

Aufgabe 21

a)

$$\left(\sqrt[3]{5}\right)^6 = \left(5^{\frac{1}{3}}\right)^6 = 5^{\frac{6}{3}} = 5^2 = 25$$

b)

$$\left(\sqrt[5]{2}\right)^{-10} = \left(2^{\frac{1}{5}}\right)^{-10} = 2^{-\frac{10}{5}} = 2^{-2} = \frac{1}{2^2} = \frac{1}{4}$$

c)

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

d)

$$\left(\sqrt[4]{x}\right)^{-2} = \left(x^{\frac{1}{4}}\right)^{-2} = x^{-\frac{2}{4}} = x^{-\frac{1}{2}} = \frac{1}{x^{\frac{1}{2}}} = \frac{1}{\sqrt{x}}$$

e)

$$\left(\sqrt[5]{y^3}\right)^{10} = \left(y^{\frac{3}{5}}\right)^{10} = y^{\frac{30}{5}} = y^6$$

f)

$$\left(\sqrt{y^{-4}}\right)^{-2} = \left(y^{-\frac{4}{2}}\right)^{-2} = \left(y^{-2}\right)^{-2} = y^4$$

g)

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

h)

$$\left(\sqrt[3]{s^4}\right)^{3n} = \left(s^{\frac{4}{3}}\right)^{3n} = s^{\frac{12n}{3}} = s^{4n}$$

i)

$$\left(\sqrt[n]{t^3}\right)^{2n} = \left(t^{\frac{3}{n}}\right)^{2n} = t^{\frac{6n}{n}} = t^6$$

j)

$$\left(\sqrt[2n]{x}\right)^n = \left(x^{\frac{1}{2n}}\right)^n = x^{\frac{n}{2n}} = x^{\frac{1}{2}} = \sqrt{x}$$

k)

$$\sqrt{\sqrt{3^{2n}}} = \sqrt{3^{\frac{2n}{2}}} = \sqrt{3^n} = 3^{\frac{n}{2}}$$

l)

$$\sqrt[3]{\sqrt{b^3}} = \sqrt[3]{b^{\frac{3}{2}}} = \left(b^{\frac{3}{2}}\right)^{\frac{1}{3}} = b^{\frac{3}{6}} = b^{\frac{1}{2}} = \sqrt{b}$$