Hausaufgabe (KW 10)

I) a

1) $f(x) = -3x^2 - 3x + 18 \mid :(-3)$ ← Ausklammern

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

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

$= -3\left(x + \frac{1}{2}\right)^2 + 6,25 \quad (\leftarrow \text{Scheitelform})$

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

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

$x_1 = -3$

$x_2 = 2$

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

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

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

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

$D = b^2 - 4ac$

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

$= -4$

Diskriminante

⇒ Diskriminante negativ

⇒ keine Nullstellenform

3) $h(x) = 4(x-5)(x-2)$

$= 4(x^2 - 2x - 5x + 10)$

$= 4x^2 - 8x - 20x + 40$

$= 4x^2 - 28x + 40$ (← Normalform)

Ausklammern 1:4

$4 = [x^2 - 7x + 10]$

$4 = [x^2 - 7x + (3{,}5)^2 - (3{,}5)^2 + 10]$

$= 4(x - 3{,}5)^2 - 2{,}25$ g (← Scheitelform)

II) 1) S(4|1)

P(8|5) ·2

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

$5 = a(8-4)^2 + 1$

$5 = 16a + 1$ |-1

$4 = 16a$ |:16

$a = \frac{1}{4}$

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

2) S(-4|0)

P(0|-3)

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

$-3 = a(0+4)^2$

$-3 = 16a$ |:16

$a = -\frac{3}{16}$

$f(x) = -\frac{3}{16}(x+4)^2$

3) Nullstellen $x_1 = -3$

$x_2 = 1$

P (2|2)

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

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

$2 = a \cdot 5 \cdot 1$

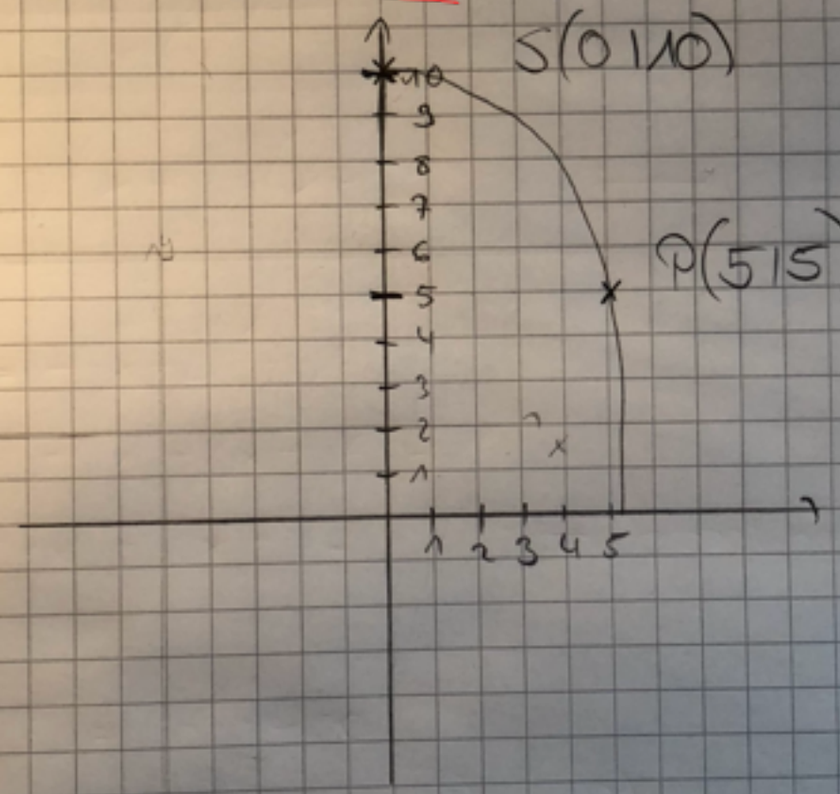
$2 = 5a$

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

$f(x) = \frac{1}{3}(x+3)(x-1)$ 0,4

S(0|10)

S(7|18)



P(5|5)

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

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

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

$50 = x^2$

$x = 1,41 = 5\sqrt{2} \approx 7$

Idee richtig

NS bestim.