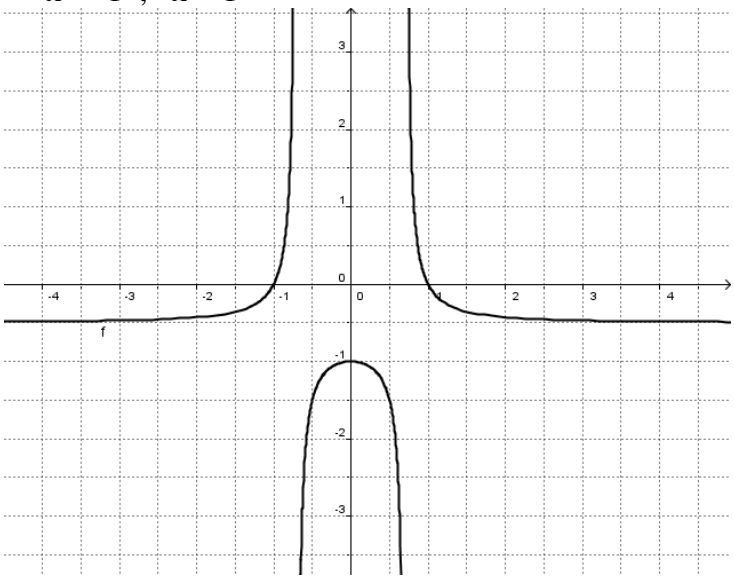
Klasse	Art	Schwierigkeit	Thema	S. 25
11	**Üben**	**XX**	**Gebrochen-rationale Funktionen 3**	**10**

a) $f(x) = \frac{1-x^2}{2x^2-1}$, $D_f = \mathbb{R} \setminus \{ -\sqrt{\frac{1}{2}}; \sqrt{\frac{1}{2}} \}$

$f(-x) = \frac{1-(-x)^2}{2(-x)^2-1} = \frac{1-x^2}{2x^2-1} = f(x)$ => Symmetrie bzgl. der Y-Achse

Asymptoten: $x = -\sqrt{\frac{1}{2}}$; $x = \sqrt{\frac{1}{2}}$; $y = -0{,}5$

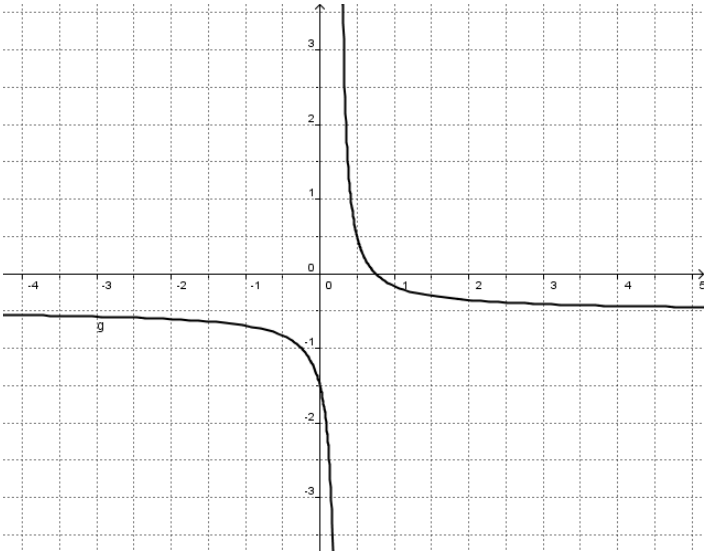
Nullstellen: $x = -1$; $x = 1$



b) $g(x) = \frac{1{,}5-2x}{4x-1}$, $D_g = \mathbb{R} \setminus \{ \frac{1}{4} \}$

$g(-x) = \frac{1{,}5+2x}{4x+1}$ => keine Symmetrie bzgl. des Koordinatensystems

Asymptoten: $x = \frac{1}{4}$; $y = -0{,}5$; Nullstelle: $x = \frac{3}{4}$



c) $h(x) = x - \frac{1}{2} + \frac{1}{4x+3}$, $D_g = \mathbb{R} \setminus \{-\frac{3}{4}\}$

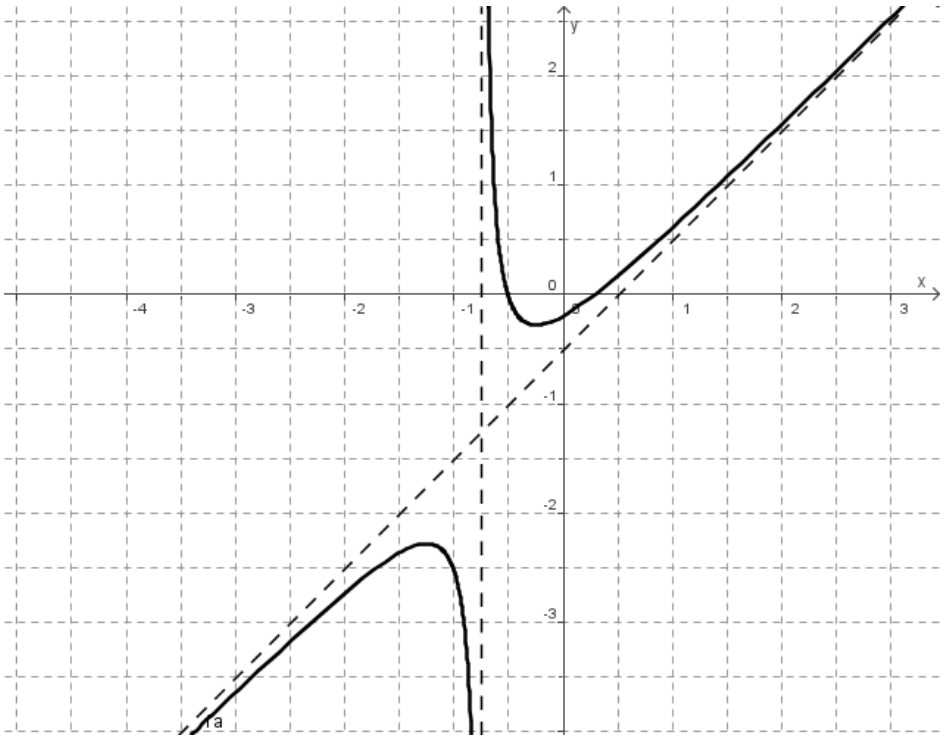
$h(-x) = -x - \frac{1}{2} + \frac{1}{-4x+3}$ => keine Symmetrie bzgl. des Koordinatensystems

Asymptoten: $x = -\frac{3}{4}$; $y = x - \frac{1}{2}$;

Nullstelle? $h(x) = x - \frac{1}{2} + \frac{1}{4x+3} = \frac{(x-\frac{1}{2})(4x+3)+1}{4x+3} =$

$$\frac{4x^2+3x-2x-1{,}5+1}{4x+3} = \frac{4x^2+x-0{,}5}{4x+3} = 0$$

Löse: Zähler = 0 $\Rightarrow$ Nullstellen : $x = -\frac{1}{2}$; $x = \frac{1}{4}$



d) $f(x) = \frac{4x}{x^2+1}$, $D_f = \mathbb{R}$

$f(-x) = \frac{-4x}{(-x)^2+1} = -\frac{4x}{x^2+1} = -f(x)$ => Punktssymmetrie zum Ursprung

Asymptote: y = 0 (x-Achse) ;

Nullstelle ? x = 0