

## Muster-Schulaufgabe B12 NT

1.0  $f_a(x) = \frac{1}{2}x^3 - \frac{5}{2}x - a; a \in \mathbb{R}$

1.1  $a = 0$ : P-Sym. zum Ursprung

$a \neq 0$ : keine besondere Sym.

1.2  $f_a(-2) = 0 \Rightarrow \frac{1}{2} \cdot (-2)^3 - \frac{5}{2} \cdot (-2) - a = 0 \Leftrightarrow a = 1$

$$f_1(x) = \frac{1}{2}x^3 - \frac{5}{2}x - 1 = \frac{1}{2}(x^3 - 5x - 2)$$

$$\frac{1}{2} \frac{(x^3 + 0x^2 - 5x - 2) : (x + 2) = \frac{1}{2}(x^2 - 2x - 1)}{-(x^3 + 2x^2)}$$

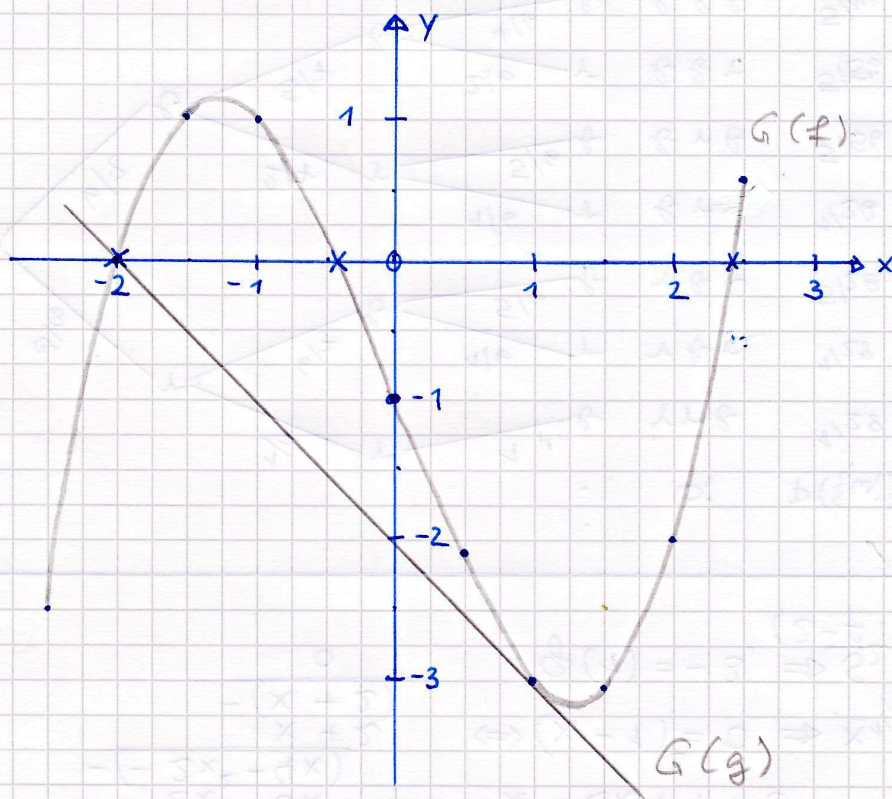
$$\begin{array}{r} -2x^2 - 5x \\ -(-2x^2 - 4x) \\ \hline -x - 2 \end{array} \quad x^2 - 2x - 1 = 0$$

$$\frac{-x-2}{-(-x-2)} \quad x_{1/2} = \frac{2 \pm \sqrt{4+4}}{2} \begin{array}{l} \nearrow x_1 = 1 + \sqrt{2} \approx 2,4 \\ \searrow x_2 = 1 - \sqrt{2} \approx -0,4 \end{array}$$

$$f_1(x) = \frac{1}{2}(x-2)(x-1+\sqrt{2})(x-1-\sqrt{2})$$

$$L = ]-2; 1-\sqrt{2}[ \cup ]1+\sqrt{2}; \infty[$$

1.3



1.4.1  $N(-2|0)$  und  $S_g(0|-2) \Rightarrow t = -2$

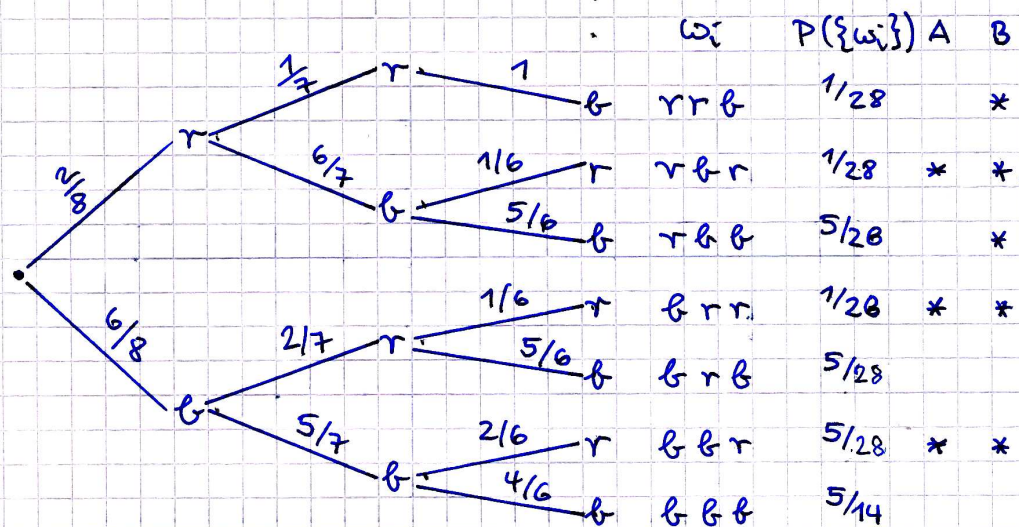
$$m = \frac{\Delta y}{\Delta x} = \frac{y_N - y_S}{x_N - x_S} = \frac{0 + 2}{-2 - 0} = -1 \Rightarrow \underline{g(x) = -x + 2}$$



1.4.2  $f_1(x) = g(x) \Rightarrow \frac{1}{2}x^3 - \frac{5}{2}x - 1 = -x - 2$   $S_1(-2|0)$   
 $\Leftrightarrow \frac{1}{2}x^3 - \frac{3}{2}x + 1 = 0 \Leftrightarrow \frac{1}{2}(x^3 - 3x + 2) = 0$ ;  $x_1 = -2$   
 $\frac{1}{2}(x^3 + 0x^2 - 3x + 2) : (x + 2) = \frac{1}{2}(x^2 - 2x + 1)$   

$$\begin{array}{r} x^3 + 0x^2 - 3x + 2 \\ -(x^3 + 2x^2) \\ \hline -2x^2 - 3x + 2 \\ -(-2x^2 - 4x) \\ \hline x + 2 \\ -(x + 2) \\ \hline 0 \end{array}$$
  
 $x^2 - 2x + 1 = 0 \Leftrightarrow (x - 1)^2 = 0 \Rightarrow x_{1/2} = 1$   
 $g(1) = -3 \Rightarrow S_2(1|-3)$   
 (2-f: Berühr.)

2.1



2.2  $\bar{B}$ : "Die erste und die letzte Kugel ist blau"

$P(B) = \frac{1}{28} + \frac{1}{28} + \frac{5}{28} + \frac{1}{28} + \frac{5}{28} = \frac{13}{28} \Rightarrow P(B) = \frac{13}{28}$

$P(A \cap \bar{B}) = 0$

3.1

	T	$\bar{T}$	
M	$\frac{12}{35}$	$\frac{17}{35} - \frac{12}{35} = \frac{5}{35} = \frac{1}{7}$	$\frac{17}{35}$
$\bar{M}$	$\frac{28}{35} - \frac{12}{35} = \frac{16}{35}$	$\frac{7}{35} - \frac{5}{35} = \frac{2}{35}$	$1 - \frac{17}{35} = \frac{18}{35}$
	$\frac{28}{35}$	$1 - \frac{28}{35} = \frac{7}{35} = \frac{1}{5}$	

$P(T) \cdot P(M) = \frac{28}{35} \cdot \frac{17}{35} = \frac{68}{175} \approx 38,9\%$  } ungleich  $\Rightarrow$

$P(T \cap M) = \frac{12}{35} \approx 34,3\%$  } stoch. abhängig

3.2  $P(T \cup \bar{M}) = \frac{12}{35} + \frac{16}{35} + \frac{2}{35} = \frac{6}{7}$