

AUFGABEN ZU POTENZEN

Vereinfachen Sie die folgenden Ausdrücke mittels der Potenzgesetze.

$$1) \sqrt{x^3 \cdot \sqrt[4]{x^6} \cdot \sqrt[3]{x^2}} =$$

$$4) \sqrt{\frac{y^{-2} \cdot (x \cdot z^3)^5}{x^{-3} \cdot y^4 \cdot z^7}} =$$

$$2) \frac{(8u^2v^{-2}w)^4}{(81r^{-3}s^{-2}t^3)^2} : \frac{(3^4r^{-3}s^4t^3)^{-2}}{(2^4u^3v^{-4}w^{-2})^{-3}} =$$

$$5) \frac{(5ab^{-3}c^2)^3}{(2^{-3}x^2y^0)^{-2}} : \frac{(4^{-1}a^{-2}b^0c^3)^2}{(25xy^{-3})^{-2}} =$$

$$3) \frac{\sqrt[k]{a^{2-k}}}{(\sqrt[k]{a})^{3k+4}} \cdot \left(\frac{\sqrt[k]{a}}{(\sqrt[k]{a^2})^{k+3}} \right)^{-2} =$$

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

$$a) \sqrt{x^3} = 125$$

$$b) \left(\sqrt[3]{x^5} \right)^2 = 1024$$

$$c) \sqrt[3]{\frac{16}{x^2}} = 0,25$$

$$\begin{aligned}
 \text{a) } \sqrt{x^3} &= 125 \\
 x^{3/2} &= 125 \quad \uparrow^{2/3} \\
 (x^{3/2})^{2/3} &= 125^{2/3} \\
 x^1 &= \sqrt[3]{125^2} = 5^2 = 25
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } (3\sqrt{x^5})^2 &= 1024 \\
 x^{10/3} &= 1024 \\
 (x^{10/3})^{3/10} &= 1024^{3/10} = \sqrt[10]{1024^3} = 8 \\
 &= \sqrt[10]{(2^{10})^3} = 2^3
 \end{aligned}$$

$(2^{10})^3)^{1/10}$

$$\begin{aligned}
 \text{c) } \sqrt[3]{\frac{16}{x^2}} &= 0,25 = 1/4 = 1/2^2 \\
 (\frac{16}{x^2})^{1/3} &= 1/2^2 \quad \uparrow^3 \quad \frac{2^4}{x^2} = 1/2^6 \quad | \cdot x^2 \cdot 2^6 \quad \begin{matrix} 2^{10} = x^2 \\ x = 2^5 = \underline{32} \end{matrix}
 \end{aligned}$$



$$1) 3 \ln x - 5 \ln x + 3 \cdot \ln 2 = 4 \ln x - 5 \cdot \ln 4 + \frac{1}{3} \ln 8$$

$$2) \ln 256 - e^{2 \cdot \ln \sqrt{8}} + \log \frac{1}{100} - 4^{\ln 5} + 3 \ln e^2$$

$$1) \ln x^3 - \ln x^5 + \ln 2^3 = \ln x^4 - \ln 4^5 + \ln 8^{\frac{1}{3}}$$

$$\ln \frac{x^3 \cdot 2^3}{x^5} = \ln \frac{x^4 \cdot 8^{\frac{1}{3}}}{4^5} \quad \uparrow e$$

$$4 = (2^2) \quad \ln \frac{x^3 \cdot 2^3}{x^5} = \frac{x^4 \cdot 2^1}{2^{10}} \Leftrightarrow 2^{12} = x^6 \quad \sqrt[6]{\quad}$$

$$2^{2 \cdot \ln 5} = 2^{\ln 5^2} = 2 \ln 25$$

$$\pm (2^{12})^{\frac{1}{6}} = \pm 2^2 = \pm 4$$

$$\ln 2^8 - e^{\ln 8} + \log 10^{-2} - 2^{\ln 25} + \ln e^6$$

$$8 - 8 - 2 - 25 + 6 = -21$$