

1.1 A: $\begin{array}{ccc|c} 4 & 2 & 1 & 0 \end{array}$

B: $\begin{array}{ccc|c} 9 & 3 & 1 & 1,5 \end{array} \quad \begin{array}{ccc|c} 5 & 1 & 0 & 1,5 \end{array}$

E: $\begin{array}{ccc|c} 4 & -2 & 1 & -16 \end{array} \quad \begin{array}{ccc|c} 0 & 4 & 0 & 16 \end{array}$

III: $4B = 16 \Leftrightarrow B = 4$ in II'

II': $5a + 4 = 1,5 \Leftrightarrow a = -\frac{7}{2}$ in I

I: $4 \cdot (-\frac{7}{2}) + 2 \cdot 4 + C = 0 \Leftrightarrow C = -6 \Rightarrow p(x) = -\frac{1}{2}x^2 + 4x - 6$

1.2 $p(x) = 0 \Rightarrow -\frac{1}{2}x^2 + 4x - 6 = 0 \Leftrightarrow x^2 - 8x + 12 = 0 \Leftrightarrow (x-6)(x-2) = 0$
 $x_1 \leq 6 \quad x_2 = 2$
 $\Rightarrow N_1(2|0); N_2(6|0); S_y(0|-6)$

1.3 $p(x) = -\frac{1}{2}(x^2 - 8x + (\frac{8}{2})^2 - 16) - 6 = -\frac{1}{2}(x-4)^2 + \frac{1}{2} \cdot 16 - 6$
 $\Rightarrow p(x) = -\frac{1}{2}(x-4)^2 + 2 \Rightarrow S(4|2)$

1.4 $kx - 3k + 1 = -\frac{1}{2}x^2 + 4x - 6 \Leftrightarrow \frac{1}{2}x^2 + (k-4)x + 7 - 3k = 0$

$D = (k-4)^2 - 4 \cdot \frac{1}{2} \cdot (7-3k) = k^2 - 8k + 16 - 14 + 6k = k^2 - 2k + 2$

NR: $k^2 - 2k + 2 = 0 \Rightarrow k_{1/2} = \frac{1}{2}(2 \pm \sqrt{2^2 - 4 \cdot 2}) = \frac{1}{2}$ Es gibt kein passendes k.

2.1 $-\frac{1}{4}(x+2)^2 + 4 = 0 \Leftrightarrow (x+2)^2 = 16 \Leftrightarrow x_{1/2} + 2 = \pm 4 \Leftrightarrow x_2 = -2 \pm 4$

$N_1(-6|0); N_2(2|0); S_y(0|3); S(-2|4)$

2.2 $q_a(x) = x^2 + 4ax + \frac{16}{5}a^2 = x^2 + 4ax + (2a)^2 - (2a)^2 + \frac{16}{5}a^2 = (x+2a)^2 - \frac{4}{5}a^2$

2.3 $-\frac{1}{4}x^2 - x + 3 = x^2 + 4ax + \frac{16}{5}a^2 \Leftrightarrow \frac{5}{4}x^2 + (4a+1)x + \frac{16}{5}a^2 - 3 = 0$

$D = (4a+1)^2 - 4 \cdot \frac{5}{4} \cdot (\frac{16}{5}a^2 - 3) = \dots = 8a + 16 = 0 \Rightarrow a = -2$

3 $x^2 + ax + a^2 + 5 = x^2 + ax + (\frac{a}{2})^2 - \frac{a^2}{4} + 5 = (x + \frac{a}{2})^2 + \frac{3}{4}a^2 + 5; S(-\frac{a}{2} | \frac{3}{4}a^2 + 5)$

4.1 $-(x^2 + 2x + 1 - 1) + 3 = -(x+1)^2 + 4; S(-1|4)$

4.2 $-(x^2 + 2x - 3) = 0 \Leftrightarrow -(x+3)(x-1) = 0; p(x) \geq 0 \Rightarrow L = [-3; 1]$

3 $-x^2 - 2x + 3 = -kx + 3 \Leftrightarrow x^2 + (2-k)x = 0; D = (2-k)^2 - 0$

$(2-k)^2 > 0$ für $k \neq 2$: 2 SP. für $k \neq 2$

4.4
$k_1 = -1$
$k_2 = 3$