

2.12

- 1) $\sqrt{\sqrt{16}} = ((2^4)^{\frac{1}{2}})^{\frac{1}{2}} = 2^{4 \cdot \frac{1}{2} \cdot \frac{1}{2}} = 2^1 = 2$
- 2) $\sqrt{\sqrt{4}} = ((2^2)^{\frac{1}{2}})^{\frac{1}{2}} = 2^{2 \cdot \frac{1}{2} \cdot \frac{1}{2}} = 2^{\frac{1}{2}} = \sqrt{2}$
- 3) $\sqrt[3]{\sqrt{27}} = ((3^3)^{\frac{1}{2}})^{\frac{1}{3}} = 3^{3 \cdot \frac{1}{2} \cdot \frac{1}{3}} = 3^{\frac{1}{2}} = \sqrt{3}$
- 4) $\sqrt{\sqrt[3]{729}} = ((3^6)^{\frac{1}{3}})^{\frac{1}{2}} = 3^{6 \cdot \frac{1}{3} \cdot \frac{1}{2}} = 3^1 = 3$
- 5) $\sqrt[4]{\sqrt{256}} = ((2^8)^{\frac{1}{2}})^{\frac{1}{4}} = 2^{8 \cdot \frac{1}{2} \cdot \frac{1}{4}} = 2^1 = 2$
- 6) $\sqrt[5]{\sqrt{1024}} = ((2^{10})^{\frac{1}{2}})^{\frac{1}{5}} = 2^{10 \cdot \frac{1}{2} \cdot \frac{1}{5}} = 2^1 = 2$
- 7) $\sqrt[7]{\sqrt{7^7}} = ((7^7)^{\frac{1}{2}})^{\frac{1}{7}} = 7^{7 \cdot \frac{1}{2} \cdot \frac{1}{7}} = 7^{\frac{1}{2}} = \sqrt{7}$
- 8) $\sqrt[3]{\sqrt{8}} = ((2^3)^{\frac{1}{2}})^{\frac{1}{3}} = 2^{3 \cdot \frac{1}{2} \cdot \frac{1}{3}} = 2^{\frac{1}{2}} = \sqrt{2}$
- 9) $\sqrt{3} \sqrt{3} = (3 \cdot 3^{\frac{1}{2}})^{\frac{1}{2}} = (3^{1+\frac{1}{2}})^{\frac{1}{2}} = (3^{\frac{3}{2}})^{\frac{1}{2}} = 3^{\frac{3}{2} \cdot \frac{1}{2}} = 3^{\frac{3}{4}} = \sqrt[4]{3^3} = \sqrt[4]{27}$
- 10) $\sqrt[3]{a} \sqrt{a^4} = (a \cdot a^{\frac{4}{2}})^{\frac{1}{3}} = (a \cdot a^2)^{\frac{1}{3}} = (a^3)^{\frac{1}{3}} = a^{3 \cdot \frac{1}{3}} = a^1 = a$
- 11) $\sqrt[5]{a^2} \sqrt[10]{a^3} = a^{\frac{2}{5}} \cdot a^{\frac{3}{10}} = a^{\frac{2}{5} + \frac{3}{10}} = a^{\frac{7}{10}} = \sqrt[10]{a^7}$
- 12) $\sqrt{\sqrt{\sqrt{a}}} = ((a^{\frac{1}{2}})^{\frac{1}{2}})^{\frac{1}{2}} = a^{\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}} = a^{\frac{1}{8}} = \sqrt[8]{a}$
- 13) $\sqrt[3]{a} \sqrt{a^2} \sqrt{a^4} = (a \cdot (a^2 \cdot a^{\frac{4}{2}})^{\frac{1}{2}})^{\frac{1}{3}} = a^{(1+(2+\frac{4}{2}) \cdot \frac{1}{2}) \cdot \frac{1}{3}} = a^1 = a$
- 14) $\sqrt{\sqrt[3]{\sqrt{a}}} = ((a^{\frac{1}{2}})^{\frac{1}{3}})^{\frac{1}{2}} = a^{\frac{1}{2} \cdot \frac{1}{3} \cdot \frac{1}{2}} = a^{\frac{1}{12}} = \sqrt[12]{a}$
- 15) $\sqrt{a} \sqrt[3]{a} \sqrt{a} = (a \cdot (a \cdot a^{\frac{1}{2}})^{\frac{1}{3}})^{\frac{1}{2}} = a^{(1+(1+\frac{1}{2}) \cdot \frac{1}{3}) \cdot \frac{1}{2}} = a^{\frac{3}{4}} = \sqrt[4]{a^3}$
- 16) $\sqrt[3]{a} \sqrt[3]{a^4} \sqrt[3]{a^6} = (a \cdot (a^4 \cdot a^{\frac{6}{3}})^{\frac{1}{3}})^{\frac{1}{3}} = a^{(1+(4+\frac{6}{3}) \cdot \frac{1}{3}) \cdot \frac{1}{3}} = a^1 = a$