

KDisk, m. Parameter

Aufgabe 1 $f_k(x) = \frac{1}{4}(x^3 - 6kx^2 + 9k^2x)$

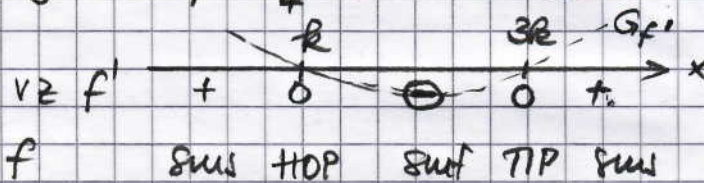
1.1 $f_k(x) = \frac{1}{4}x(x^2 - 6kx + 9k^2) = \frac{1}{4}x(x - 3k)^2$

i. A. $x_1 = 0$ Einf. ; $x_2 = 3k$ do

Sonderfall : $x_1 = x_2$ d. h. $k = 0$ und $x_1 = 0$ 3-f

1.2 $f'_k(x) = \frac{1}{4}(3x^2 - 12kx + 9k^2) = \frac{3}{4}(x^2 - 4kx + 3k^2)$
 $= \frac{3}{4}(x - 3k)(x - k)$

i. A. $x_3 = k$; $x_4 = 3k$ beide 1-f m. VZW



$f_k(k) = k^2 \Rightarrow$
HOP ($k | k^3$)

$f_k(3k) = 0 \Rightarrow$
TIP ($3k | 0$)

Sonderfall : $x_3 = x_4$, also $k = 0$

$x_3/k = 0$ do. NST 0. VZW \Rightarrow TEP

(kein Extrempkt!)

1.3 $f'_k(2k) = -3 \Rightarrow \frac{3}{4}(4k^2 - 8k + 3k^2) = -3 \Leftrightarrow \underline{k = \frac{1}{2}}$

2.1 $f_2(x) = \frac{1}{4}(x^3 - 12x + 36x) = \frac{1}{4}x(x - 6)^2$

$f'_2(x) = \frac{3}{4}(x^2 - 8x + 12)$

$f'_2(4) = -3$ (siehe 1.3) ; $f_2(4) = 4 = y_p$

$t = y_p - mx_p = 4 - (-3) \cdot 4 = 16$; $t(x) = -3x + 16$

Allg. für z. B Geogebra

$f_k(2k) = \frac{1}{2}k^3$; $f'_k(2k) = -\frac{3}{4}k^2$; $t = \frac{1}{2}k^3 - (-\frac{3}{4}k^2) \cdot 2k$
 $= 2k^3$

$t_k(x) = -\frac{3}{4}k^2x + 2k^3$