

3. Schulaufgabe 2012 M. Klassen
LÖSUNG

1.1. $6x - 3 = 0$ $x_1 = \frac{1}{2} \checkmark$ $4 - x = 0$ $x_2 = 4 \checkmark$ $\mathbb{L} = \left\{ \frac{1}{2}; 4 \right\} \checkmark$ (3)

1.2. $4x^2 - x - 3 = 0 \checkmark$
$$x_{1/2} = \frac{+1 \pm \sqrt{1^2 - 4 \cdot 4 \cdot (-3)}}{2 \cdot 4} = \frac{1 \pm \sqrt{49}}{8}$$

$x_1 = \frac{1+7}{8} = 1 \checkmark$ $x_2 = \frac{1-7}{8} = -\frac{3}{4} \checkmark$

$\mathbb{L} = \left\{ -\frac{3}{4}; 1 \right\} \checkmark$ (4)

2.1. $P(x) = a(x-3)^2 - 3 \checkmark$

$-\frac{9}{4} = a(2-3)^2 - 3 \checkmark$

$-\frac{9}{4} + 3 = a \Rightarrow a = \frac{3}{4} \checkmark$

$P(x) = \frac{3}{4}(x-3)^2 - 3 \checkmark$

$= \frac{3}{4}(x^2 - 6x + 9) - 3$

$= \frac{3}{4}x^2 - \frac{9}{2}x + \frac{27}{4} - 3$

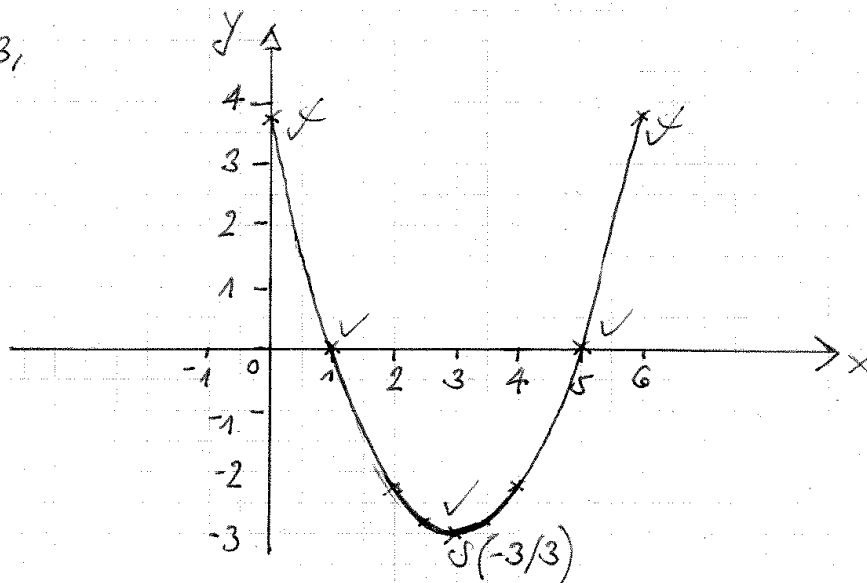
$P(x) = 0,75x^2 - 4,5x + 3,75$ (4)

2.2. $P(x) = 0 \Rightarrow 0,75x^2 - 4,5x + 3,75 = 0 \checkmark$

$$x_{1/2} = \frac{4,5 \pm \sqrt{4,5^2 - 4 \cdot 0,75 \cdot 3,75}}{2 \cdot 0,75} = \frac{4,5 \pm \sqrt{9}}{1,5}$$

$x_1 = \frac{4,5+3}{1,5} = 5 \checkmark$ $x_2 = \frac{4,5-3}{1,5} = 1 \checkmark$ (3)

2,3,



(4)

2.4, $g(x) = mx + t$

$$m = \frac{-6-3}{3-0} = -3 \checkmark \quad t = 3 \checkmark \text{ aus } B(0/3)$$

$$g(x) = -3x + 3 \checkmark$$

$$p(x) = g(x)$$

$$0,75x^2 - 4,5x + 3,75 = -3x + 3 \checkmark$$

$$0,75x^2 - 1,5x + 0,75 = 0 \checkmark$$

$$D = 1,5^2 - 4 \cdot 0,75 \cdot 0,75 = 0 \checkmark \Rightarrow \text{g ist Tangente an P.}$$

(7)

2.5, $p(x) = f(x)$

$$0,75x^2 - 4,5x + 3,75 = -x^2 + 2x - 3 \checkmark$$

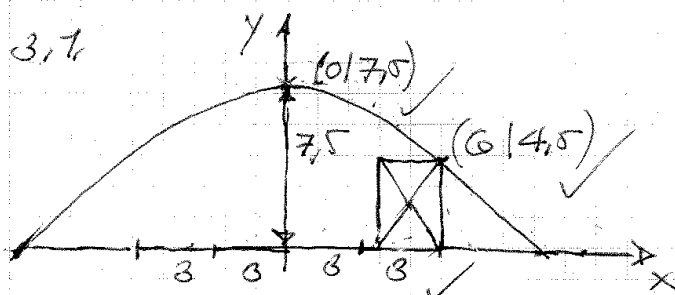
$$1,75x^2 - 6,5x + 6,75 = 0 \checkmark$$

$$D = 6,5^2 - 4 \cdot 1,75 \cdot 6,75 = -5 < 0 \checkmark$$

$\Rightarrow$ keine Schnittpunkte $\checkmark$

(4)

3,1



(3)

3,2, $f(x) = a(x-0)^2 + 7,5$ ✓

$4,5 = a \cdot 6^2 + 7,5$ ✓

$-3 = 36a$

$a = -\frac{1}{12}$ ✓

$f(x) = -\frac{1}{12}x^2 + 7,5$ ✓

(3)

3,3, $f(x) = 0 \quad -\frac{1}{12}x^2 + 7,5 = 0$ ✓

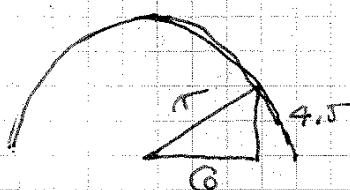
$x_{1/2} = \pm \sqrt{75 \cdot 12}$ ✓

$x_{1/2} = \pm 9,49$ ✓

$\Rightarrow \text{Abstand} = 9,49 - 6 = 3,49 \text{ m}$ ✓

(3)

3,4,



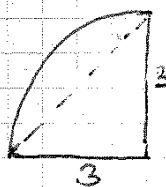
$r^2 = 4,5^2 + 6^2$ ✓

$r = 7,5$ ✓

$\Rightarrow \text{Abstand} = 7,5 - 6 = 1,5 \text{ m}$ ✓

(3)

4,1



$A_{\text{segment}} = \frac{1}{4} \pi \cdot 3^2 - \frac{1}{2} \cdot 3 \cdot 3$ ✓

$= 2,57$ ✓

$A_g = 8 \cdot A_{\text{seg}} = 8 \cdot 2,57 = 20,55 \text{ cm}^2$ ✓

(4)

4,2, $p = \frac{20,55}{6 \cdot 6} = 0,57 \Rightarrow 57\%$ ✓

(2)

4,3, zwei Halbkreise mit Radius a

$U = 4 \cdot \pi \cdot a$ ✓

(2)