1) \[-\frac{6,5}{5} - \frac{1}{2xy} = \frac{-xy - 5}{10xy} \frac{5}{(x^2 + 10xy + 25)} \frac{(5xy)}{5xy}\]

\[-\frac{xy - 5}{10xy} \frac{5xy}{(x^2 + 10xy + 25)} = \frac{-xy + 5}{2(5xy)} = \frac{-1}{2(5xy)}\]

5) \[\frac{\sqrt{12 \cdot (x^2 - 12 \cdot 5 \cdot 13 \cdot 13)} \cdot x}{x^2 \cdot (x^2 - 13) \cdot \sqrt{6}}\]

\[= \frac{5 \cdot 6 + 8 + 1 - 24}{12} \cdot \frac{1}{x} = \frac{1}{x} \cdot \frac{1}{\sqrt{x^3}}\]
(c) \[
3 k \sqrt{\frac{(1 - 3k)^2}{(2k - 1)}} \cdot \frac{\left(3 \sqrt{\frac{k}{2}} - 1\right)^{3 - 2k}}{4k \sqrt{2k - 1}} \cdot \frac{(1 - 3k) \cdot 6}{3k} = \frac{2 \cdot (1 - 3k) + (3 - 2k) - (1 - 3k)}{1k}
\]
\[
\frac{-1k}{k} = 2^{-1} = \frac{1}{2}
\]
\[
\frac{3^2 \cdot (2^{-1} \cdot x^2 \cdot y^{-2} \cdot z)^{-4} \cdot 2^{-1} \cdot (3 \cdot x^4 \cdot y^3 \cdot z^{-4})^{-3}}{3 \cdot 2 \cdot (2 \cdot x^2 \cdot y^{-5} \cdot z^{-4})^2} = \frac{3 \cdot 2^2 \cdot x^{-2} \cdot y^{-8} \cdot z^{-12}}{3 \cdot 2 \cdot x^6 \cdot y^{-9} \cdot z^6}
\]

\[
\frac{3 \cdot 2^2 \cdot x^3 \cdot y^2 \cdot z^4}{2^4 \cdot 2 \cdot x^2 \cdot z^3} = \frac{x^2 \cdot y^2 \cdot z^8}{x^2 \cdot 2^2 \cdot 3^3}
\]

\[
2 \cdot \frac{x^{10}}{2^2} = 2 \cdot x^{10} \cdot z^{-6}
\]
\[ f(x) = 3 \sqrt[3]{3 \cdot x - 2} \]

\[ D = x \in \mathbb{R} \setminus \{0, 3\} \]

\[ f(0) = 3 \sqrt[3]{3 \cdot 2} \approx -1 \]

\[ f'(x) = 0 = 3 \sqrt[3]{3 \cdot x - 2} \]

\[ 0 = 3x - 2 \quad \Rightarrow \quad x = \frac{2}{3} \]

\[ f''(x) = \ldots \]

\[ f(x) = 3 \sqrt[3]{3 \cdot (x - 2)^\frac{1}{3}} \]

\[ f'(x) = \ldots \]

\[ f(x) = \frac{3 \sqrt[3]{3}}{3} \cdot \frac{1}{(x - 2)^{\frac{2}{3}}} \]
Logarithms

$2^x = 32 \Rightarrow 2^x = 2^5 \Rightarrow x = 5$

$5^x = 25 \Rightarrow x \in \{1, 5\}$

$\alpha^x = 5 \quad \Leftrightarrow \quad x = \log_\alpha 5 = \frac{\log 5}{\log \alpha}$

$\Rightarrow x = \log_2 25 = \log 25$

$\log_5 (\varnothing) = x \quad \Leftrightarrow \quad 5^x = \varnothing$

$\log_5 (0) = x \quad \Leftrightarrow \quad 5^x = 0$

$\mathbb{D}_{\log} = \mathbb{R} \\supset \\{0\}$
1) \( 3 \cdot \log(x-y) + \log(x+y) - \frac{1}{2} \cdot \log((x-y)^2) \)

\[
\log(x-y)^3 + \log(x+y) - \log[(x-y)^2]^{\frac{1}{2}} \\
\log a + \log b - \log c \\
\log \frac{(x-y)^3 \cdot (x+y)}{(x-y)^2} - \log (x-y)(x+y) = \log (x^2 - y^2)
\]

2) \( 2 \ln 2x - 3 \ln 3x^2 + 4 \ln \sqrt{7x} + 2 \ln \sqrt{x}^2 \\
\ln (4x^3) - \ln 8 + \ln x^3 + \ln \frac{16}{x^4} \\
\ln \frac{4x^3}{8} = \ln 8 \)
3) \[ \log \sqrt[5]{\frac{x^{3/2}}{3 \cdot (x+y)^{3/2}}} = \frac{1}{5} \cdot \log \frac{x^{3/2}}{3 \cdot (x+y)^{3/2}} \]
\[ \frac{1}{5} \cdot \left[ \log x^3 + \log y^3 - \log 3 - \log (x+y)^{3/2} \right] \]
\[ \frac{3}{5} \log x + \frac{3}{5} \log y - \frac{1}{5} \log 3 - \frac{3}{5} \log (x+y)^{3/2} \]

4) \[ \ln \left( \frac{2^{1/a-28}}{c^{2 \sqrt{4d^3}}} \right)^3 = 3 \cdot \ln \left( \frac{2^{1/a-28}}{c^{2 \sqrt{4d^3}}} \right) \]
\[ 3 \left[ \ln 2 + \ln (a-28)^{1/2} - \ln c^2 - \ln d^{3/2} \right] \]
\[ 3 \ln 2 + \frac{3}{2} \cdot \ln (a-28) - 6 \ln c - \frac{3}{4} \ln d \]