

$$47. \sqrt{\sqrt{2}} = \sqrt{\sqrt{2^1}} = \sqrt{2^{\frac{1}{2}}} = 2^{\frac{1}{2} \cdot \frac{1}{2}} = 2^{\frac{1}{4}} = \sqrt[4]{2}$$

$$48. \sqrt{\sqrt{x}} = \sqrt[4]{x^1} = x^{\frac{1}{4}} = x^{\frac{1}{2} \cdot \frac{1}{2}} = \sqrt[4]{x}$$

$$49. \sqrt[3]{\sqrt[4]{x^{12}}} = \sqrt[3]{\sqrt[4]{x^{12}}} = \sqrt[3]{x^{\frac{12}{4}}} = \sqrt[3]{x^3} = x^{\frac{3}{3}} = x$$

$$50. \sqrt[4]{\sqrt[5]{\sqrt{2}}} = \sqrt[4]{\sqrt[5]{\sqrt{2^1}}} = \sqrt[4]{\sqrt[5]{2^{\frac{1}{2}}}} = \sqrt[4]{2^{\frac{1}{2 \cdot 5}}} = 2^{\frac{1}{2 \cdot 5 \cdot 4}} = 2^{\frac{1}{40}} = \sqrt[40]{2}$$

$$51. \sqrt{\sqrt{81}} = \sqrt{9} = 3$$

$$52. \sqrt[4]{\sqrt{c}} = \sqrt[4]{c^{\frac{1}{2}}} = c^{\frac{1}{4 \cdot 2}} = \sqrt[8]{c}$$

$$53. \sqrt[4]{\sqrt{a^{20}}} \cdot \sqrt[3]{\sqrt{a^{16}}} = \sqrt[4]{a^{\frac{20}{2}}} \cdot \sqrt[3]{a^{\frac{16}{2}}} = a^{\frac{20}{4 \cdot 2}} \cdot a^{\frac{16}{3 \cdot 2}} = a^{\frac{5}{2}} \cdot a^{\frac{8}{3}} = a^{\frac{5}{2} + \frac{8}{3}} = a^{\frac{15}{6} + \frac{16}{6}} = a^{\frac{31}{6}} = a^{\frac{5}{2} + \frac{8}{3}} = a^{\frac{15}{6} + \frac{16}{6}} = a^{\frac{31}{6}} = a^{\frac{5}{2} + \frac{8}{3}}$$

$$a^{\frac{5}{3}} = ? \quad .54$$

$$\sqrt[3]{a^5}$$

$$\sqrt[3]{3} \cdot \sqrt[4]{3} = ? \quad .55$$

$$= 3^{\frac{1}{3}} \cdot 3^{\frac{1}{4}} = 3^{\frac{4}{12} + \frac{3}{12}} = 3^{\frac{7}{12}} = \sqrt[12]{3^7}$$

$$\sqrt{40} = ? \quad .56$$

$$\sqrt{40} = \sqrt{4 \cdot 10} = 2\sqrt{10}$$

$$\sqrt{6} \cdot \sqrt{30} = ? \quad .57$$

$$\sqrt{6} \cdot \sqrt{30} = \sqrt{180} = \sqrt{36 \cdot 5} = \sqrt{36} \cdot \sqrt{5} = 6\sqrt{5}$$

$$a^{\frac{1}{2}} \cdot a^{\frac{1}{2}} = ? \quad .58$$

$$a^{\frac{1}{2}} \cdot a^{\frac{1}{2}} = a^{\frac{1}{2} + \frac{1}{2}} = a$$

$$\sqrt[3]{25} \cdot \sqrt[3]{40} = ? \quad .59$$

$$\begin{aligned}\sqrt[3]{25} \cdot \sqrt[3]{5 \cdot 8} &= \sqrt[3]{25} \cdot \sqrt[3]{5} \cdot \sqrt[3]{8} = \sqrt[3]{25 \cdot 5} \cdot \sqrt[3]{8} = \sqrt[3]{125} \cdot \sqrt[3]{8} \\ &= 5 \cdot 2 = 10\end{aligned}$$

$$\frac{a}{\sqrt{5a} \cdot \sqrt{a}} = ? \quad .60$$

$$\frac{a}{\sqrt{5a} \sqrt{a}} = \frac{a}{\sqrt{5a \cdot a}} = \frac{a}{\sqrt{5a^2}} = \frac{a}{\sqrt{5} \cdot \sqrt{a^2}} = \frac{\cancel{a}}{\sqrt{5} \cdot \cancel{a}} = \frac{1}{\sqrt{5}}$$

$$\frac{\sqrt[3]{48}}{\sqrt[3]{2} \cdot \sqrt[3]{3}} = ? \quad .61$$

$$\frac{\sqrt[3]{48}}{\sqrt[3]{2 \cdot 3}} = \frac{\sqrt[3]{48}}{\sqrt[3]{6}} = \sqrt[3]{\frac{48}{6}} = \sqrt[3]{8} = 2$$

$$\sqrt[a]{\sqrt[b]{x}} = ? \quad .62$$

$$= \sqrt{x^{\frac{1}{b}}} = x^{\frac{1}{b} \cdot \frac{1}{a}} = x^{\frac{1}{ab}}$$

$$(\sqrt{2})^6 = ? \quad .63$$

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