

Hausaufgabe (KW 10)

I)
1)

$$f(x) = -3x^2 - 3x + 18 \quad | :(-3)$$

Ausklammern

$$= -3(x^2 + x - 6)$$

$$= -3\left[x^2 + x + \left(\frac{1}{2}\right)^2 - \left(\frac{1}{2}\right)^2 - 6\right]$$

$$= -3\left(x + \frac{1}{2}\right)^2 + 48,75 \quad (\leftarrow \text{Scheitelform})$$

$$x_{1/2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{3 \pm \sqrt{(-3)^2 - 4 \cdot (-3) \cdot 18}}{2 \cdot (-3)}$$

$$= \frac{3 \pm \sqrt{9 + 216}}{-6}$$

$$x_1 = -3$$

$$x_2 = 2$$

$$f(x) = -3a(x+3)(x-2) \quad (\leftarrow \text{Nullstellenform})$$

2) $g(x) = -(x+4)^2 - 1$

$$= -(x^2 + 8x + 16) - 1$$

$$= -x^2 - 8x - 17 \quad (\leftarrow \text{Normalform})$$

$$\Delta = b^2 - 4ac$$

$$= (-8)^2 - 4 \cdot (-1) \cdot (-17)$$

$$= -4$$

Diskriminante
 \Rightarrow Diskriminante negativ
 \Rightarrow keine Nullstellenform

$$\begin{aligned}
 3) \quad h(x) &= 4(x-5)(x-2) \\
 &= 4(x^2 - 2x - 5x + 10) \\
 &= 4x^2 - 8x - 20x + 40 \\
 &= 4x^2 - 28x + 40 \quad (\leftarrow \text{Normalform})
 \end{aligned}$$

Ausklammern

$$4 \cdot [x^2 - 7x + 10]$$

$$| :4$$

$$4 \cdot [x^2 - 7x + (3,5)^2 - (3,5)^2 + 10]$$

$$= 4(x - 3,5)^2 - 2,25 \cdot 4 \quad (\leftarrow \text{Scheitelform})$$

$$\begin{aligned}
 \text{II)} \quad 1) \quad &S(4|1) \\
 &P(8|5)
 \end{aligned}$$

$$f(x) = a(x-d) + e$$

$$5 = a(8-4) + 1$$

$$5 = 4a + 1 \quad | -1$$

$$4 = 4a \quad | :4$$

$$a = 1$$

$$f(x) = (x-4)^2 + 1$$

$$2) \quad S(-4|0)$$

$$P(0|-3)$$

$$f(x) = a(x-d) + e$$

$$-3 = a(0+4)$$

$$-3 = 4a \quad | :4$$

$$a = -\frac{3}{4}$$

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

3) Nullstellen $x_1 = -3$
 $x_2 = 1$

$\varphi(2|2)$

$f(x) = a(x-x_1)(x-x_2)$

$2 = a(2+3)(2-1)$

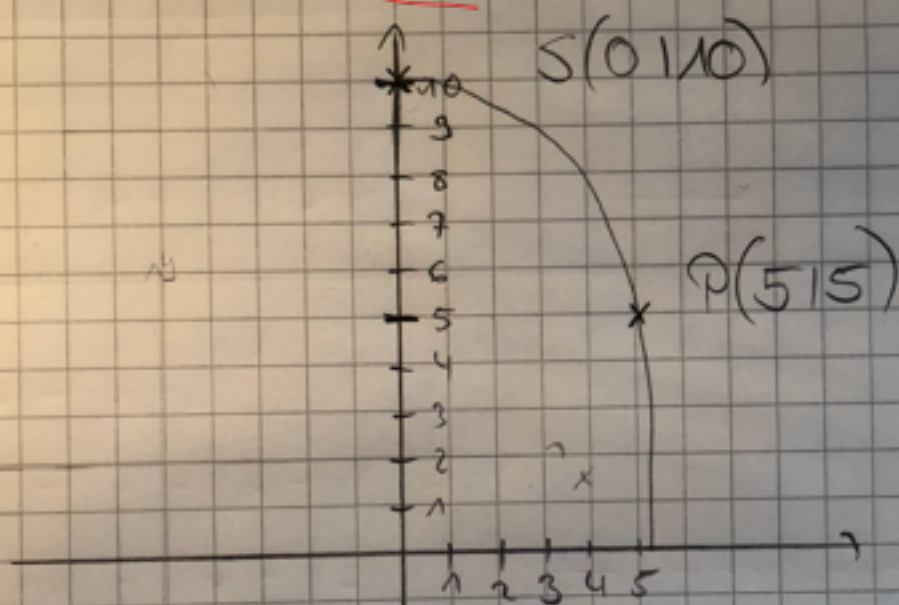
$2 = a \cdot 5 \cdot 1$

$2 = 5a$

$a = \frac{2}{5} = 0,4$

$f(x) = \frac{1}{5}(x+3)(x-1)$

S(0|10)



a)

$f(x) = +a(x-d)^2 + e$

$5 = +a(5-0)^2 + 10$

$5 = +25a + 10 \quad | -10$

$-5 = +25a$

$a = -\frac{1}{5}$

$\Rightarrow f(x) = -\frac{1}{5}(x-0)^2 + 10$
 $= -\frac{1}{5}x^2 + 10$

b) $0 = -\frac{1}{5}(x-0)^2 + 10$

$0 = -\frac{1}{5}x^2 + 10$

$-10 = -\frac{1}{5}x^2 \quad | \cdot (-5)$

$50 = x^2$

$x = \sqrt{50} = 5\sqrt{2} \approx 7$

Idee richtig

NS bestim.