

Leistungsnachweis Nr. 2

Aufgabe 1

$$f) \quad f'(x) = \frac{-x^4 + 19x^2 - 22}{(x^2 - 9)^2}$$

$$f''(x) = \frac{(x^2 - 9)^2 (-4x^3 + 38x) - (-x^4 + 19x^2 - 22)(2(x^2 - 9)(2x))}{(x^2 - 9)^4}$$

$$= \frac{(x^2 - 9)(-4x^3 + 38x) - (-x^4 + 19x^2 - 22)(4x)}{(x^2 - 9)^3}$$

$$= \frac{-4x^5 + 38x^3 + 36x^3 - 342x + 4x^5 - 76x^3 + 288x}{(x^2 - 9)^3}$$

$$= \frac{-2x^3 - 54x}{(x^2 - 9)^3}$$

$$= -2x \frac{(x^2 + 27)}{(x^2 - 9)^3}$$

n.B. $f''(x) = 0$

$$0 = -2x \frac{(x^2 + 27)}{(x^2 - 9)^3}$$

$$0 = -2x(x^2 + 27)$$

$$-2x = 0$$

$$x = 0$$

$$x^2 + 27 = 0$$

$$x^2 = -27 \quad \downarrow$$

n.B. VZW

$$f''(-1) = -2(-1) \frac{((-1)^2 + 27)}{((-1)^2 - 9)^3} = + \cdot \frac{+}{-} = - \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{VZW}$$

$$f''(1) = -2(1) \frac{(1^2 + 27)}{(1^2 - 9)^3} = - \cdot \frac{+}{-} = +$$

$$f(0) = 0$$

$$W(0|0)$$

~~g)~~

$$g) \quad D_f = \mathbb{R} \setminus \{-3, 3\}$$

$$W_f = \mathbb{R}$$