

Nr. 10) a)  $f_a(x) = x^3 - ax^2$ ;  $f'_a(x) = 3x^2 - 2ax$ ;  $a \in \mathbb{R}^+$

$f''_a(x) = 6x - 2a$       $f'''_a(x) = 6$

Wendestelle: notw. Bed  $f''_a(x) \stackrel{!}{=} 0 = 6x - 2a$

$6x - 2a = 0 \Rightarrow x_w = \frac{2a}{6} = \frac{a}{3}$

hinr. Bed  $f'''_a\left(\frac{a}{3}\right) = 6 \neq 0 \Rightarrow \underline{W_a\left(\frac{a}{3} \mid \left(\frac{a}{3}\right)^3 - a \cdot \left(\frac{a}{3}\right)^2\right) = \left(\frac{a}{3} \mid -\frac{2a^3}{27}\right)}$

b)  $f_a(x) = x^4 - 2ax^2 + 1$ ;  $f'_a(x) = 4x^3 - 4ax$

$f''_a(x) = 12x^2 - 4a$ ;  $f'''_a(x) = 24x$

Wendestelle:  $f''_a(x) \stackrel{!}{=} 0$  notw. Bed.

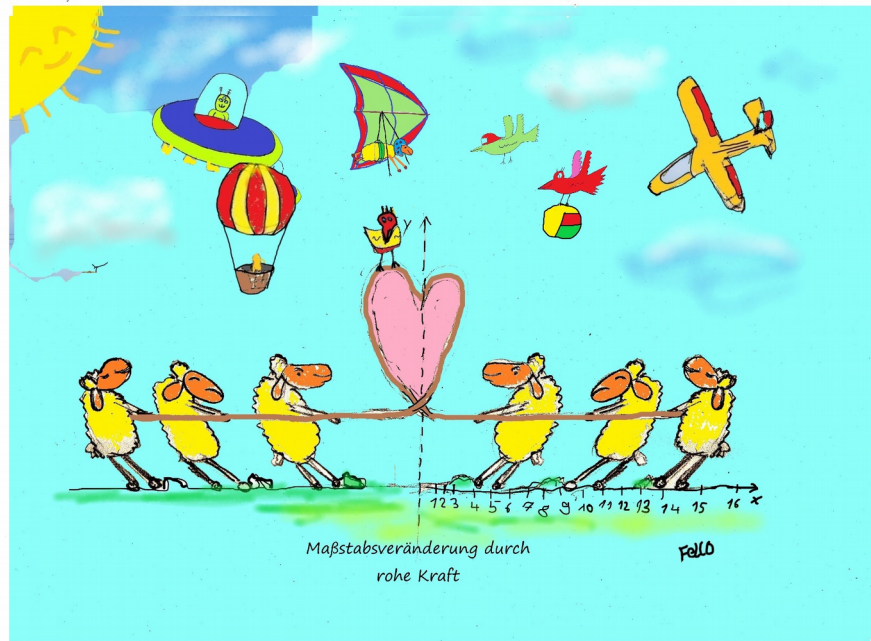
$12x^2 - 4a = 0 \Rightarrow x^2 = \frac{4a}{12} \Rightarrow \underline{x_{1,2} = \pm \sqrt{\frac{a}{3}}}$

hinr. Bed.  $f'''_a\left(+\sqrt{\frac{a}{3}}\right) = 24 \cdot \sqrt{\frac{a}{3}} \neq 0$

$f'''_a\left(-\sqrt{\frac{a}{3}}\right) = -24 \cdot \sqrt{\frac{a}{3}} \neq 0$

$\Rightarrow \underline{W_{a_1}\left(-\sqrt{\frac{a}{3}} \mid \left(-\sqrt{\frac{a}{3}}\right)^4 - 2a \cdot \left(-\sqrt{\frac{a}{3}}\right)^2 + 1\right) = \left(-\sqrt{\frac{a}{3}} \mid -\frac{5}{9}a^2 + 1\right)}$

$\underline{W_{a_2}\left(\sqrt{\frac{a}{3}} \mid \left(\sqrt{\frac{a}{3}}\right)^4 - 2a \cdot \left(\sqrt{\frac{a}{3}}\right)^2 + 1\right) = \left(\sqrt{\frac{a}{3}} \mid -\frac{5}{9}a^2 + 1\right)}$



O. Fell