S 221 Nr. 11b

$f(x) = ax^4 + bx^3 + cx^2 + dx + e$

$f'(x) = 4ax^3 + 3bx^2 + 2cx + d$

$f''(x) = 12ax^2 + 6bx + 2c$

O(0|0) : $f(0) = a\cdot 0^4 + b\cdot 0^3 + c\cdot 0^2 + d\cdot 0 + e = 0$

Tangente ‖ zur x-Achse $f'(0) = 4\cdot a\cdot 0^3 + 3b\cdot 0^3 + 2\cdot c\cdot 0 + d = 0$

W(-2|2) : $f(-2) = a\cdot(-2)^4 + b\cdot(-2)^3 + c\cdot(-2)^2 + d\cdot(-2) + e = 2$

Tangente ‖ zur x-Achse $f'(-2) = 4a\cdot(-2)^3 + 3b\cdot(-2)^2 + 2c\cdot(-2) + d = 0$

notw. Bed Wendepunkt $f''(-2) = 12a\cdot(-2)^2 + 6b\cdot(-2) + 2c = 0$

$$\left(\begin{array}{ccccc|c} 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 16 & -8 & 4 & -2 & 1 & 2 \\ -32 & 12 & -4 & 1 & 0 & 0 \\ 48 & -12 & 2 & 0 & 0 & 0 \end{array}\right) \Rightarrow \left(\begin{array}{cccccc} 1 & 0 & 0 & 0 & 0 & \frac{3}{8} \\ 0 & 1 & 0 & 0 & 0 & 2 \\ 0 & 0 & 1 & 0 & 0 & 3 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right) \Rightarrow f(x) = \frac{3}{8}x^4 + 2x^3 + 3x$$

S 221 Nr. 11 d)

$f(x) = ax^4 + cx^2 + e$ aus Symmetrie zur y-Achse

$f'(x) = 4ax^3 + 2cx$

$f''(x) = 12ax^2 + 2c$

W(2|0) : $f(2) = a\cdot 2^4 + c\cdot 2^2 + e = 0$

Wendetangente Steigung $-\frac{4}{3}$ $f'(2) = 4a\cdot 2^3 + 2c\cdot(2) = -\frac{4}{3}$

notw. Bed Wendepunkt $f''(2) = 12a\cdot 2^2 + 2c = 0$

$$\left(\begin{array}{ccc|c} 16 & 4 & 1 & 0 \\ 32 & 4 & 0 & -\frac{4}{3} \\ 48 & 2 & 0 & 0 \end{array}\right) \Rightarrow \left(\begin{array}{ccc|c} 1 & 0 & 0 & \frac{1}{48} \\ 0 & 1 & 0 & -\frac{1}{2} \\ 0 & 0 & 1 & \frac{5}{3} \end{array}\right) \Rightarrow f(x) = \frac{1}{48}x^4 - \frac{1}{2}x^2 + \frac{5}{3}$$