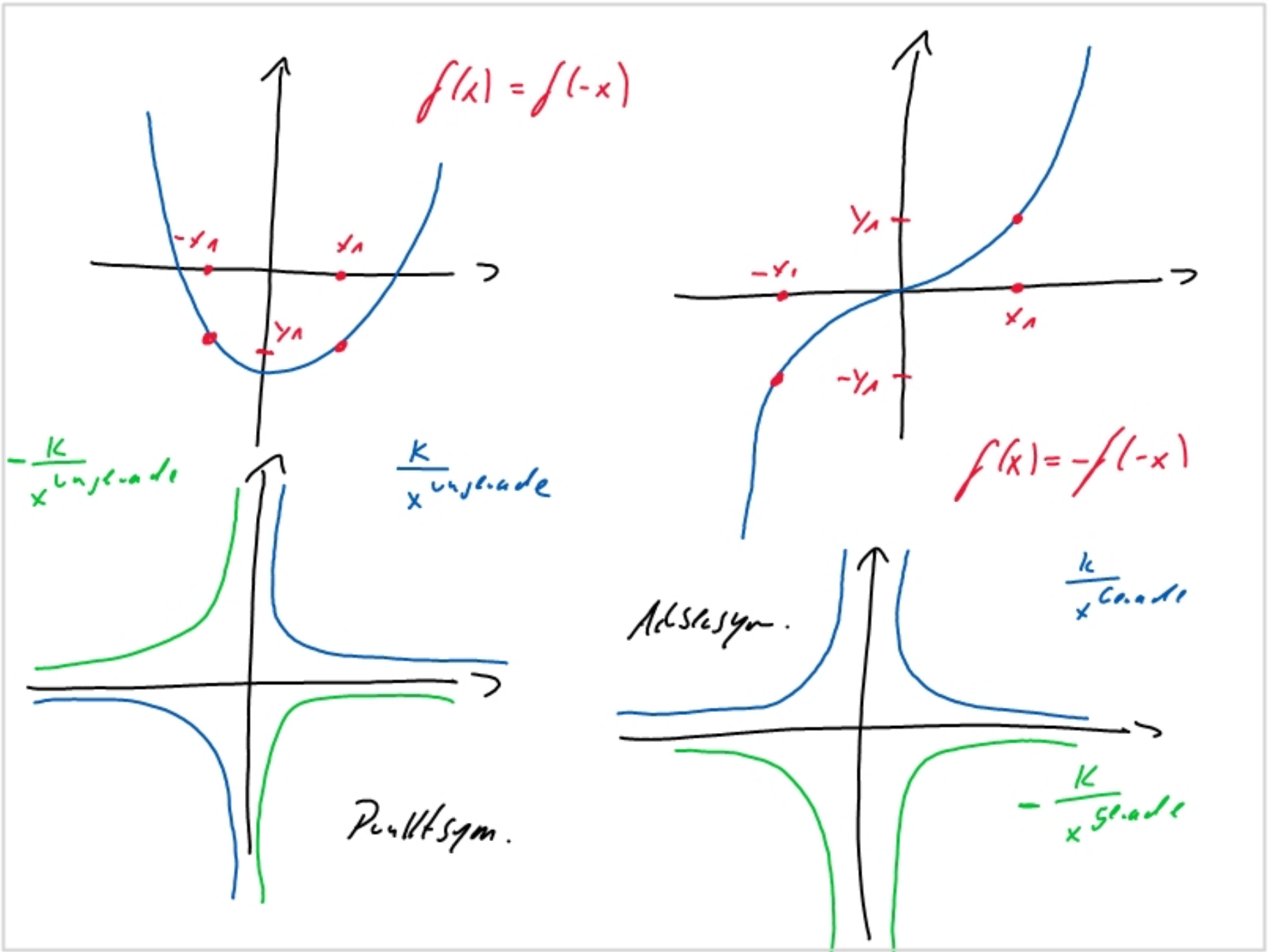
f(x) = f(-x)
-y_A
y_A
y_A
-k / x^ungerade
k / x^ungerade
Achsensym.
f(x) = -f(-x)
y_A
-y_A
-y_A
y_A
k / x^gerade
-k / x^gerade
Punktsym.

1) 2) 3) a) I)

1) $\sqrt[3]{\sqrt{a^4 \cdot \sqrt[3]{a} \cdot \sqrt[3]{a}}\, a^2} = \left(\left(a^4\right)^{1/2}\right)^{1/3} \left(\left(\left(a^3\right)^{1/2}\right)^{1/3}\right)^{1/3} \left(\left(\left(a^{1/3}\right)^{1/2}\right)^{1/3} \left(a^2\right)^{1/3}\right)^{1/3}$

$a^{2/3}\, a^{1/4}\, a^{1/18}\, a^{2/3} = a^{\frac{24+9+2+24}{36}} = a^{59/36} = \sqrt[36]{a^{59}}$

2) $\dfrac{3(2x^{-2}y^{-3})^2}{2^2(3a^3b^{-2})^3} \cdot \dfrac{2^3(3a^4b^{-3})^2}{3^2(2x^{-1}y^{-2})^3}$

$\dfrac{3\,2^2 x^{-4} y^{-6}\, 2^3\, 3^2\, a^8 b^{-6}}{2^2\, 3^3\, a^9 b^{-6}\, 3^2\, 2^3\, x^{-3} y^{-6}}$

$\dfrac{3^3 2^5}{3^5 2^5} \quad \dfrac{a^8 b^6 x^3 y^6}{x^4 y^6 b^6 a^9} = \dfrac{1}{9} \cdot \dfrac{1}{ax}$

3) $\dfrac{42}{\sqrt[4]{x^{10}}} \cdot \dfrac{\left(\sqrt[4]{x^2}\right)^{3-2n}}{\sqrt[2n]{x^{4n-6}}} \cdot \left(\dfrac{\left(\sqrt[4]{x}\right)^{2n+5}}{\sqrt[\frac{4}{2}]{x^{6-4}}} \right)^2$

$\dfrac{42}{x^{10/4}} \cdot \dfrac{x^{\frac{6-4n}{4}}}{x^{\frac{2n-3}{4}}} \cdot \dfrac{x^{\frac{4n+10}{4}}}{x^{\frac{2n-4n}{4}}}$

$42 \cdot x^{\frac{-10+(6-4n)-(2n-3)+(4n+10)-(2n-4n)}{4}}$

$42 \cdot x^{\frac{-15+2n}{4}} = 42 \cdot \left(x^{-\frac{15}{4}} \cdot x^{\frac{2n}{4}} \right)$

$= 42 \cdot \dfrac{x^2}{\sqrt[4]{x^{15}}}$

a) $\left(\sqrt[12]{x^6}\right)^3 = 64 \quad | \cdot 1$

$\left((x^6)^{1/12}\right)^3 = 2^6 \quad \Leftrightarrow \quad x^{3/2} = 2^6 \quad | \uparrow^{2/3}$

$x = (2^6)^{2/3} = 2^4 = 16$

I $\quad f(x) = \sqrt[3]{\frac{3}{x-2}}$ $\qquad$ II $= x \in \mathbb{R} \setminus \{2\}$

$\qquad\qquad\qquad\qquad\qquad\qquad$ III $= y \in \mathbb{R} \setminus \{0\}$

$f(-x) = \sqrt[3]{\frac{3}{-x-2}}$

$= -\sqrt[3]{\frac{3}{x+2}} \neq f(x) \qquad -f(-x) = \sqrt[3]{\frac{3}{x+2}} \neq f(x)$

$\Rightarrow$ keine Symmetrie

Logarithmus

$a^x = b \quad | \log$

$x \cdot \log(a) = \log(b) \quad | : \log(a)$

$x = \log(b) / \log(a)$

$a^x = b \Leftrightarrow x = \log_a b$

$\log_4 16 = x$

$4^x = 16 \quad x = 2$

$\log_4 -16 = x \Leftrightarrow 4^x = -16$ ↯

$\log_4 0 = x \Leftrightarrow 4^x = 0$ ↯

$4^{-4} = \frac{1}{4^4} = \frac{1}{256}$

$x = \log 0{,}001$

$10^x = 0{,}001 = \frac{1}{1000}$

$10^x = 10^{-3}$

$x = -3$

1) $3 \cdot \log_a(x-y) + \log_a(x+y) - \frac{1}{2}\cdot \log_a(x-y)^4$

$\log_a(x-y)^3 + \log_a(x+y) - \log_a\left((x-y)^4\right)^{\frac{1}{2}}$

$\log_a \frac{(x-y)^3 (x+y)}{(x-y)^2}$

$\log_a (x-y)(x+y) = \log_a(x^2-y^2)$

3) $\log_a \sqrt[5]{\frac{x^3 \cdot y^2}{3\cdot(x+y^2)}} = \frac{1}{5}\cdot\left[\log_a x^3 + \log_a y^2 - \log_a 3 - \log_a(x+y^2)\right]$

$\frac{3}{5}\log_a x + \frac{2}{5}\log_a y - \frac{1}{5}\log_a 3 - \frac{1}{5}\log_a(x+y^2)$