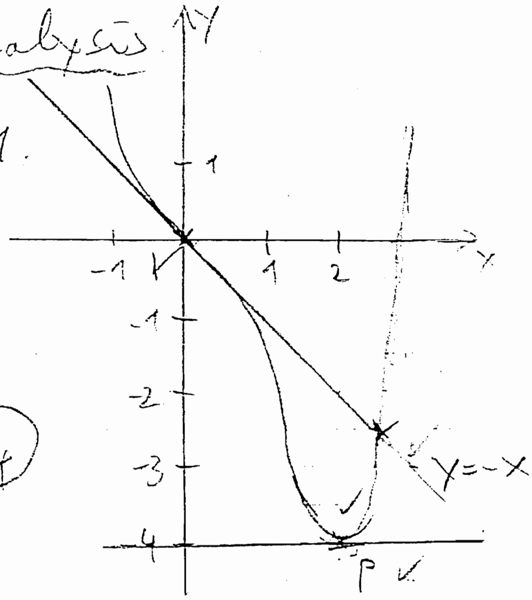
Analysis

1.1.



(4)

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

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

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

WEP(0|0) $\Rightarrow f(0) = 0 \Rightarrow \boxed{e = 0}$

$\hookrightarrow f''(0) = 0 \Rightarrow 2c = 0 \Rightarrow \boxed{c = 0}$

WT: $y = -x \Rightarrow f'(0) = -1 \Rightarrow \boxed{d = -1}$

TP(2|-4) $\Rightarrow f(2) = -4 \Rightarrow 16a + 8b - 2 = -4$ I·2

$\hookrightarrow f'(2) = 0 \Rightarrow 32a + 12b - 1 = 0$ II

2·I $32a + 16b = -4$

II $32a + 12b = 1$

2·I − II: $4b = -5$ $\boxed{b = -1{,}25}$ in II: $32a = 15 + 1 \Rightarrow \boxed{a = \frac{1}{2}}$

$\Rightarrow f(x) = \frac{1}{2}x^4 - 1{,}25x^3 - x$

(9)

1.3. • Da $y = -x$ Tangente bei $x = 0$: stetig u. diffbar $\mathbb{D}_f = \mathbb{D}_g = \mathbb{R}$

• $g(2{,}5) = -2{,}5$; $f(2{,}5) = f(2{,}5) = -2{,}5 \Rightarrow$ stetig bei $x = 2{,}5$ aber

• nicht diffbar, da $g'(2{,}5) < 0$ $f'(2{,}5) > 0$ (oder Werte)

(7)

2.1. $V = \frac{1}{3}\pi r^2 h$ NB: $h + r = 12 \Rightarrow r = 12 - h \Rightarrow V(h) = \frac{1}{3}\pi(12-h)^2 h \Rightarrow$

$V(h) = \frac{1}{3}\pi(144 - 24h + h^2) h \Rightarrow V(h) = \pi(\frac{1}{3}h^3 - 8h^2 + 48h)$ $D_V =]0{,}12[$

2.2. $V'(h) = \pi(h^2 - 16h + 48) = 0$ $h_{1/2} = \frac{16 \pm \sqrt{256 - 192}}{2}$

$(h_1 = 12 \notin \mathbb{D}_V)$ $\boxed{h_2 = 4}$ $V''(h) = \pi(2h - 16)$

$V''(4) = \pi \cdot (-8) < 0 \Rightarrow V$ max. für $h = 4$ [cm]

$r = 8$ cm $\Rightarrow V(4) = \frac{256}{3}\pi = 268$ cm^3

(6)

30 P.