

Musterlösung 1-SA (A)

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

1. $2x-1=0 \quad x=\frac{1}{2} \quad \mathbb{D}=\mathbb{R} \setminus \{\frac{1}{2}\} \quad N(0|0) \text{ dreifach}$

2. $x=\frac{1}{2}$ Polstelle ohne VZW ✓

$\lim_{x \rightarrow \frac{1}{2}^-} f(x) = \infty \quad \lim_{x \rightarrow \frac{1}{2}^+} f(x) = \infty$

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

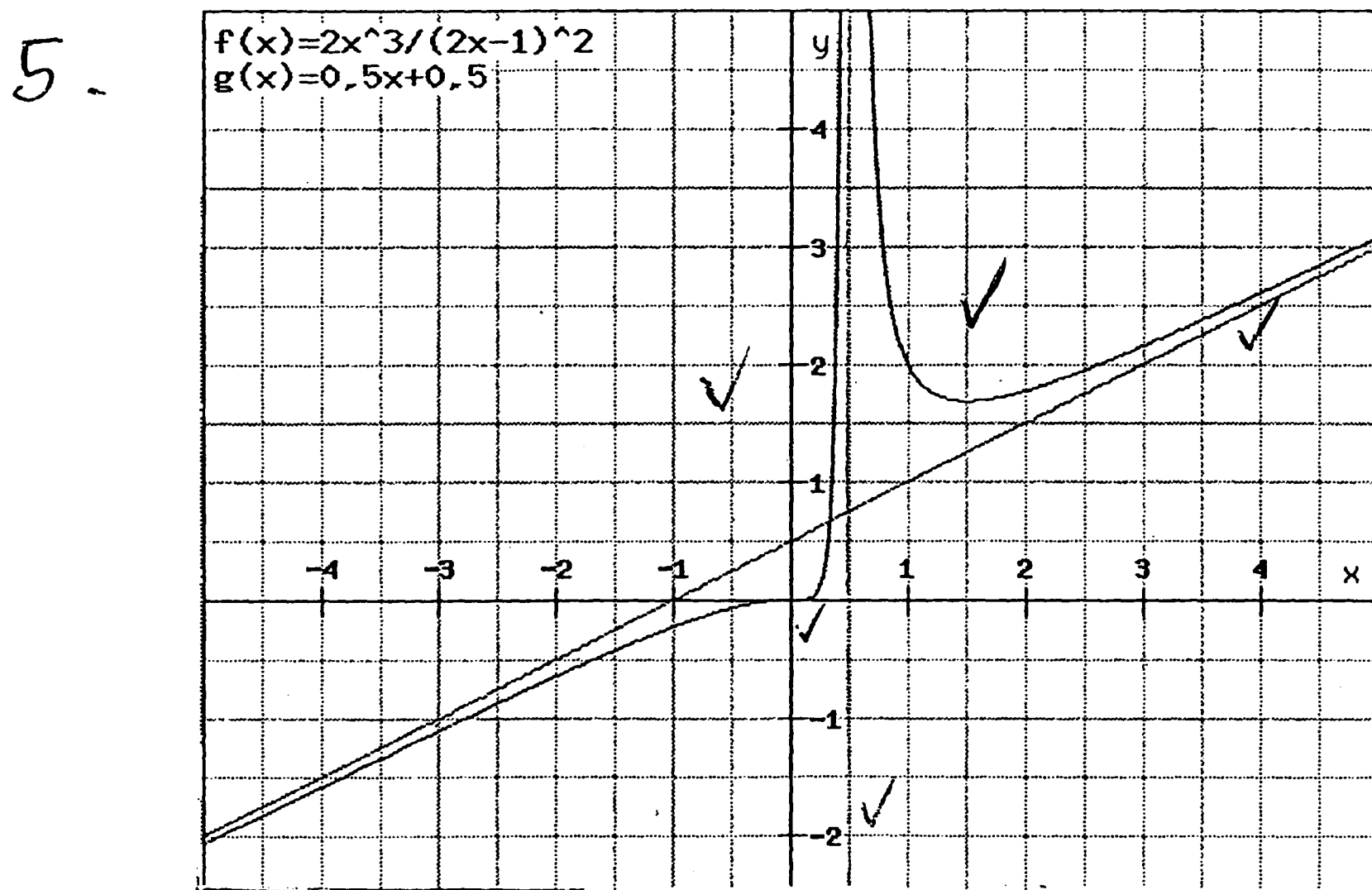
$$\begin{array}{r} 2x^3 \\ - (2x^3 - 2x^2 + \frac{1}{2}x) \\ \hline 2x^2 - \frac{1}{2}x \\ - (2x^2 - 2x + \frac{1}{2}) \\ \hline \frac{3}{2}x - \frac{1}{2} \end{array}$$

$y = \frac{1}{2}x + \frac{1}{2}$
 $x = \frac{1}{2}$

$\frac{3}{2}x - \frac{1}{2} = 0 \quad x = \frac{1}{3} \quad S(\frac{1}{3} | \frac{2}{3})$

4. $f'(x) = \frac{6x^2(2x-1)^2 - 2x^3 \cdot 2(2x-1) \cdot 2}{(2x-1)^4} = \frac{12x^3 - 6x^2 - 8x^3}{(2x-1)^3} = \frac{4x^3 - 6x^2}{(2x-1)^3}$

$f'(x) = 0 \Leftrightarrow x^2(4x-6) = 0 \quad x_1 = 0 \quad x_2 = \frac{3}{2}$
 $E_1(0|0) \quad E_2(\frac{3}{2} | \approx 1,69)$



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