Kurvendiskussion

S. 77 / 3e)

$$f(x) = \frac{4+x^2}{x^2-9} = \frac{x^2+4}{(x+3)(x-3)}$$

$\mathbb{D} = \mathbb{R} \setminus \{-3; 3\}$

$f(x) = f(-x)$

$= \frac{4+(-x)^2}{(-x)^2-9} = f(x) \rightarrow$ achsensymmetrisch

$f(0) = -\frac{4}{9} \rightarrow P(0|-\frac{4}{9})$

$x^2+4 = 0 \quad |-4$

$x^2 = -4 \quad |\sqrt{\ldots}$ ↯ → keine NSt.

$\lim\limits_{x \to \pm\infty} \frac{4+x^2}{x^2-9} = 1 \quad (ZG = NG)$

$\lim\limits_{x \geq 3} \frac{4+x^2}{x^2-9} = -\infty \qquad \lim\limits_{x \leq 3} \frac{4+x^2}{x^2-9} = +\infty$

// Analog für $x \to -3$

$u = x^2+4 \qquad v = x^2-9$

$u' = 2x \qquad v' = 2x$

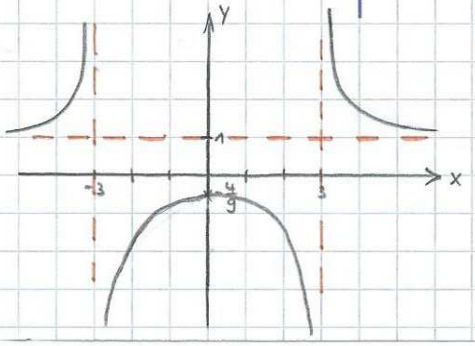
$f'(x) = \frac{u' \cdot v - u \cdot v'}{v^2} = \frac{2x(x^2-9)-(x^2+4)\cdot 2x}{(x^2-9)^2} = \frac{2x^3-18x-2x^3-8x}{(x^2-9)^2} =$

$= \frac{-26x}{(x^2-9)^2}$;

$-26x = 0 \quad |:(-26)$

$x = 0 \rightarrow$ Extremum

x	$-\infty<x<-3$	$x=-3$	$-3<x<0$	$x=0$	$0<x<3$	$x=3$	$3<x<+\infty$
f'	+	/	+	0	-	/	-
f	SMS	Def.-Lü.	SMS	Max. $(0\|-\frac{4}{9})$	SMF	Def.-L.	SMF



$W =]-\infty; -\frac{4}{9}] \cup]1; +\infty[$