

### Aufgabe 9

a)  $4^{\frac{1}{4}} \cdot 2^{\frac{3}{2}} = (2^2)^{\frac{1}{4}} \cdot 2^{\frac{3}{2}} = 2^{\frac{2}{4}} \cdot 2^{\frac{3}{2}} = 2^{\frac{1}{2} + \frac{3}{2}} = 2^2 = 4$

b)  $\left(2^{\frac{1}{2}}\right)^6 = 2^{\frac{6}{2}} = 2^3 = 8$

c)  $3^{\frac{1}{2}} \cdot 12^{\frac{1}{2}} = (3 \cdot 12)^{\frac{1}{2}} = 36^{\frac{1}{2}} = \sqrt{36} = 6$

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

e)  $25^{\frac{3}{8}} \cdot 25^{\frac{5}{8}} = 25^{\frac{3}{8} + \frac{5}{8}} = 25^{\frac{8}{8}} = 25^1 = 25$

f)

$$\begin{aligned} 16^{\frac{2}{3}} \cdot 2^{-\frac{2}{3}} &= 16^{\frac{2}{3}} \cdot \frac{1}{2^{\frac{2}{3}}} = \frac{16^{\frac{2}{3}}}{2^{\frac{2}{3}}} \\ &= \left(\frac{16}{2}\right)^{\frac{2}{3}} = 8^{\frac{2}{3}} \\ &= \sqrt[3]{8^2} = \sqrt[3]{64} = 4 \end{aligned}$$

g)  $a^{\frac{1}{2}} \cdot a^{\frac{1}{3}} = a^{\frac{1}{2} + \frac{1}{3}} = a^{\frac{5}{6}} = \sqrt[6]{a^5}$

h)  $a^{\frac{1}{2}} : a^{\frac{1}{3}} = a^{\frac{1}{2} - \frac{1}{3}} = a^{\frac{1}{6}} = \sqrt[6]{a}$

i)  $\left(a^{\frac{3}{5}}\right)^{10} = a^{\frac{30}{5}} = a^6$

j)  $a^{-\frac{1}{2}} \cdot a^{-\frac{1}{5}} = a^{-\frac{1}{2} - \frac{1}{5}} = a^{-\frac{7}{10}} = \frac{1}{a^{\frac{7}{10}}} = \frac{1}{\sqrt[10]{a^7}}$

k)  $a^6 : a^{-\frac{1}{3}} = a^{6 - (-\frac{1}{3})} = a^{6\frac{1}{3}} = a^{\frac{19}{3}} = \sqrt[3]{a^{19}}$

l)  $\left(a^{\frac{2}{3}}\right)^{-12} = a^{-\frac{24}{3}} = a^{-8} = \frac{1}{a^8}$