Nr. 4) $f_1(x) = \frac{1}{1+x^2}$; $\mathbb{D}_f = \mathbb{R}$; keine Polstelle ; keine Nullstelle
waagr. Asymptote $y = 0 \Rightarrow f_1(x) \to D$

$f_2(x) = \frac{x}{1-x}$; $\mathbb{D}_f = \mathbb{R} \setminus \{1\}$; Polstelle $x_1 = 1$; Nullstelle $x_2 = 0$
senkr. Asymptote $x = 1$; waagr. Asymptote $y = -1 \Rightarrow f_2(x) \to B$

$f_3(x) = \frac{x^2}{1 - \frac{1}{2}x^2} = \frac{x^2}{(1 - \frac{1}{\sqrt{2}}x) \cdot (1 + \frac{1}{\sqrt{2}}x)}$ $\mathbb{D}_f = \mathbb{R} \setminus \{-\sqrt{2}; +\sqrt{2}\}$

Nullstelle $x_1 = 0$; Polstellen $x_2 = -\sqrt{2}$; $x_3 = +\sqrt{2}$
$\Rightarrow$ senkr. Asymptoten $x = -\sqrt{2}$; $x = +\sqrt{2}$
waagr. Asymptote $y = -2 \Rightarrow f_3(x) \to A$

$f_4(x) = \frac{2x-2}{x+1}$; $\mathbb{D}_f = \mathbb{R} \setminus \{-1\}$; Polstelle $x_1 = -1$
senkr. Asymptote $x = -1$; Nullstelle $x_2 = 1$
waagr. Asymptote $y = 2 \Rightarrow f_4(x) \to C$

$f_5(x) = \frac{x^2}{x^2-1} = \frac{x^2}{(x+1)\cdot(x-1)}$; $\mathbb{D}_f = \mathbb{R} \setminus \{-1; +1\}$

Polstellen $x_1 = -1$; $x_2 = +1$; Nullstellen $x_3 = 0$
Senkr. Asymptoten $x = -1$; $x = 1$
waagr. Asymptoten $y = 1 \Rightarrow f_5(x) \to E$

$f_6(x) = \frac{3x}{1+x}$; $\mathbb{D}_f = \mathbb{R} \setminus \{-1\}$

Polstelle $x_1 = -1 \Rightarrow$ senkr. Asymptote $x = -1$
Nullstelle $x_2 = 0$
waagr. Asymptote $y = 3 \Rightarrow f_6(x) \to F$