Formula to Analysis

slope: m = tangα = f '(x) α = tang^{-1}(f '(x)) touch: I. f(x) = g(x) II. f ' (x) = g ' (x) Extrema: I. f ' (x_E) = 0 II. f '' (x_E) < 0 HP f '' (x_E) = 0 SP f '' (x_E) > 0 TP Inflection point: I. f '' (x_{WP}) = 0 II. f ''' (x_{WP}) $\neq 0$	<u>Linear function</u>: Y=mx+n $X_0 = \frac{-n}{m}$; $Y_0 = n$ Two lines are parallel: $m_1 = m_2$ Two lines are ortogonal: $m_1 = 1/m_2$ <u>Quadratic function</u>: $Y = ax^2 + bx + c$ $X_0 =$ p/q Formel ... $Y_0 =$ c $SP\ \left(\frac{-b}{2a};\frac{4ac-b^2}{4a}\right)$ a>0 upwards a<0 downwards vertex in [0,0]: $Y = ax^2$ vertex on Y-Axis: $Y = ax^2 + c$ Parabola through [0,0]: $Y = ax^2 + bx$	<u>Analysis:</u> Tangents / Normals $Y_{Tan} = f'(x_1)\cdot(x - x_1) + f(x_1)$ $Y_{Nor} = -\frac{1}{f'(x_1)}\cdot(x - x_1) + f(x_1)$ <u>Touch of two functions:</u> $f(x_1) = g(x_1)$ und f ' (x_1) = g ' (x_1)
	<u>Distance between two points</u> $P_1(x_1; y_1)$; $P_2(x_2; y_2)$ $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ <u>Line through two points:</u> $P_1(x_1; y_1)$; $P_2(x_2; y_2)$ $m = \frac{y_2 - y_1}{x_2 - x_1}$; $n = y - m \cdot x$ $Y = mx + n$	<u>Special derivative:</u> $\sqrt{x}\,' = \frac{1}{2\sqrt{x}}$ $\frac{1}{x}\,' = -\frac{1}{x^2}$ $\frac{1}{x^2}\,' = -\frac{2}{x^3}$