1. Schulaufgabe Mathematik FI1S1 und FI1W1

am 22.12.05

1.1. $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{14-2}{5-(-1)} = \frac{12}{6} = 2$

$y = mx + t \Leftrightarrow t = y - mx$

$t = 14 - 2 \cdot 5 = 14 - 10 = 4$; $\underline{\underline{g(x) = 2x + 4}}$

(5)

1.2 $2x + 4 = mx + 2m + 4$

$\Leftrightarrow 2x - mx = 2m \Leftrightarrow x(2-m) = 2m \mid : (2-m)$

1. Fall: $2 - m = 0 \Leftrightarrow m = 2$

$x \cdot 0 = 4$ (↯) $\Rightarrow L = \{\}$; keine SP.

2. Fall: $m \neq 2$

$x = \frac{2m}{2-m}$

$y = 2 \cdot \frac{2m}{2-m} + 4 = \frac{4m}{2-m} + \frac{4(2-m)}{2-m} =$

$= \frac{4m + 8 - 4m}{2-m} = \frac{8}{2-m}$ $\underline{\underline{S\left(\frac{2m}{2-m} \mid \frac{8}{2-m}\right)}}$

(8)

1.3 $S(3 \mid 18) \in G_{fg}$

$18 = 3k + 2k + 4 \Leftrightarrow 5k = 14$

$\Leftrightarrow \underline{\underline{k = \frac{14}{5}}}$ $(= 2{,}8)$

(3)

1.4 $f_k(x) = mx + 2m + 4$

$= m(x+2) + 4 \Rightarrow \underline{\underline{B(-2 \mid 4)}}$

(3)

2.1

$B(-2/4)$: $4a - 2b + c = 4$ (I)

$P(2/0)$: $4a + 2b + c = 0$ (II)

$Q(-3/2{,}5)$: $9a - 3b + c = 2{,}5$ (III)

(I)−(II): $-4b = 4 \Leftrightarrow \underline{b = -1}$ in II, III

(II'): $4a - 2 + c = 0 \Leftrightarrow 4a + c = 2$

(III') $9a + 3 + c = 2{,}5 \Leftrightarrow 9a + c = -0{,}5$

(II')−(III'): $-5a = 2{,}5 \Leftrightarrow \underline{a = -0{,}5}$

In II': $4 \cdot (-0{,}5) + c = 2 \Leftrightarrow \underline{c = 4}$

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

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2.2 $S_y(0/4)$

$-\frac{1}{2}x^2 - x + 4 = 0 \Rightarrow x_{1/2} = \frac{1 \pm \sqrt{1 - 4\left(-\frac{1}{2}\right) \cdot 4}}{2 \cdot \left(-\frac{1}{2}\right)} = \frac{1 \pm 3}{-1}$

$x_1 = -4 \Rightarrow \underline{\underline{N_1(-4/0)}}$; $x_2 = 2 \Rightarrow \underline{\underline{N_2(2/0)}}$

4

2.3 $f(x) = -\frac{1}{2}(x^2 + 2x + 1 - 1) + 4 = -\frac{1}{2}(x+1)^2 + \frac{1}{2} + 4$

$f(x) = -\frac{1}{2}(x+1)^2 + 4\frac{1}{2}$ $\underline{\underline{S(-1/4{,}5)}}$

$\rightarrow$ G_p siehe Angabe

$W_p =]4{,}5 ; -3{,}5[$

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2.4 $kx + 2k + 4 = -\frac{1}{2}x^2 - x + 4$

$\frac{1}{2}x^2 + x(k+1) + 2k = 0$

$D = (k+1)^2 - 4 \cdot \frac{1}{2} \cdot 2k$

$= k^2 + 2k + 1 - 4k$

$= k^2 - 2k + 1 = 0$

$\Leftrightarrow (k-1)^2 = 0$

$\Rightarrow \underline{\underline{k = 1}}$

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$\Sigma = 40$