S 148

a) $$\frac{-\frac{0{,}5}{5}-\frac{1}{2yx}}{\frac{xy}{5}+2+\frac{5}{xy}} = \frac{\frac{-xy-5}{10xy}}{\frac{(xy)^2+10xy+5^2}{5xy}} = -\frac{(xy+5)}{10xy}\cdot\frac{5xy}{(xy+5)^2} = \frac{-1}{2\cdot(xy+5)}$$

b) $$\sqrt{x}\cdot\frac{\sqrt[3]{x^2\cdot\sqrt{x}\cdot x^5}}{x^2\cdot\sqrt[6]{x^5\cdot\sqrt[3]{x^2}}}\cdot\sqrt[9]{x} = \frac{x^{1/2}\cdot x^{2/3}\cdot x^{1/12}\cdot x^{5/6}\cdot x^{1/9}}{x^2\cdot x^{5/6}\cdot x^{2/18}} = \frac{1}{\sqrt[4]{x^3}}$$

$$= x^{1/2+2/3+1/12-2} = x^{\frac{6+8+1-24}{12}} = x^{-9/12} = x^{-3/4}$$

c) $$\sqrt[3k]{\left(z^{k-3}\right)^6}\cdot\frac{\left(\sqrt[3]{\sqrt[k]{z^3}}\right)^{3-2k}}{\sqrt[4k]{z^{4k-12}}} = \left(\left(z^{k-3}\right)^6\right)^{1/3k}\cdot\left(\left(\left(z^3\right)^{1/k}\right)^{1/3}\right)^{3-2k}\cdot\left(\left(z^{4k-12}\right)^{1/4k}\right)^{-1}$$

$$= z^{\frac{2k-6}{k}}\cdot z^{\frac{3-2k}{k}}\cdot z^{\frac{-k+3}{k}}$$

$$= z^{\frac{(2k-6)+(3-2k)+(-k+3)}{k}} = z^{-k/k} = z^{-1} = \frac{1}{z}$$

d) $\frac{9\cdot(0{,}5\,x^2y^{-2}z)^4}{54\cdot(4\,x^{-2}y^3z^{-2})^{-3}}\cdot\frac{16\cdot(2\,x^2y^5z^{-4})^{-2}}{36\,(3\,x^4y^3z^{-4})^{-3}}$

$0{,}5 = 2^{-1}$

$\frac{3^2\,2^{-4}\,x^8\,y^{-8}\,z^4\;2^4\,2^{-2}\,x^{-4}\,y^{-10}\,z^8}{(2\cdot3^3)\cdot2^{-6}\,x^6\,y^{-9}\,z^6\;\;(2^2\cdot3^2)\cdot3^{-3}\,x^{-12}\,y^{-9}\,z^{12}}$

$\frac{3^2\,2^4\,3^3\,2^{-6}}{2^4\,2^2\,2\cdot3^3\,2^2\cdot3^2}\cdot\frac{x^8\,z^4\,z^8\,y^9\,x^{12}\,y^9}{y^8\,x^4\,y^{10}\,x^6\,z^6\,z^{12}}$

$2\cdot\frac{x^{10}\,y^0}{z^6}=2\cdot x^{10}\cdot z^{-6}$

S 151

1) $3 \cdot \log(x-y) + \log(x+y) - 1/2 \cdot \log(x-y)^4$

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

2) $2\ln(2x) - 3\ln 2 + 4 \cdot \ln\sqrt{x} + 2 \cdot \ln(4/x^2)$

$\ln(2x)^2 - \ln 2^3 + \ln(x^{1/2})^4 + \ln(4/x^2)^2$

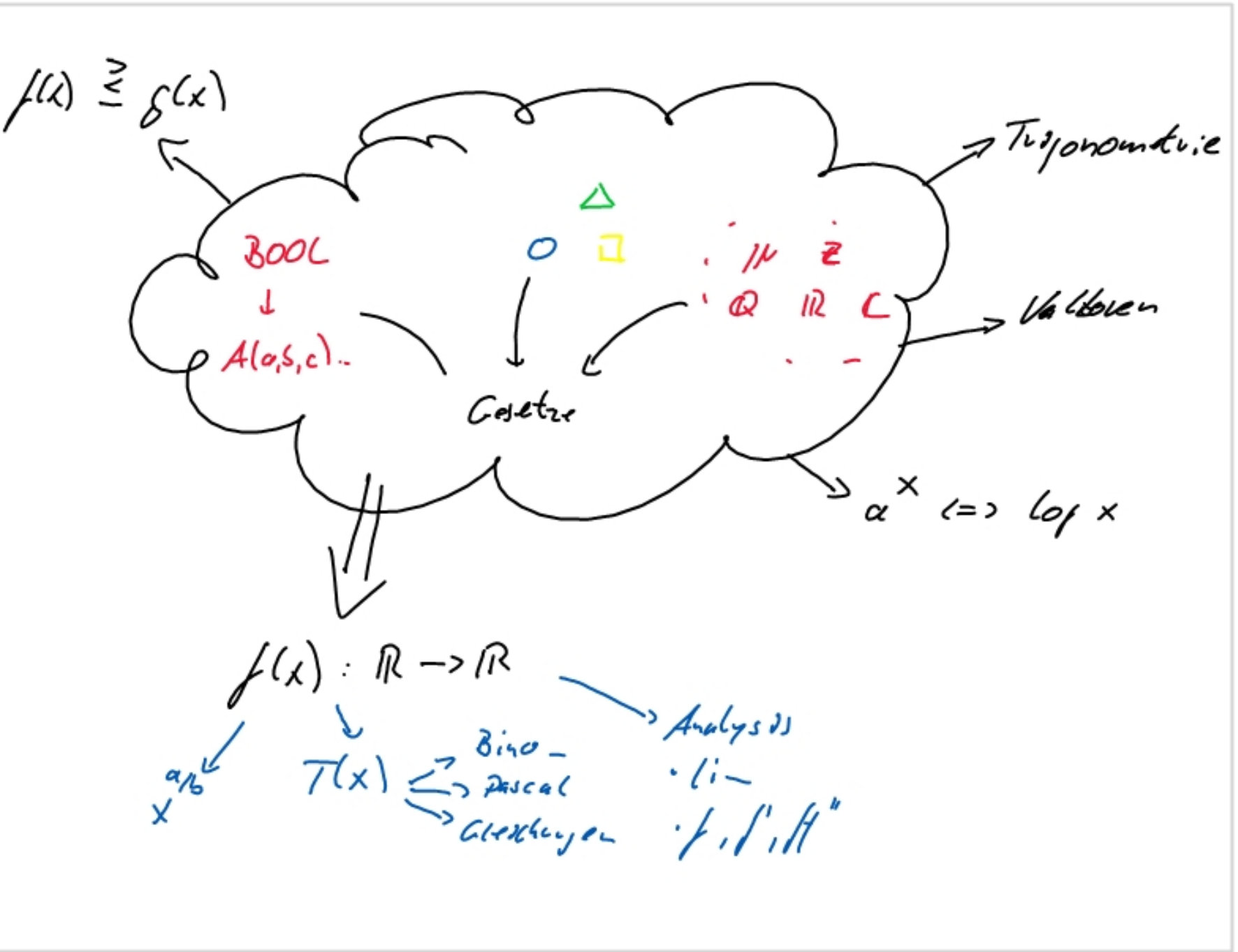
$\ln \frac{4x^2 \cdot x^2 \cdot 16/x^4}{8} = \ln 8$

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

$= 3/5 \log x + 2/5 \log y - 1/5 \log 3 - 1/5 \log(x+y^2)$

4) $\ln \left(\frac{2 \cdot \sqrt{a-25}}{c^2 \sqrt[4]{d}} \right)^3 = \ln \left(\frac{2^3 \cdot (a-25)^{3/2}}{c^6 d^{3/4}} \right) = \ln 2^3 + \ln(a-25)^{3/2} - \ln c^6 - \ln d^{3/4}$

$= 3 \cdot \ln 2 + 3/2 \cdot \ln(a-25) - 6 \cdot \ln c - 3/4 \ln d$


f(x) ≡ g(x)
Trigonometrie
BOOL
A(a,s,c)..
Geometrie
Variablen
a^x <=> log x
f(x) : ℝ -> ℝ
a/b
T(x)
Binom
Pascal
Analysis
f, f', f''

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

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

$x = \frac{\log b}{\log a} = \log_a b$

$\log_5 200 = x \quad \Rightarrow \quad 5^x = 200$

$5^3 = 125$

$5^4 = 625$

$x \approx 3{,}2$

$e^{-x} = 1/e^x$