

Aufgabe 1

a) $27^{\frac{1}{3}} = \sqrt[3]{27} = 3$

b) $16^{\frac{1}{4}} = \sqrt[4]{16} = 2$

c) $64^{\frac{1}{6}} = \sqrt[6]{64} = 2$

d) $25^{\frac{3}{2}} = 25^{\frac{1}{2} \cdot 3} = \left(25^{\frac{1}{2}}\right)^3 = (\sqrt{25})^3 = 5^3 = 125$

e) $8^{\frac{2}{3}} = 8^{\frac{1}{3} \cdot 2} = \left(8^{\frac{1}{3}}\right)^2 = (\sqrt[3]{8})^2 = 2^2 = 4$

f) $64^{\frac{5}{6}} = 64^{\frac{1}{6} \cdot 5} = \left(64^{\frac{1}{6}}\right)^5 = (\sqrt[6]{64})^5 = 2^5 = 32$

g) $\left(\frac{1}{25}\right)^{\frac{1}{2}} = \frac{1^{\frac{1}{2}}}{25^{\frac{1}{2}}} = \frac{\sqrt{1}}{\sqrt{25}} = \frac{1}{5}$

h) $125^{\frac{1}{3}} = \sqrt[3]{125} = 5$

i) $0,25^{0,5} = \left(\frac{1}{4}\right)^{\frac{1}{2}} = \frac{1^{\frac{1}{2}}}{4^{\frac{1}{2}}} = \frac{\sqrt{1}}{\sqrt{4}} = \frac{1}{2}$

j) $0,0001^{0,25} = \left(\frac{1}{10.000}\right)^{\frac{1}{4}} = \frac{1^{\frac{1}{4}}}{10.000^{\frac{1}{4}}} = \frac{\sqrt[4]{1}}{\sqrt[4]{10.000}} = \frac{1}{10}$

k) $243^{0,2} = 243^{\frac{2}{10}} = 243^{\frac{1}{5}} = \sqrt[5]{243} = 3$

l) $100^{1,5} = 100^{\frac{3}{2}} = 100^{\frac{1}{2} \cdot 3} = \left(100^{\frac{1}{2}}\right)^3 = (\sqrt{100})^3 = 10^3 = 1000$

m)

$$\begin{aligned}\left(\frac{1}{16}\right)^{0,75} &= \left(\frac{1}{16}\right)^{\frac{3}{4}} = \left(\frac{1}{16}\right)^{\frac{1}{4} \cdot 3} = \left(\left(\frac{1}{16}\right)^{\frac{1}{4}}\right)^3 \\ &= \left(\frac{1^{\frac{1}{4}}}{16^{\frac{1}{4}}}\right)^3 = \left(\frac{\sqrt[4]{1}}{\sqrt[4]{16}}\right)^3 = \left(\frac{1}{2}\right)^3 \\ &= \frac{1^3}{2^3} = \frac{1}{8}\end{aligned}$$

n)

$$\begin{aligned}\left(\frac{1}{16}\right)^{2,5} &= \left(\frac{1}{16}\right)^{\frac{5}{2}} = \left(\frac{1}{16}\right)^{\frac{1}{2} \cdot 5} = \left(\left(\frac{1}{16}\right)^{\frac{1}{2}}\right)^5 \\ &= \left(\frac{1^{\frac{1}{2}}}{16^{\frac{1}{2}}}\right)^5 = \left(\frac{\sqrt{1}}{\sqrt{16}}\right)^5 = \left(\frac{1}{4}\right)^5 \\ &= \frac{1^5}{4^5} = \frac{1}{1024}\end{aligned}$$

o) $(10^{10})^{0,1} = 10^{10 \cdot 0,1} = 10^1 = 10$

p) $(2^4)^{0,5} = 2^{4 \cdot 0,5} = 2^2 = 4$