

Übungen zu Ortskurven

NT 2016

$$f_a(x) = ax^3 - 3x^2 + 3$$

$$f_a'(x) = 3ax^2 - 6x$$

$$f_a''(x) = 6ax - 6$$

$$0 = 6ax - 6 \quad x = \frac{1}{a}$$

$$y = \frac{1}{a^3} - \frac{3}{a^2} + 3 = -\frac{2}{a^2} + 3$$

$$a = \frac{1}{x}$$

$$y = -\frac{2}{\left(\frac{1}{x}\right)^2} + 3 = -2x^2 + 3$$

$$\underline{\underline{y = -2x^2 + 3}}$$

ET 2012

$$f_p(x) = x^2 - px - 2$$

$$f_p'(x) = 2x - p$$

$$0 = 2x - p \quad x = \frac{p}{2}$$

$$y = \frac{p^2}{4} - \frac{p^2}{2} - 2 = -\frac{p^2}{4} - 2$$

$$p = 2x$$

$$y = -\frac{4x^2}{4} - 2 = -x^2 - 2$$

$$\underline{\underline{y = -x^2 - 2}}$$

ET 2013

$$f_t(x) = \frac{1}{3}x^3 - tx^2$$

$$f_t'(x) = x^2 - 2tx$$

$$0 = x(x - 2t) \quad x_1 = 0$$

$$x_2 = 2t$$

$$f_t''(x) = 2x - 2t$$

$$f_t''(0) = -2t < 0 \Rightarrow \text{Max}$$

$$f_t''(2t) = 4t - 2t = 2t > 0 \Rightarrow \text{Min}$$

$$y_2 = \frac{8}{3}t^3 - 4t^3 = -\frac{4}{3}t^3$$

$$t = \frac{x}{2}$$

$$y = -\frac{4}{3} \cdot \frac{x^3}{8} = -\frac{1}{6}x^3$$
$$\underline{\underline{y = -\frac{1}{6}x^3}}$$

NT 2012

$$f_k(x) = \frac{1}{3}x^3 - k^2x + k^3$$

$$f'_k(x) = x^2 - k^2$$

$$x = k$$

$$y = \frac{1}{3}k^3 - k^3 + k^3 = \frac{1}{3}k^3$$

$$\underline{\underline{y = \frac{1}{3}x^3}}$$

NT 2014

$$f_a(x) = x^2 - 2ax + a$$

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

$$x = a$$

$$y = a^2 - 2a^2 + a$$

$$y = -a^2 + a$$

$$\underline{\underline{y = -x^2 + x}}$$

NT 2015

$$f_k(x) = -\frac{1}{2}x^2 + kx + k$$

$$f'_k(x) = -x + k$$

$$x = k$$

$$y = -\frac{1}{2}k^2 + k^2 + k$$

$$y = \frac{1}{2}k^2 + k$$

$$\underline{\underline{y = \frac{1}{2}x^2 + x}}$$