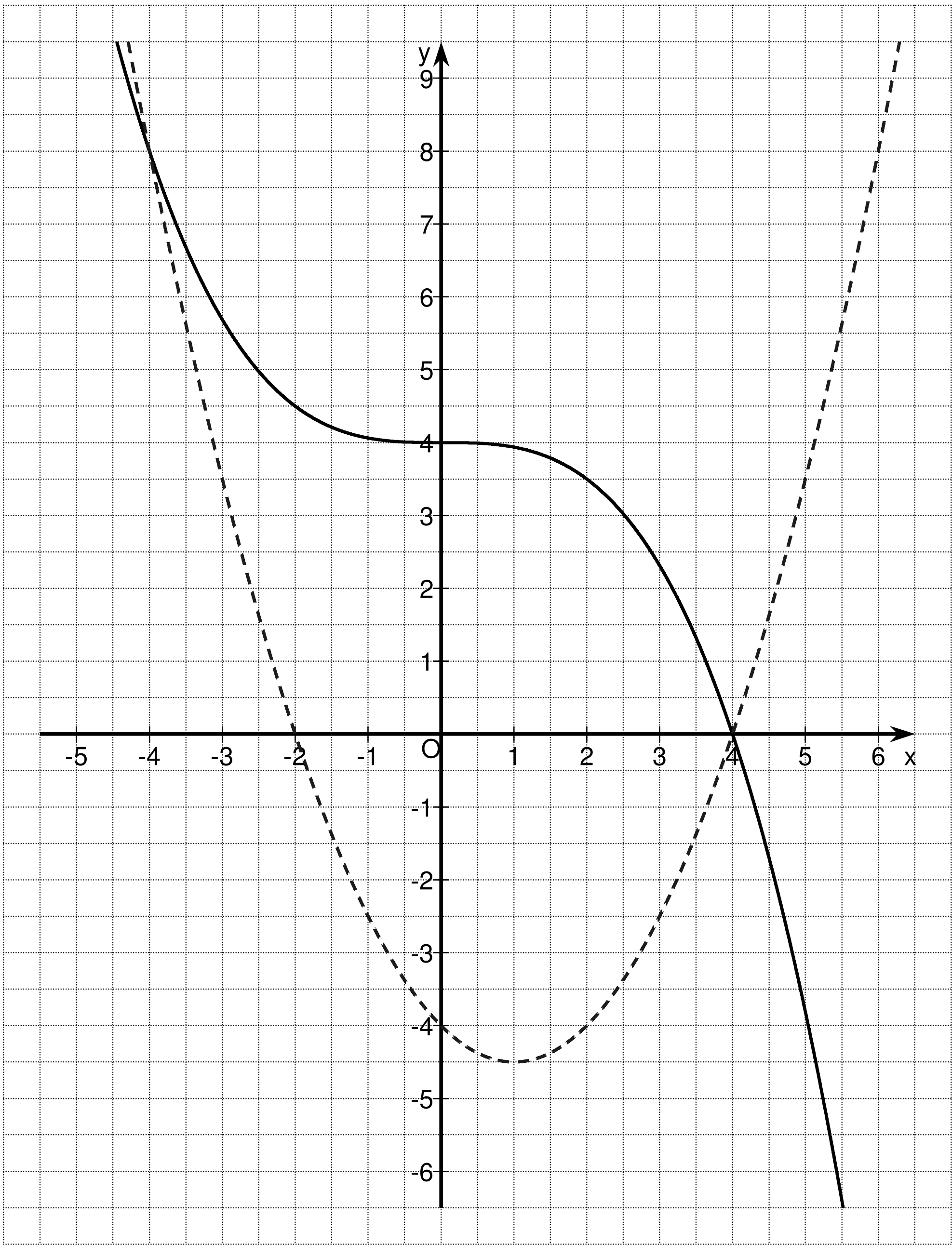
Klasse BVKT1
2. Schulaufgabe aus der Mathematik
am 17.04.2013

Name: ....

1.1	1.2	1.3	1.4	1.5	1.6	1.7	2	3	Σ

Zu 1.2 und 1.6



BVKT1 2. Schulaufgabe am 17.04.2013 (1/2)

1.1 6

$$\begin{array}{l|ccc|c} P: & 16 & 4 & 1 & 0 \\ Q: & 4 & 2 & 1 & -4 \\ R: & 1 & -1 & 1 & -2{,}5 \end{array} \quad \begin{array}{ccc|c} 16 & 4 & 1 & 0 \\ \overset{-6}{12} & \overset{-1}{2} & \overset{0}{0} & \overset{-2}{4} \\ \overset{1}{3} & \overset{1}{3} & \overset{0}{0} & \overset{-0{,}5}{-1{,}5} \end{array} \quad \begin{array}{l} \\ \,|:(-2) \\ \,|:(3) \end{array}$$

$-5a = -2{,}5 \Leftrightarrow \underline{a = \frac{1}{2}}$; $-6 \cdot \frac{1}{2} - b = -2 \Leftrightarrow \underline{b = -1}$

$16 \cdot \frac{1}{2} + 4 \cdot (-1) + c = 0 \Leftrightarrow \underline{c = -4}$; $\underline{\underline{p(x) = \frac{1}{2}x^2 - x - 4}}$

1.2 4

$p(x) = \frac{1}{2}(x^2 - 2x + 1 - 1) - 4 = \frac{1}{2}(x-1)^2 - 4{,}5$; $\underline{S(1 \mid -4{,}5)}$

G_p

1.3 2

$g_k(x) = -k(x+1) - 3 \Rightarrow \underline{B(-1 \mid -3)}$

1.4 8

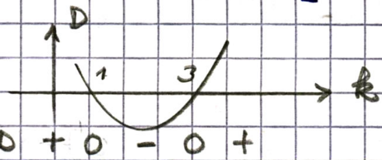
$\frac{1}{2}x^2 - x - 4 = -kx - k - 3 \Leftrightarrow \frac{1}{2}x^2 + (k-1)x + k - 1 = 0$

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

$D = 0: \; k^2 - 4k + 3 = 0 \Leftrightarrow (k-1)(k-3) = 0 \; \begin{array}{l} \nearrow k_1 = 1 \\ \searrow k_2 = 3 \end{array}$

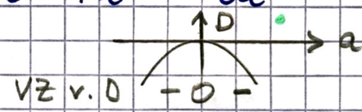
2 Schnittpunkte, wenn $D > 0$

also: $\underline{k \in \mathbb{R} \setminus [1; 3]}$



1.5 5

$x_1 = 4$; $x^2 + ax + a^2 = 0 \Rightarrow D = a^2 - 4a^2 = -3a^2$



1. Fall: $a \neq 0$: $x_1 = 4$ 1-f

2. Fall: $a = 0$: $x_1 = 4$ 1-f ; $x_2 = 0$ do

1.6 7

$f_4(x) = -\frac{1}{16}(x-4) \cdot (x^2 + 4x + 4^2) =$

$= -\frac{1}{16}(x^3 + 4x^2 + 16x - 4x^2 - 16x - 4 \cdot 16)$

$= -\frac{1}{16}x^3 + 4$

$-\frac{1}{16}$: Spiegelung an der x-Achse und Stauchung

$+4$: Verschiebung um 4 nach oben (y-Richt.)

G_{f_4}

1.7 ⑥

$$\frac{1}{2}x^2 - x - 4 = -\frac{1}{16}x^3 + 4 \Leftrightarrow \frac{1}{16}\left(x^3 + 8x^2 - 16x - 128\right) = 0$$

$$\frac{1}{16}\left(x^3 + 8x^2 - 16x - 128\right) : (x-4) = \left(x^2 + 12x + 32\right) \cdot \frac{1}{16}$$

$$\begin{array}{l} -(x^3 - 4x^2) \\ \hline \quad 12x^2 - 16x \\ \quad -(12x^2 - 48x) \\ \hline \qquad 32x - 128 \\ \qquad -(32x - 128) \end{array}$$

$$= \frac{1}{16}(x+4)(x+8)$$

$$x_2 = -4 \qquad x_3 = -8$$

$$f_4(-4) = -\frac{1}{16}(-4)^3 + 4 = 8 \Rightarrow \underline{S_2(-4/8)}$$

$$f_4(-8) = -\frac{1}{16}(-8)^3 + 4 = 36 \Rightarrow \underline{S_3(-8/36)}$$

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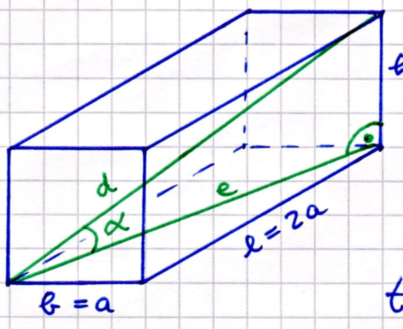
2 ⑤



$$e^2 = b^2 + l^2$$

$$\Rightarrow e^2 = a^2 + (2a)^2$$

$$\Leftrightarrow e^2 = 5a^2 \Rightarrow e = \sqrt{5}\,a$$

$$\tan(\alpha) = \frac{a}{\sqrt{5}\,a} = \frac{1}{\sqrt{5}}$$

$$\alpha = \tan^{-1}\left(\frac{1}{\sqrt{5}}\right) \Rightarrow \underline{\alpha \approx 24{,}09^\circ}$$

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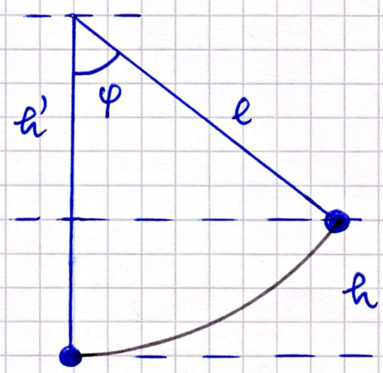
3 ④



$$h = l - h'$$

$$\cos(\varphi) = \frac{h'}{l} \Leftrightarrow h' = l \cdot \cos(\varphi)$$

$$\underline{h = l - l \cdot \cos(\varphi)}$$

$$\left(\underline{h = l\left(1 - \cos(\varphi)\right)}\right)$$

$\Sigma = 47$ BE