

F12T1 1. Schulaufgabe am 13.12.06

1.1 $f_a(x) = \frac{x^2 - a^2}{2x + 2} = \frac{(x+a)(x-a)}{2(x+1)}$; $a \geq 0$

$D = \mathbb{R} \setminus \{-1\}$; $x_1 = -1$ Def. Lücke

Nicht behebbbar für $a \neq 1$

Für $a = 1$:

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

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1.2 $\frac{(x^2 - a^2)}{-(x^2 + x)} : (2x + 2) = \frac{1}{2}x - \frac{1}{2} + \frac{1-a^2}{2x+2}$

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

Schräge $y = \frac{1}{2}x - \frac{1}{2}$
 Senkr. $x = -1$ } beide unabh. von a

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1.3 $f'_a(x) = \frac{(2x+2) \cdot 2x - (x^2 - a^2) \cdot 2}{[2(x+1)]^2} = \frac{4x^2 + 4x - 2x^2 + 2a^2}{4(x+1)^2}$

$$= \frac{2(x^2 + 2x + a^2)}{2 \cdot 2(x+1)^2}$$

$$x^2 + 2x + a^2 = 0 ; D = 4 - 4a^2$$

TEP : Do. NST v. $f'_a(x) \Rightarrow D \stackrel{!}{=} 0$

Also: $4 - 4a^2 = 0 \Leftrightarrow a^2 = 1 \Leftrightarrow a_{1/2} = (\pm)1$ ($a_2 = -1 \notin Da$)

Für $a = 1$: $\bar{f}_1(x) = \frac{1}{2}x - \frac{1}{2}$ hat keinen TEP!

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1.4.1. $f'(x) = \frac{x^2 + 2x}{2(x+1)^2}$; $D = \mathbb{R} \setminus \{-1\}$

$$Z(x) = x(x+2) = 0 \Rightarrow x_1 = 0 ; x_2 = -2 \text{ einf. m. vzw}$$

	-2	-1	0		
vZ $Z(x)$	+	0	-	0	+
vZ $N(x)$	+	+	+	+	+
vZ f'	+	0	-	0	+

Gf SMS H Suff. TIP EMS

$$f(0) = 0 \Rightarrow \text{TIP } (0|0) = N(0|0)$$

$$f(-2) = \frac{4}{-2+2} = -2 \Rightarrow \text{HOP } (-2|2)$$

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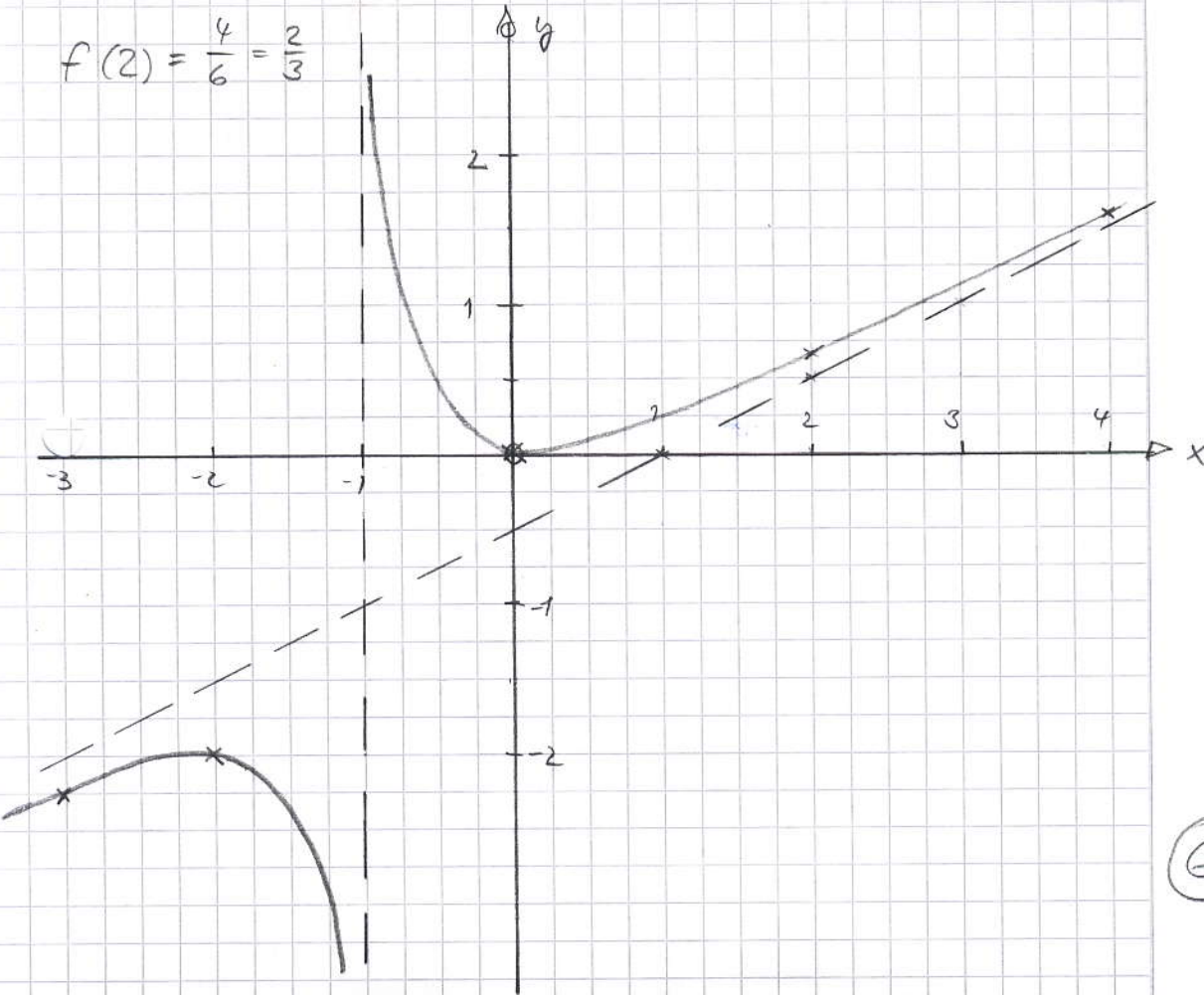
1.4.2 $x = -1$ senkr. As.

$y = \frac{1}{2}x - \frac{1}{2}$ schräge As.

$N(0|0) = TP(0|0)$; HOP $(-2|-2)$

$$f(-3) = \frac{9}{-6+2} = -\frac{9}{4} = -2,25; \quad f(4) = \frac{16}{8+2} = \frac{8}{5} = 1,6$$

$$f(2) = \frac{4}{6} = \frac{2}{3}$$



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