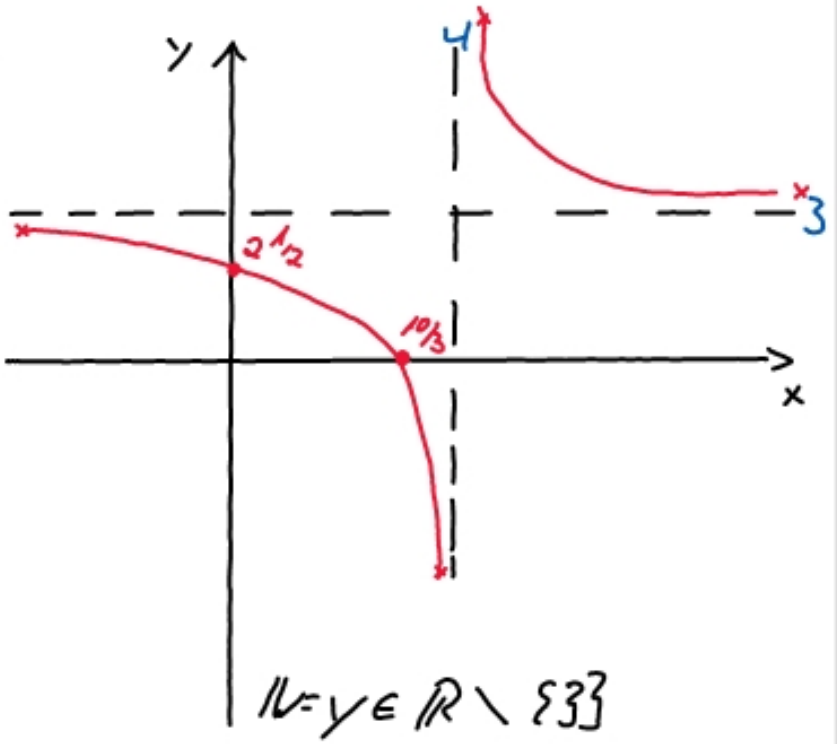
1) $f(x) = 3 + \frac{2}{x-4}$; $x-4 = 0$ $\Rightarrow$ $\mathbb{D} = x \in \mathbb{R} \setminus \{4\}$

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

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

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

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



$f(0) = 3 + \frac{2}{0-4} = 2\frac{1}{2}$ $\rightarrow$ y-Achse

x-Achse

$f(x) = 0 = 3 + \frac{2}{x-4} \quad |-3 \qquad -3 = \frac{2}{x-4} \quad |\cdot(x-4) \qquad -3x+12 = 2 \Rightarrow x = \frac{10}{3}$

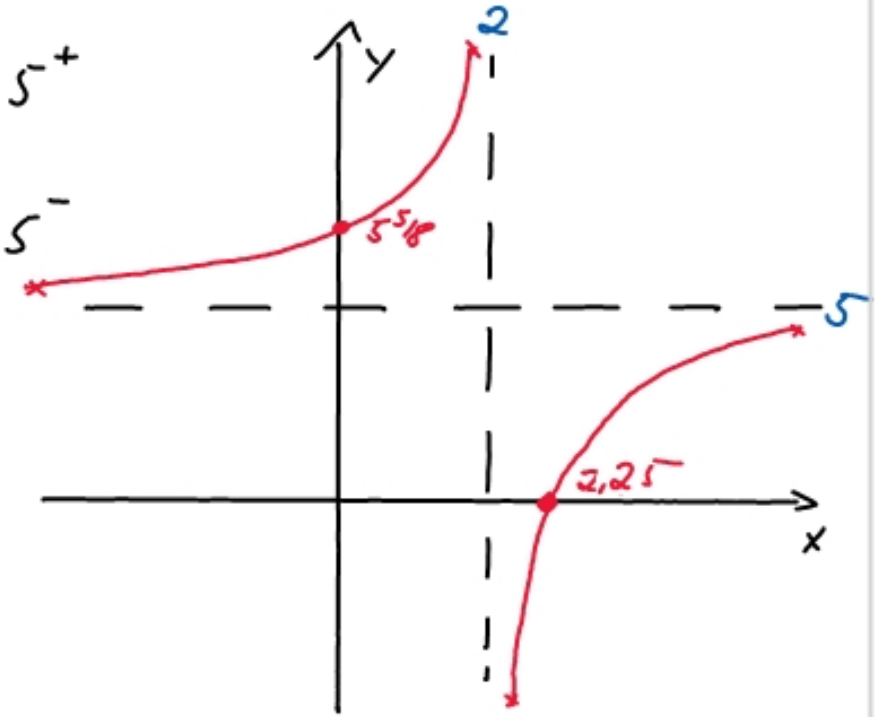
2) $f(x) = \frac{5}{8-4x} + 5$; $8-4x = 0 \Rightarrow \mathbb{D} = x \in \mathbb{R} \setminus \{2\}$

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

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

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

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



$f(0) = \frac{5}{8-0} + 5 = 5\frac{5}{8}$

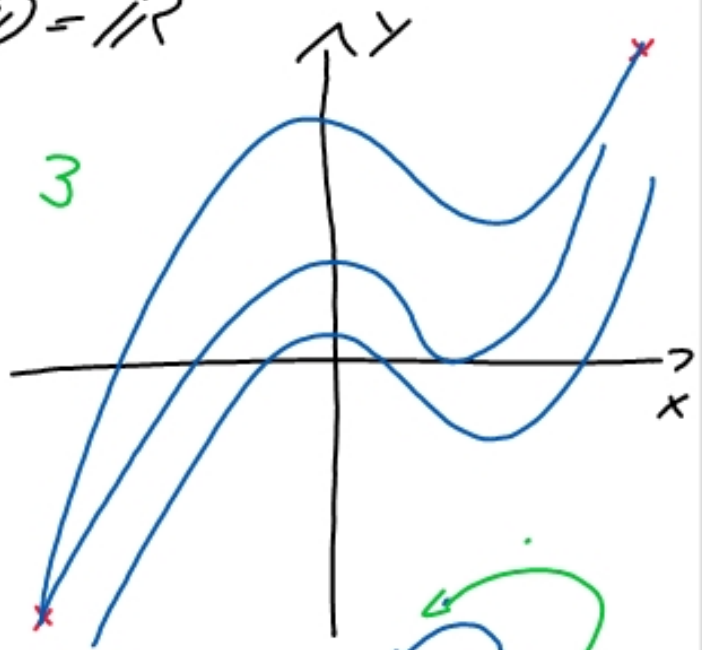
$\mathbb{W} = y \in \mathbb{R} \setminus \{5\}$

$f(x) = 0 = \frac{5}{8-4x} + 5 \quad |-5 \quad -5 = \frac{5}{8-4x} \quad |\cdot 8-4x \quad -40+20x = 5 \ldots x = 45/20$

$x = 2{,}25$

$f(x) = x^3 - 2x^2 - 5x + 6$ $\quad \mathbb{D} = \mathbb{R}$

ganzrationales Polynom vom Grade 3



$f(x) = 0$ $\quad f(x) = (x+a)(x+b)(x+c)$

$M_6 = \{\pm 1; \pm 2; \pm 3; \pm 6\}$

$f(1) = 0 \quad \rightarrow (x-1)$

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

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

$-x^2 - 5x + 6$

$-(-x^2 + x)$

$-6x + 6$

$-(-6x + 6)$

0

$f(x) = (x^2 - x - 6)(x-1)$

$a \cdot s = -6 \wedge a + s = -1$

$f(x) = (x-3)(x+2)(x-1) = 0$

$\mathbb{L} = \{-2; 1; 3\}$

$\ldots$

$23518 : 11 = 2137$

-22

1518

-11

418

$x^2 + p \cdot x + q = (x+a)\cdot(x+s) = x^2 + a\cdot x + s\cdot x + a\cdot s$

$x^2 + (a+s)\cdot x + a\cdot s$

$x^2 - 4x - 12 = (x-6)(x+2) = 0 \quad \mathbb{L} = \{-2; 6\}$

$f(x) = x^3 + x^2 - 9x - 9$

$\mu = \{\pm 1; \pm 3; \pm 9\}$

$f(1) = -16 \neq 0$

$f(-1) = 0 \Rightarrow (x+1)$

$f(x) = (x+1)\cdot(x^2-9)$

$= (x+1)(x+3)(x-3)$

$(x^3 + x^2 - 9x - 9) : (x+1) = x^2 - 9$

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

$-9x - 9$

$-(-9x - 9)$

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

5.124 $\frac{1}{2} \cdot \left(\frac{4}{3} + \frac{4}{5}\right) - \frac{2}{3} \cdot \left(\frac{3}{4} - \frac{1}{6}\right)$

$\frac{1}{2} \cdot \left(\frac{20+12}{15}\right) - \frac{2}{3} \cdot \left(\frac{9-2}{12}\right)$

$\frac{1}{2} \cdot \frac{32}{15} - \frac{2}{3} \cdot \frac{7}{12} = \frac{16}{15} - \frac{7}{18}$

$\frac{96-35}{3 \cdot 5 \cdot 6} = \frac{61}{90}$

$\frac{\frac{2}{5} + \frac{4}{3}}{\frac{4}{5} - \frac{10}{13}} = \frac{\frac{6+20}{15}}{\frac{52-50}{65}} = \frac{\frac{26}{15}}{\frac{2}{65}} = \frac{26}{15} \cdot \frac{65}{2} = \frac{169}{3}$

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