Nr. 7.) a) Falsch: Gegenbeispiel $f(x) = x^5$

b) Richtig: $f(x) = ax^3 + bx^2 + cx + d \; ; \; a \neq 0$

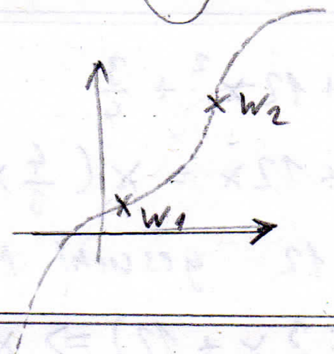
$f'(x) = 3ax^2 + 2bx + c$

$f''(x) = 6ax + 2b = 0 \Rightarrow x_1 = -\frac{2b}{a}$

$f'''(x) = 6a \Rightarrow f'''\left(-\frac{2b}{a}\right) = 6a \neq 0$ $\Rightarrow$ Wendestelle

c) Richtig:

d) Falsch:



Nr. 8.) $f(x) = \frac{1}{6}x^3 - \frac{3}{4}x^2 + 2 \; ; \; f'(x) = \frac{1}{2}x^2 - \frac{3}{2}x$

$f''(x) = x - \frac{3}{2} \; ; \; f'''(x) = 1$

Wendestelle notw. Bed. $f''(x) = 0 = x - \frac{3}{2} \Rightarrow x_w = \frac{3}{2}$

$f'''\left(\frac{3}{2}\right) = 1 \neq 0$

$\Rightarrow W\left(\frac{3}{2} \,\middle|\, f\left(\frac{3}{2}\right)\right) = \left(\frac{3}{2} \,\middle|\, \frac{1}{6}\cdot\frac{27}{8} - \frac{3}{4}\cdot\frac{9}{4} + 2\right) = \left(\frac{3}{2} \,\middle|\, \frac{7}{8}\right)$

$W\,(u \mid f(u))$

$t(x) = f'(u)\cdot(x-u) + f(u)$

$t(x) = \left(\frac{1}{2}\cdot\left(\frac{3}{2}\right)^2 - \frac{3}{2}\cdot\frac{3}{2}\right)\cdot\left(x - \frac{3}{2}\right) + \frac{7}{8}$

$t(x) = -\frac{9}{8}\left(x - \frac{3}{2}\right) + \frac{7}{8} = -\frac{9}{8}x + \frac{27}{16} + \frac{7}{8}$

$t(x) = -\frac{9}{8}x + \frac{41}{16}$ Tangentengleichung

O. Fell