

3. Schulaufgabe M. Klassen 2017 Lösung

1.1. $(2x-4)(4-x)=0$ $2x-4=0 \Rightarrow x_1=2 \checkmark$ $4-x=0 \Rightarrow x_2=4 \checkmark$ $L=\{2; 4\} \checkmark$ (3)

1.2. $2x^2-x-1=0 \checkmark$ $D=(-1)^2-4 \cdot 2 \cdot (-1)=9 \checkmark$
 $x_{1/2} = \frac{1 \pm \sqrt{9}}{2 \cdot 2} \checkmark$ $x_1 = \frac{1+3}{4}=1 \checkmark$ $x_2 = \frac{1-3}{4}=-\frac{1}{2} \checkmark$ $L=\{-\frac{1}{2}; 1\} \checkmark$ (4)

2.1. $T(0|3)$ $N_1(-2|0)$ $N_2(6|0) \checkmark$

$f(x)=a(x-(-2))(x-6) \checkmark$ Alternativ $f(x)=ax^2+bx+c$

$3=a(0+2)(0-6) \checkmark$

$\Rightarrow a=-\frac{1}{4} \checkmark$

$f(x)=-\frac{1}{4}(x+2)(x-6) \checkmark$
 $=-\frac{1}{4}(x^2-6x+2x-12) \checkmark$
 $=-\frac{1}{4}x^2+x+3$

$T: 3=c \checkmark$

$N_1: 0=a(-2)^2+b(-2)+3 \checkmark$

$N_2: 0=a \cdot 6^2+b \cdot 6+3 \checkmark$

$-3=4a-2b \quad | \cdot 3$

$-3=36a+6b$

$-9=12a-6b \quad | \cdot 2$

$* -3=36a+6b \quad | \cdot 2$

$-12=48a \Rightarrow a=-\frac{1}{4} \checkmark$

$a.m.*: -3=36(-\frac{1}{4})+6b$

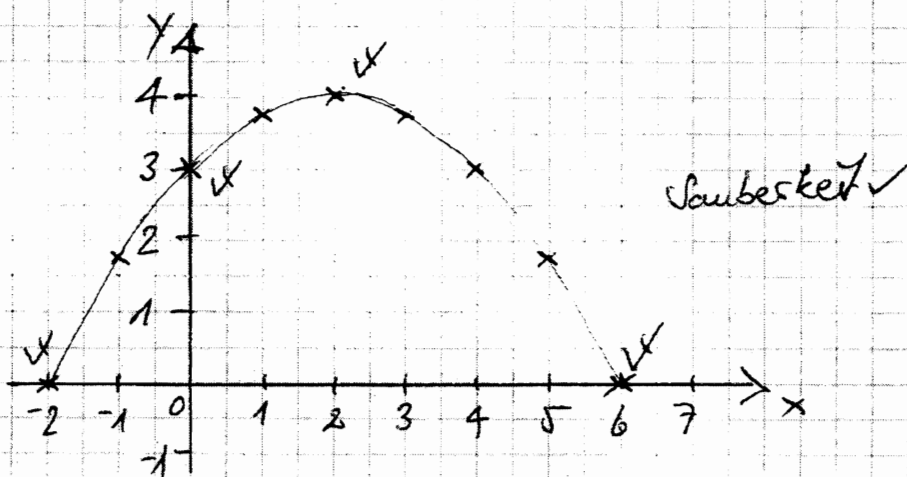
$b=1 \checkmark$

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

2.2. $x_s = \frac{-1}{2 \cdot (-\frac{1}{4})} = 2 \checkmark$

$y_s = -\frac{1}{4} \cdot 2^2 + 2 + 3 = 4 \checkmark$ $\sqrt{(2|4)} \checkmark$

2.3.



2.4. $P(x) = g_a(x)$

$$-0,25x^2 + x + 3 = -x + a \quad \checkmark$$

$$-0,25x^2 + 2x + 3 - a = 0 \quad \checkmark$$

$$D = 4 - 4(-0,25)(3-a) \checkmark = 4 + 3 - a = 7 - a \quad \checkmark$$

$$D = 0 \quad \checkmark \Rightarrow 7 - a = 0 \Rightarrow a = 7 \quad \checkmark$$

Für $a=7$ ist g Tangente an p $\checkmark$

⑥

$$x_B = \frac{-2 \pm \sqrt{6}}{2 \cdot (-0,25)} = 4 \quad \checkmark$$

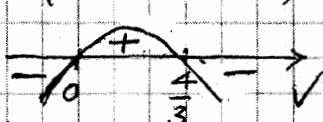
$$y_B = -4 + 7 = 3 \quad \checkmark \quad B(4/3) \quad \checkmark$$

2.5. $-x^2 + 2x + 3 < -0,25x^2 + x + 3 \quad \checkmark$

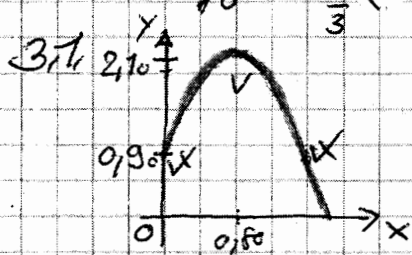
$$-0,75x^2 + x < 0 \quad \checkmark$$

$$x(-0,75x + 1) < 0 \quad \checkmark \quad x_1 = 0 \quad \checkmark \quad x_2 = \frac{4}{3} \quad \checkmark$$

⑥



$$x \in]-\infty, 0[\cup]\frac{4}{3}, +\infty[\quad \checkmark$$



3.2. $f(x) = a(x - 0,80)^2 + 2,70 \quad \checkmark$

$$0,90 = a(0 - 0,80)^2 + 2,70 \quad \checkmark$$

$$-1,2 = a \cdot 0,64$$

$$a = -1,875 \quad \checkmark$$

$$f(x) = -1,875(x - 0,80)^2 + 2,70$$

②

④

3.3. $y = 0,30 = -1,875x^2 + 3x + 0,90 \quad \checkmark$

$$0 = -1,875x^2 + 3x + 0,60 \quad \checkmark$$

$$D = 3^2 - 4 \cdot (-1,875) \cdot 0,6 = 13,5 \quad \checkmark$$

$$x_{1/2} = \frac{-3 \pm \sqrt{13,5}}{2(-1,875)} \quad \checkmark \Rightarrow (x_1 = -0,18 \quad \checkmark) \quad x_2 = 1,78 \quad \checkmark$$

⑤

Das Kind steht 1,78 m von der Wasserdüse entfernt. $\checkmark$

4.1. $A_{\text{grau}} = 2 \cdot \frac{1}{2} \cdot \pi (4a)^2 + 2 \cdot \frac{1}{2} \pi (3a)^2 + 6a \cdot 8a - \pi (5a)^2 \quad \checkmark$

④

$$= \pi \cdot 16a^2 + \pi \cdot 9a^2 + 48a^2 - \pi \cdot 25a^2 = 48a^2 \quad \checkmark$$

③

4.2. $A_{\text{Figur}} = 2 \cdot \frac{1}{2} \pi \cdot 8a^2 + 2 \cdot \frac{1}{2} \pi \cdot 6a^2 = 14\pi a^2 \quad \checkmark$

4.3. $A_{\text{gesamt}} = \pi \cdot 16a^2 + \pi \cdot 9a^2 + 48a^2 = 126,54a^2 \quad \checkmark$

②

$$\text{Anteil} = \frac{A_{\text{grau}}}{A_{\text{gesamt}}} = \frac{48a^2}{126,54a^2} = 0,3793 = 37,93\% \quad \checkmark$$

Σ SOBE