

Lösung A1

- a) $\sqrt{x^2 y^2} = xy$
 b) $\sqrt{a^2 b^2 c^2} = abc$
 c) $\sqrt{4x^2 y^2} = 2xy$
 d) $\sqrt[3]{u^3 v^3 w^3} = uvw$
 e) $\sqrt[5]{x^{10} y^5 z^{15}} = x^2 y z^3$
 f) $\sqrt[4]{a^2 b^4 c^6} = bc \cdot \sqrt[4]{a^2 c^2}$
 g) $(x^4 y^4)^{\frac{3}{2}} = \sqrt{(x^4 y^4)^3} = \sqrt{x^{12} y^{12}} = x^6 y^6$
 h) $(27a^3 b^6)^{\frac{1}{3}} = \sqrt[3]{27a^3 b^6} = 3ab^2$
 i) $\sqrt{3} + 3\sqrt{2} - \sqrt{2} + 4\sqrt{3} = 5\sqrt{3} + 2\sqrt{2}$

Lösung A2

- a) $x\sqrt{y} - \sqrt[4]{b} + 2x\sqrt{y} - 3\sqrt[4]{b} = 3x\sqrt{y} - 4\sqrt[4]{b}$
 b) $\sqrt[3]{(a+b)^{2^2}} \cdot \sqrt{(a+b)^{3^3}} = ((a+b)^{\frac{2}{3}})^2 \cdot ((a+b)^{\frac{3}{3}})^3 = (a+b) \cdot \sqrt{a+b}$
 c) $\frac{3\sqrt{a^3} \cdot 2\sqrt[3]{a^2} \cdot \sqrt{a} \cdot a^{\frac{4}{3}}}{\sqrt[4]{a} \cdot a^{\frac{3}{4}}} = \frac{6a\sqrt{a} \cdot \sqrt[3]{a^2} \cdot \sqrt{a} \cdot \sqrt[3]{a^4}}{\sqrt[4]{a^4}} = \frac{6a^2 \sqrt[3]{a^6}}{a} = \frac{6a^4}{a} = 6a^5$
 d) $\sqrt[3]{x^2} \cdot \sqrt[5]{x^6} \cdot \sqrt[12]{x^{-18}} = \frac{x^{\frac{2}{3}} \cdot x^{\frac{6}{5}}}{\sqrt[12]{x^{18}}} = \frac{x^{\frac{2}{3} + \frac{6}{5}}}{x^{\frac{3}{2}}} = \frac{x^{\frac{28}{15}}}{x^{\frac{3}{2}}} = x^{\frac{28}{15} - \frac{3}{2}} = x^{\frac{71}{30}} = x^{2.3\overline{6}} \sqrt[30]{x^{11}}$
 e) $\sqrt[4]{(n+x)^3} \cdot \sqrt[4]{(n+x)^5} = (n+x)^2$
 f) $\frac{x^{\frac{2}{3}} \cdot x^{\frac{3}{2}} \cdot 5\sqrt{x} \cdot \sqrt[3]{x^4}}{\sqrt[4]{x} \cdot \sqrt[4]{x^3}} = \frac{5 \cdot \sqrt{x^4} \cdot \sqrt[3]{x^6}}{\sqrt[4]{x^4}} = 5x^2$
 g) $\frac{a^{\frac{5}{4}} \cdot \sqrt[3]{a^2} \cdot a^{\frac{3}{5}} \cdot a^{\frac{3}{5}} \cdot \sqrt[3]{a^7}}{a^4 \cdot \sqrt{a^3} \cdot \sqrt[4]{a^3}} = \frac{a^{\frac{5}{4} + \frac{3}{5} + \frac{3}{5}} \cdot \sqrt[3]{a^9}}{a^{4 + \frac{3}{2} + \frac{3}{4}}} = \frac{a^{\frac{49}{20}} \cdot a^2}{a^{\frac{24}{8}}} = \frac{a^2 \cdot a^{\frac{9}{20}} \cdot a^2}{a^3} = a \cdot \sqrt[20]{a^9}$
 h) $\frac{a^{\frac{3}{2}} \cdot \sqrt[4]{a^3} \cdot \sqrt[3]{a} \cdot 4 \cdot \sqrt[4]{a^2} \cdot \sqrt[3]{a^2} \cdot \sqrt[4]{a}}{a^4 \cdot \sqrt[4]{16a}} = \frac{4 \cdot \sqrt{a^3} \cdot \sqrt[3]{a^3} \cdot \sqrt[4]{a^6}}{2^4 \sqrt{a^3} \cdot \sqrt[4]{a}} = \frac{4a\sqrt{a} \cdot a \cdot a \cdot \sqrt[4]{a^2}}{2a} = 2a^2 \sqrt{a} \sqrt[4]{a^2} = 2a^3$

Lösung A3

- a) $\sqrt{3} \cdot \sqrt{27k} = \sqrt{81k} = 9\sqrt{k}$
 b) $(3\sqrt{a} + x\sqrt{a}) \cdot \sqrt{a} = 3a + xa = a(3+x)$
 c) $(\sqrt{3} - \sqrt{5})^2 = 3 - 2\sqrt{15} + 5 = 8 - 2\sqrt{15}$
 d) $(\sqrt{50} + \sqrt{18}) : \sqrt{2} = \sqrt{25} + \sqrt{9} = 8$
 e) $(\sqrt{3x} - \sqrt{12x}) : \sqrt{x} = \sqrt{3} - \sqrt{12} = \sqrt{3} - \sqrt{4 \cdot 3} = -\sqrt{3}$
 f) $(\sqrt{e} - \sqrt{\frac{1}{e}}) \cdot \sqrt{2e} = e\sqrt{2} - \sqrt{2} = \sqrt{2}(e-1)$
 g) $(0,5\sqrt{x})^3 + 3x\sqrt{x} = 0,125x\sqrt{x} + 3x\sqrt{x} = 3,125x\sqrt{x}$