S1/7

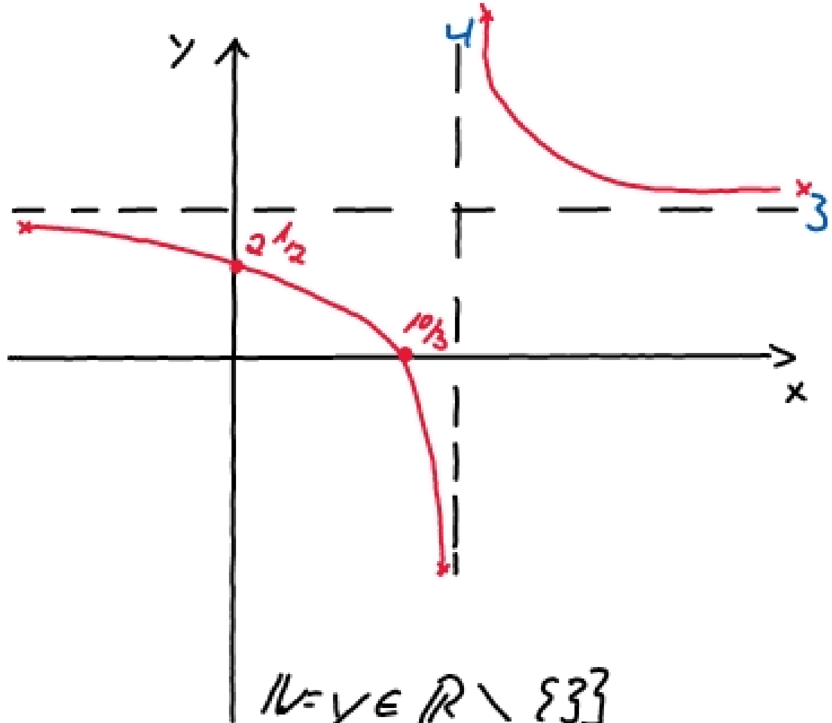
1) $f(x) = 3 + \frac{2}{x-4}$; $x-4 = 0 \Rightarrow \mathbb{D} = x \in \mathbb{R} \setminus \{4\}$

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

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

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

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



$\mathbb{W} = y \in \mathbb{R} \setminus \{3\}$

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

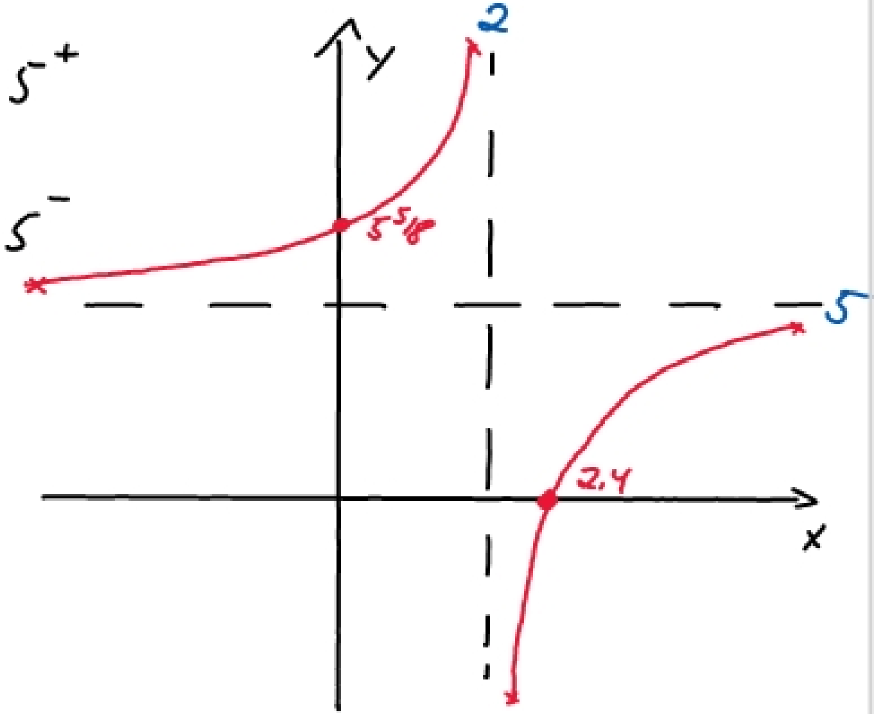
x-Achse

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

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

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

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



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

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

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

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

$f(x) = 0 = \frac{5}{8-4x} + 5 \quad | -5 \quad -5 = \frac{8}{8-4x} \quad | \cdot 8-4x \quad -40+20x = 8 \quad .. \quad x = \frac{48}{20}$

$x = \underline{\underline{2{,}4}}$

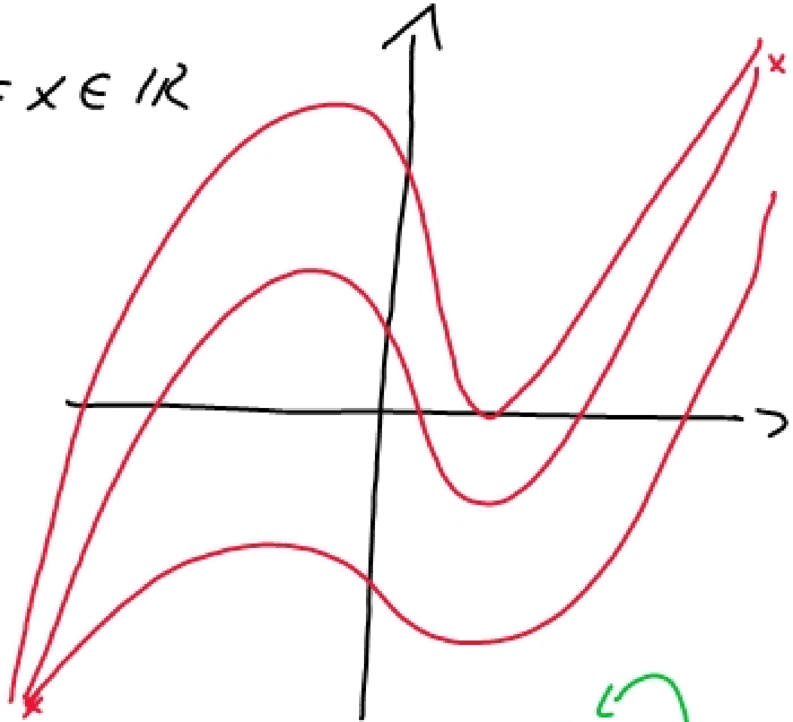
$f(x) = x^3 - 2x^2 - 5x + 6 \qquad \mathbb{D} = x \in \mathbb{R}$

$\to (x^2 - x - 6)(x - 1)$

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

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

$f(1) = 0 \to (x-1)$



$$
\begin{aligned}
(x^3 - 2x^2 - 5x + 6) &: (x-1) = x^2 - x - 6 \\
-(x^3 - x^2) & \\
/ \quad -x^2 - 5x + 6 & \\
-(-x^2 + x) & \\
/ \quad -6x + 6 & \\
-(-6x + 6) & \\
/ \qquad / &
\end{aligned}
$$

↓ Vieta

$a \cdot b = -6$

$a + b = -1$

$(x+2) \cdot (x-3)$

$$
\begin{aligned}
&123456 : 11 = 11 \\
&-11 \\
&\;\;13456 \\
&\;\;-11 \\
&\;\;\;\;2456
\end{aligned}
$$

$$x^2 + \underline{p}\cdot x + \underline{q} = (x+a)\cdot(x+b) = x^2 + a\cdot x + b\cdot x + a\cdot b$$

$$= x^2 + \underline{(a+b)}\cdot x + \underline{a\cdot b}$$

$f(x) = x^3 + 3x^2 - 4x - 12$ $\qquad$ $f(x) = 0$

$f(1) = -12$ $\qquad$ $M_{12} = \{\pm 1;\ \pm 2;\ \pm 3;\ \pm 4;\ \pm 6;\ \pm 12\}$

$f(2) = 0 \rightarrow (x-2)$

$$
\begin{array}{l}
(x^3 + 3x^2 - 4x - 12) : (x-2) = x^2 + 5x + 6 \\
\underline{-(x^3 - 2x^2)} \\
\quad / \quad 5x^2 - 4x - 12 \\
\quad\ \ \underline{-(5x^2 - 10x)} \\
\qquad / \quad 6x - 12 \\
\qquad\ \ \underline{-(6x - 12)} \\
\qquad\qquad — \quad —
\end{array}
$$

a	b
1	6
-1	-6
2	3
-2	-3

$\Downarrow$

$(x+2)(x+3)$

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

$f(x) = 0 \qquad \mathbb{L} = \{-3;\ -2;\ 2\}$

S 124

$$\frac{1}{2}\cdot\left(\frac{4}{3}+\frac{4}{5}\right)-\frac{2}{3}\cdot\left(\frac{3}{4}-\frac{1}{6}\right) \qquad \frac{1}{6}\overset{\cdot 2}{=}\frac{2}{12} \quad \frac{3}{4}\overset{\cdot 3}{=}\frac{9}{12}$$

$$\frac{1}{2}\cdot\left(\frac{20+12}{15}\right)-\frac{2}{3}\cdot\left(\boxed{\frac{9-2}{12}}\right)=\frac{32}{30}-\frac{14}{36}$$

$$\frac{16}{15}-\frac{7}{18}=\frac{96-35}{3\cdot5\cdot6}=\frac{61}{90}$$

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