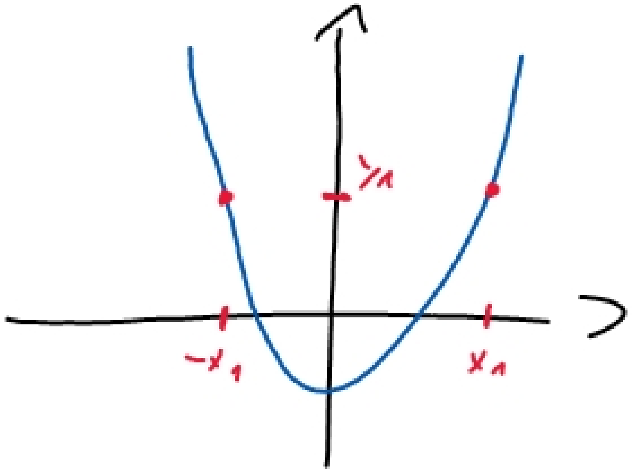
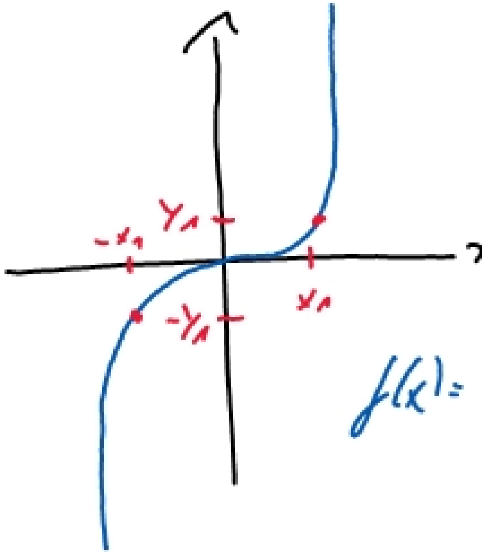
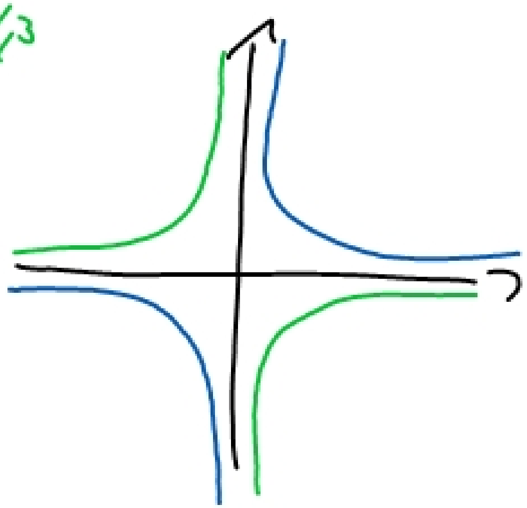


$f(x) = f(-x)$

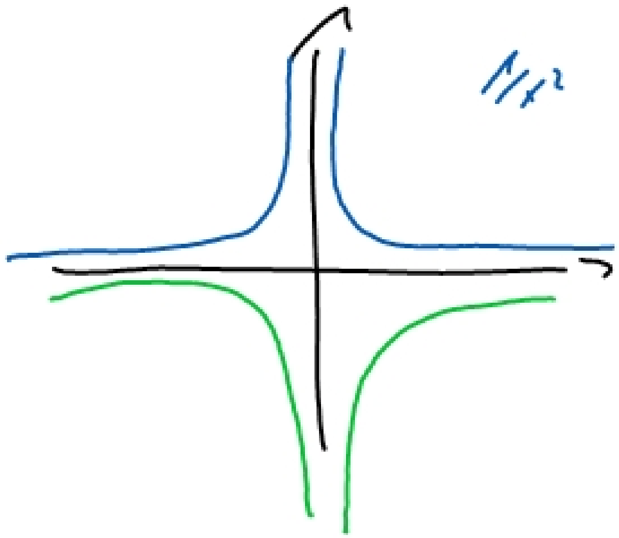


$f(x) = -f(-x)$

$-1/x^3$



$1/x$



$1/x^2$

$-1/x^4$

1) 2) 3) a) I)

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

$a^{2/3} \quad a^{1/4} \quad a^{1/18} \quad a^{2/3} = a^{\frac{24+9+2+24}{36}}$

$= a^{59/36} = \sqrt[36]{a^{59}}$

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

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

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

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

$$\frac{42}{x^{10/n}} \cdot \frac{x^{\frac{6-4n}{n}}}{x^{\frac{2n-3}{n}}} \cdot \frac{x^{\frac{24-4n}{n}}}{x^{\frac{4n+10}{n}}}$$

$$42 \cdot x^{\frac{-10+6-4n-(2n-3)+24-4n-(4n+10)}{n}}$$

$$42 \cdot x^{\frac{13-14n}{n}}$$

a) $\left(\sqrt[12]{x^6}\right)^3 = 64 \iff \left(\left(x^6\right)^{1/12}\right)^3 = 2^6$

$x^{3/2} = 2^6 \quad | \uparrow^{2/3} \quad \Rightarrow \quad x = \left(2^6\right)^{2/3} = 2^4 = 16$

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

$\mathbb{W} = y \in \mathbb{R} \setminus \{0\}$

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

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

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

$\Bigg\}$ keine Symmetrie

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

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

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

$x = \log b / \log a$

$x = \log_{10} 10.000 \iff 10^x = 10.000 = 10^4$

$x = 4$

$x = \operatorname{ld} 0{,}125 = \log_2 1/8 \iff 2^x = 1/8 = 2^{-3}$

$x = -3$

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

$\log(x-y)^3 + \log(x+y) - \log(x-y)^2$

$\log \frac{(x-y)^3 \cdot (x+y)}{(x-y)^2} = \log(x-y)(x+y) = \log(x^2-y^2)$

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

$= \frac{3}{5} \cdot \log x + \frac{2}{5} \cdot \log y - \frac{1}{5} \cdot \log 3$

$- \frac{1}{5} \cdot \log(x+y^2)$