BVKT1 1. Schulaufgabe am 4.12.12

1.1 (3,5)

a) $\dfrac{a^{-2}\cdot a^5-(-2)^3\cdot a^4 : a^{-5}}{(-a^3b^2)^5} = \dfrac{a^3-8a^9}{-a^{15}b^{10}} =$

$\dfrac{a^3(1-8a^6)}{a^3(-a^{12}b^{10})} = \dfrac{1-8a^6}{-a^{12}b^{10}}$

(3,5)

b) $\left(\dfrac{1}{a^2}+\dfrac{2}{ab}+\dfrac{1}{b^2}\right) : \dfrac{a^2-b^2}{a^2} = \dfrac{b^2+2ab+a^2}{a^2b^2}\cdot\dfrac{a^2}{a^2-b^2}$

$= \dfrac{(b+a)^2}{b^2(a^2-b^2)} = \dfrac{(a+b)(a+b)}{b^2(a+b)(a-b)} = \dfrac{a+b}{a(a-b)} = \dfrac{a+b}{a^2-ab}$

1.2 (3,5)

a) $\dfrac{6-3x}{x-2}=0$; $D_{max}=\mathbb{R}\setminus\{2\}$

$\Leftrightarrow 6-3x=0 \Leftrightarrow x=2 \notin D_{max} \Rightarrow L=\{\}$ (7)

b) $(x-(x-2))^2-\dfrac{3(x+2)}{2} < 2-1{,}5x$; $D_{max}=\mathbb{R}$ (3,5)

$\Leftrightarrow (x-x+2)^2-\frac{3}{2}(x+2) < 2-1{,}5x$

$\Leftrightarrow 4+\frac{3}{2}x-3 < 2-1{,}5x$

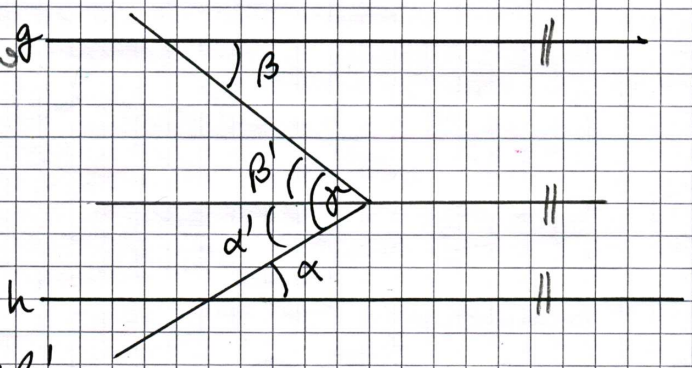
$\Leftrightarrow 1 < 2$ (w) $\Rightarrow L=D=\mathbb{R}$

Aufgabe 3 (5)

① Erg

② Nachw

② Begr.



$\gamma = \alpha' + \beta'$

$\alpha' = \alpha$ und $\beta' = \beta$: jew. Wechselwinkel

$\Rightarrow \gamma = \alpha + \beta$

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2.1 $m = \frac{y_B - y_A}{x_B - x_A} = \frac{-1-26}{12+24} = \frac{-27}{36} = -\frac{3}{4}$ ✓✓

$g(x) = -\frac{3}{4}x + 8$ ③

$b = y_B - m x_B = -1 - \left(-\frac{3}{4}\right) \cdot 12 = -1 + 9 = 8$ ✓✓

$\in G_g$ ✓✓ ②

$g(x) = 0 \Rightarrow -\frac{3}{4}x + 8 = 0 \Leftrightarrow x_N = \frac{8 \cdot 4}{3} = \frac{32}{3}$ $(= 10{,}\overline{6})$ ✓ ①

⑥

2.2 $m_l = -\frac{1}{m_g} = \frac{4}{3}$ ① ; $b = y_P - m_l \cdot x_P = 2 - \frac{4}{3} \cdot (-4{,}5) = 8$ ①

$\Rightarrow l(x) = \frac{4}{3}x + 8$ ①

$l(x) = g(x) \Rightarrow \frac{4}{3}x + 8 = -\frac{3}{4}x + 8 \Leftrightarrow \frac{25}{12}x = 0 \Leftrightarrow x = 0$ ①

$l(0) = 8 \Rightarrow$ Lotfußpkt $L(0|8)$; einfacher $S_y(0|8)$

$d = \sqrt{(\Delta x)^2 + (\Delta y)^2} = \sqrt{(0 - (-4{,}5))^2 + (8-2)^2} \Rightarrow d = 7{,}5$ ②

⑥

2.3 $h(x) = g(s(x)) = -\frac{3}{4}(2x - 5) + 8 = -\frac{3}{2}x + \frac{47}{4}$ ① ; $D_{max} = [0;3[$ (0,5)

$h(0) = \frac{47}{4}$; $h(3) = -\frac{9}{2} + \frac{47}{4} = \frac{29}{4} \Rightarrow W_h = \left]\frac{29}{4}; \frac{47}{4}\right]$ (1,5)

7,25

③

2.4 $f_k(x) = g(x) \Rightarrow 0{,}25x - 2kx + 4 = -\frac{3}{4}x + 8$

$\Leftrightarrow x - 2kx = 4 \Leftrightarrow (1-2k)x = 4 \quad | : (1-2k)$ ②

1. Fall: $1 - 2k = 0 \Leftrightarrow k = \frac{1}{2}$: $0x = 4$ (A) $\Rightarrow$ k. SP ③

2. Fall $k \neq \frac{1}{2}$

$x_S = \frac{4}{1-2k}$; $g(x_S) = -\frac{3}{4} \cdot \frac{4}{1-2k} + 8 = \frac{-3}{1-2k} + 8$

$y_S = \frac{-3}{1-2k} + \frac{8(1-2k)}{1-2k} = \frac{-3 + 8 - 16k}{1-2k} \Rightarrow S\left(\frac{4}{1-2k} \,\middle|\, \frac{5-16k}{1-2k}\right)$ (0,5)

②

2.5 Gehört nicht dazu: Im SOFA $k = \frac{1}{2}$ gibt's k. SP, sonst immer nur einen ②

oder: Immer unterschiedl. S_y ...

2.6 $f_k(x_P) \overset{①}{<} y_P \Rightarrow 0{,}25 \cdot (-4{,}5) - 2k \overset{\cdot(-4{,}5)}{+} 4 < 2$ ①

$\Leftrightarrow 9k \overset{①}{<} -\frac{7}{8} \Leftrightarrow k \overset{①}{<} -\frac{7}{72}$

④