

Mustertlös 1. SA - Mathe 13.11.16

1) $f(x) = \frac{(x+3)^2}{4(1-x)}$

1.1) $D = \mathbb{R} \setminus \{1\}$ ✓

$x_1 = 1$ Polstelle 1. Ord mit VZW ✓

Nst: $(x+3)^2 = 0$

$x_{1/2} = -3$ ✓ Nst 2. Ord

(3 BE)

1.2) für $x \xrightarrow{< >} 1 \Rightarrow f(x) = \frac{(x+3)^2}{4(1-x)} \rightarrow \pm \infty$ ✓
0±

(2 BE)

1.3) $\frac{(x^2+6x+9)}{(x^2-x)} : (-4x+4) = -\frac{1}{4}x - \frac{7}{4} + \frac{16}{4(1-x)} = f(x)$ ✓

$$\begin{array}{r} 7x+9 \\ -(7x-7) \\ \hline 16 \end{array}$$

(2 BE)

1.4) $x=1$ ✓ senkr. Asymptote

$f_x(x) = -\frac{1}{4}x - \frac{7}{4}$ ✓ schiele Asymptote

(2 BE)

1.5) $f'(x) = \frac{4(1-x) \cdot 2(x+3) - (x+3)^2 \cdot (-4)}{16(1-x)^2}$

$$= \frac{2x+6-2x^2-6x+x^2+6x+9}{4(1-x)^2}$$
 ✓

$f'(x) = \frac{-x^2+2x+15}{4(1-x)^2}$ ✓

$-x^2+2x+15=0$ ✓

$D = 4 + 4 \cdot 15 = 64$ ✓

$x_{1/2} = \frac{-2 \pm 8}{-2}$ ✓ $x_1 = -3$ ✓ $x_2 = 5$ ✓

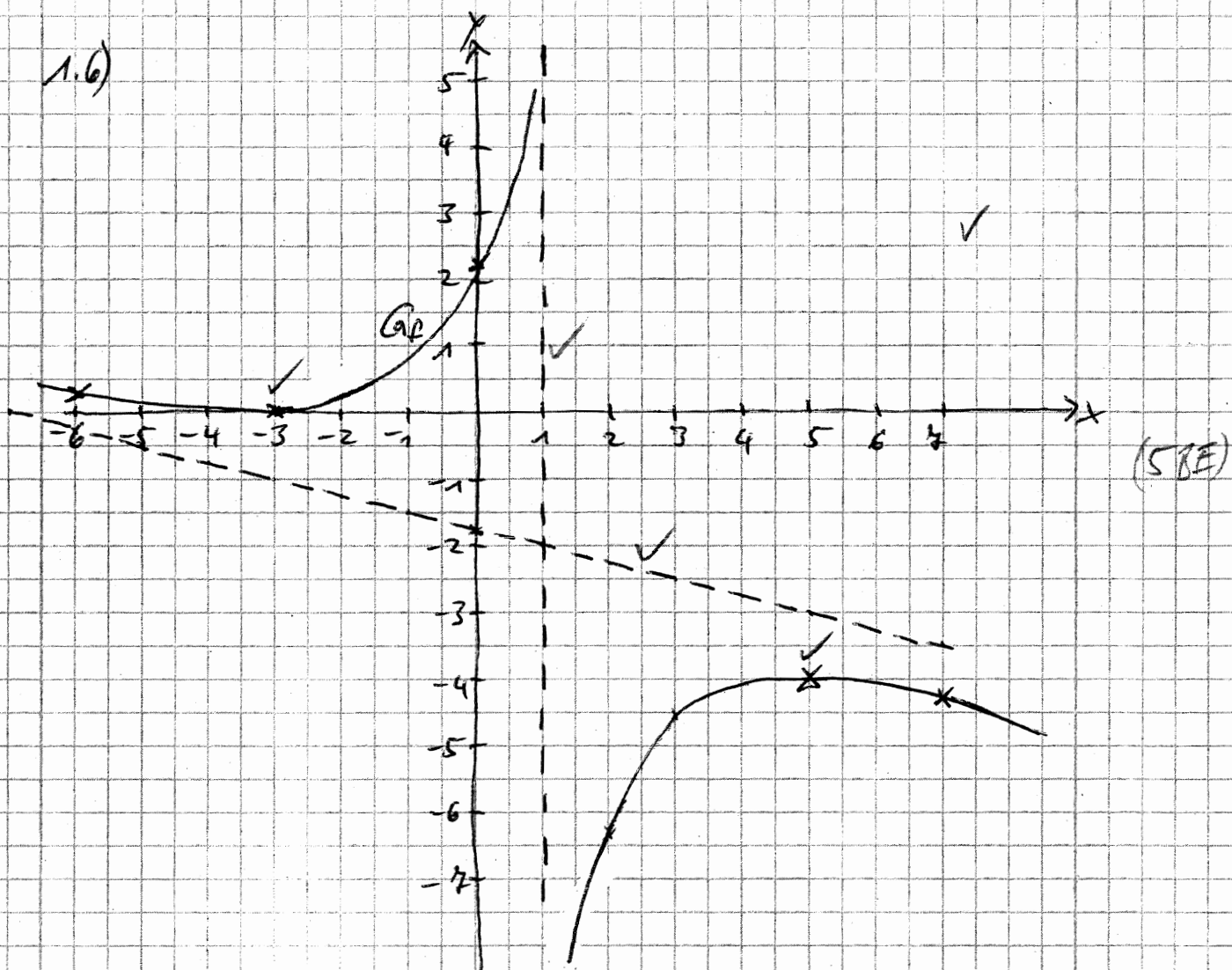
(3 BE)

x	$x < -3$	-3	$-3 < x < 1$	1	$1 < x < 5$	5	$x > 5$	✓
f(x)	-	0	+	4	+	0	-	✓
Homo	\	-	/	↓	/	↓	\	✓
Art		TIP				HOP		✓

$f(-3) = 0$ ✓ $\Rightarrow$ TIP(-3|0) ✓

$f(5) = -4$ ✓ $\Rightarrow$ HOP(5|-4) ✓

1.6)



$$2.) A = \int_2^6 (h(x) - h_1(x)) dx = \int_2^6 \frac{2}{(1-x)^2} dx = \left[\frac{2}{1-x} \right]_2^6$$

$$= -\frac{2}{3} + 2 = \frac{8}{3} = 1,6 \text{ FE}$$

(5 BE)

(228 BE)