$f: \mathbb{R} \to \mathbb{R},\ x \mapsto f(x) = \frac{1-x}{x^2}$

1) Def-Menge $\qquad x^2 \neq 0$

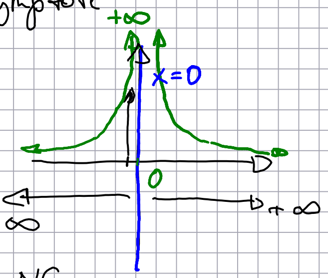
$D = \mathbb{R} \setminus \{0\}$

2) Asymptoten / Verh. an ∞

$x=0$ Polstelle $\leftrightarrow$ senkr. Asymptote

$\lim_{x\to 0^-} f(x) = \frac{\oplus}{\oplus} = +\infty$

$\lim_{x\to 0^+} f(x) = +\infty$



$\lim_{x\to \infty} f(x) = 0 \qquad ZG < NG$

$\lim_{x\to -\infty} f(x) = 0$

$ZG=NG: f(x) = \frac{2x^2+1}{3x^2-x} \to \frac{2}{3}$

3) $f(x) = \frac{1-x}{x^2}$

$f = 1-x \qquad f' = -1 \qquad f'g - fg'$

$g = x^2 \qquad g' = 2x$

$f'(x) = \frac{-1\cdot x^2 - (1-x)\cdot 2x}{x^4} = \frac{-x^2-2x+2x^2}{x^4} = \frac{x^2-2x}{x^4}$

$f'(x) = \frac{x-2}{x^3}$

$f''(x) = \frac{1\cdot x^3 - (x-2)\cdot 3x^2}{x^6}$

$f''(x) = \frac{x^3 - 3x^3 + 6x^2}{x^6} = \frac{-2x^3+6x^2}{x^6} = \frac{\cancel{x^2}(-2x+6)}{x^{\cancel{6}4}}$

$f''(x) = \frac{-2x+6}{x^4}$

4) Nullstellen

$f(x) = 0 = \frac{1-x}{x^2} \quad / \cdot x^2$

$0 = 1-x \quad \Rightarrow x = 1 \qquad N(1|0)$

5) Extrema

$f'(x) = \frac{x-2}{x^3} = 0 \Rightarrow x-2=0$

$x = 2 \Rightarrow y = f(2) = \frac{1-2}{2^2} = -\frac{1}{4}$

$E(2|-\frac{1}{4})$ T

$f''(2) = \frac{-2\cdot 2+6}{2^4} > 0 \to T$ / min

6) Wendepunkt

$$f''(x) = \frac{-2x+6}{x^3} = 0 \Rightarrow -2x+6 = 0$$

$$x = 3 \Rightarrow y = f(3) = \frac{1-3}{3^2} = -\frac{2}{9}$$

$$W\left(3 \middle| -\frac{2}{9}\right)$$

7) Wendetangente

$$t_w: \quad y = k \cdot x + d \qquad k_w = f'(3) = \frac{3-2}{3^3} = \frac{1}{27}$$

$$-\frac{2}{9} = \frac{1}{\cancel{27}\,9} \cdot \cancel{3} + d \quad \Big| -\frac{1}{9}$$

$$-\frac{3}{9} = d = -\frac{1}{3} \qquad \Rightarrow t_w: \quad y = \frac{1}{27} \cdot x - \frac{1}{3}$$

8) Graph