

2. Schulaufgabe Mathematik am 1.4.09

BVKT1

AZ: 75 min

1.1 für $a \neq 0$: keine bes. Sym. •

für $a = 0$: Achsensym. zur y-Achse; nur gerade Expon. ••

1.2 $f_a(8) = 512a^2 - \frac{3}{4} \cdot 64 + 16 = 0 \Leftrightarrow a^2 = \frac{32}{516} = \frac{1}{16} \Rightarrow a_{1/2} = \pm \frac{1}{4}$:

1.3 $f(x) = \frac{1}{16}(x^3 - 12x^2 + 256)$; $x_0 = 8$;

$(x^3 - 12x^2 + 256) : (x - 8) = x^2 - 4x - 32 \dots = (x - 8)(x + 4)$

$-(x^3 - 8x^2)$

$-4x^2$

$-(-4x^2 + 32x)$

$-32x + 256$

$-(-32x + 256)$

$x_{2/3} = \frac{1}{2}(4 \pm \sqrt{16 + 4 \cdot 32}) = \frac{1}{2}(4 \pm 8)$

$x_2 = 8$

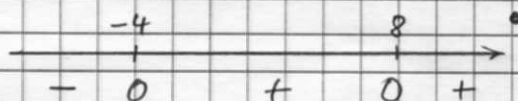
do

$x_3 = -4$

einf.

$f(x) = \frac{1}{8}(x - 8)^2(x + 4)$

1.4 $f(x) \rightarrow \infty$ für $x \rightarrow \infty$



1.6 z.B. $m = \frac{\Delta y}{\Delta x} = \frac{-4,5}{2} = -\frac{9}{4}$; $b = 18 \Rightarrow t(x) = -\frac{9}{4}x + 18$

2.1 $36a - 6b + c = 7$ (I) $\quad \text{II} - \text{I} \quad 12b = 0 \Leftrightarrow b = 0$
 $36a + 6b + c = 7$ (II) $\quad \text{III} - \text{II} \quad 28a = -7 \Leftrightarrow a = -\frac{7}{28} = -\frac{1}{4}$
 $64a + 8b + c = 0$ (III) $\quad \text{Alles in I} \quad -\frac{1}{4} \cdot 36 + c = 7 \Leftrightarrow c = 16$
 $p(x) = -\frac{1}{4}x^2 + 16$

2.3 $f(x) = p(x) \Rightarrow \frac{1}{16}x^3 - \frac{3}{4}x^2 + 16 = -\frac{1}{4}x^2 + 16 \Leftrightarrow \frac{1}{16}x^3 - \frac{2}{4}x^2 = 0$
 $\Leftrightarrow \frac{1}{16}x^2(x - 8) = 0$
 $x_1 = 0$ (do) $\Rightarrow S_1(0|16)$
 $x_2 = 8$ $\Rightarrow S_2(8|0)$

3.1 $g_0(x) = g_1(x) \Rightarrow 7 = 3x - 18 + 7 \Leftrightarrow x = 6$ ••

$f_k(6) = 18k - 18k + 7 = 7$ (unabh. v. $k \Rightarrow$ gemeins. Pkt) $\left. \vphantom{f_k(6)} \right\} B(6|7)$

3.2 $3kx - 18k + 7 = -\frac{1}{4}x^2 + 16 \Leftrightarrow \frac{1}{4}x^2 + 3kx - 18k - 9 = 0$ •

$D = 9k^2 - 4 \cdot \frac{1}{4}(-18k - 9) = 9k^2 + 18k + 9 = 9(k^2 + 2k + 1)$
 $= 9(k + 1)^2$ •

$D = 0$ für $k = -1$: 1 SP ; •

$x_B = -\frac{b}{2a} = -\frac{-3}{2 \cdot \frac{1}{4}} = 6$; $g_k(6) = 7 \Rightarrow B(6|7)$ ist Berührungspunkt

$D \neq 0$ für $k \neq -1$: 2 SP. •