Polynome – Vielfachheit von NST (Aufgabe 3)

POLYNOME – VIELFACHHEIT VON NST ...

1.1 $f_k(-2) \overset{!}{=} 0 \Leftrightarrow \frac{1}{8}\cdot(-2)^3 - k\cdot(-2) - 2 = 0 \Leftrightarrow k = \frac{3}{2}$

$f_{1,5}(x) = \frac{1}{8}(x^3 - 12x - 16)$; $x_0 = -2$ ist NST

$(x^3 - 12x - 16) : (x+2) = x^2 - 2x - 8 = (x+2)(x-4)$

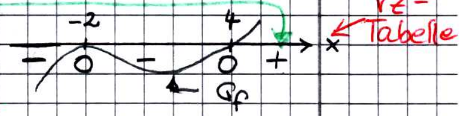
$x_0 = -2$ do ; $x_1 = 4$ einf.

1.2 $f(x) = \frac{1}{8}(x+2)^2(x-4)$ ← Produkt v. Linearfaktoren

für $x \to \infty$: $f(x) \to +\infty$

VZ v. f

$f(x) < 0$ für $x \in \,]-\infty; 4[\setminus \{-2\}$



1.3 $f_{1,5}(x) = g(x) \Rightarrow \frac{1}{8}(x^3 - 12x - 16) = -\frac{1}{2}x - 2 \quad |\cdot 8 \ \ldots$

$x^3 - 8x = 0 \Leftrightarrow x(x^2 - 8) = 0 \Leftrightarrow x(x + 2\sqrt{2})(x - 2\sqrt{2}) = 0$

$x_1 = 0 \quad x_2 = -2\sqrt{2} \quad x_3 = 2\sqrt{2}$

$g(0) = -2 \Rightarrow S_1(0|-2)$

$g(-2\sqrt{2}) = \sqrt{2} - 2 \approx -0{,}59$; $S_2(-2\sqrt{2} \,|\, +2 - \sqrt{2})$

$g(2\sqrt{2}) = -\sqrt{2} - 2 \approx -3{,}41$; $S_3(2\sqrt{2} \,|\, -2 - \sqrt{2})$

1.4 $f_{1,5}(-2) = 0$ (s.o.) $\Rightarrow P(-2|0)$ Gerade durch P u. Q

$f_{1,5}(0) = 2 \Rightarrow Q(0|2) \Rightarrow h(x) = -x - 2$

1.5.1 $\downarrow 4^2 = x^2$

$N(4|0)$: $16a + 4b + c = 0 \Rightarrow 16a + 8 + c = 0$ ⑤ $\Rightarrow a = -\frac{1}{2}$

④

$P(-1|2{,}5)$: $a - b + c = 2{,}5 \Rightarrow a - 2 + c = 2{,}5$ ⑥

③

$Q(1|4{,}5)$: ① $-(a + b + c = 4{,}5)$ $\Rightarrow c = 4$

$-2b = -2 \Leftrightarrow b = 2$ ② $p(x) = \ldots$

1.5.2 $-\frac{1}{2}x^2 + x + 4 = 0 \Leftrightarrow x^2 - 2x - 8 = 0 \Leftrightarrow (x+2)(x-4) = 0$

$N_1(-2|0) \to N_2(4|0)$ (s.1.1)

$x_S = -\frac{b}{2a} = 1$; $y_S = p(1) = 4{,}5 \Rightarrow S(1|4{,}5)$ ← gemeins. NST

1.5.3 $\frac{1}{8}(x^3 - 12x - 16) = -\frac{1}{2}x^2 + x + 4 \quad |\cdot 8 \Leftrightarrow x^3 + 4x^2 - 20x - 48 = 0$

$(x^3 + 4x^2 - 20x - 48) : (x - 4) = x^2 + 8x + 12 = (x+2)(x+6)$

$x_4 = 6 \Rightarrow S_4(6|0)$; $x_2 = -2 \Rightarrow S_2(-2|0)$; $x_6 = -6 \Rightarrow S_6(-6|-20)$

1.6.1 $a_g + 1 = -\frac{1}{2} \Leftrightarrow a_g = -\frac{3}{2}$; $a_h + 1 = -1 \Leftrightarrow a_h = -2$

1.6.2 Büschelpkt liegt im "Inneren" d. Parabel $D = a^2 + 16 > 0$ f. alle a

1.6.3 $-\frac{1}{2}x^2 + x + 4 = (a+1)x + 2 \Leftrightarrow +\frac{1}{2}x^2 + ax + 6 = 0$

D, 16, a, 2SP.