

① a) $(-10)^{-3} = \frac{1}{(-10)^3} = -\frac{1}{1000} = \underline{\underline{-0.001}}$

b) $\frac{1}{-10^{-2}} = -\frac{1}{10^{-2}} = -10^2 = \underline{\underline{-100}}$

c) $\left(\frac{1}{-10}\right)^{-2} = \left(-\frac{1}{10}\right)^{-2} = \left(-\frac{10}{1}\right)^2 = +10^2 = \underline{\underline{100}}$

d) $(-2)^{-4} = \left(\frac{1}{-2}\right)^4 = \left(-\frac{1}{2}\right)^4 = \frac{1}{16} = \underline{\underline{0.0625}}$

② a) $\sqrt{x^3} = (x^3)^{\frac{1}{2}} = \underline{\underline{x^{3/2}}}$

b) $\left(\sqrt[3]{x}\right)^5 = (x^{\frac{1}{3}})^5 = \underline{\underline{x^{5/3}}}$

c) $\left(\sqrt[3]{x^2}\right)^2 = \left((x^2)^{\frac{1}{3}}\right)^2 = \underline{\underline{x^{4/3}}}$

d) $\sqrt[3]{xy^3} = \left((xy^3)^{\frac{1}{2}}\right)^3 = \underline{\underline{x^{3/2} y^{9/2}} = (x^3 y^9)^{1/2}}$

③ a) $2^{1/5} = \underline{\underline{\sqrt[5]{2}}} = (xy^3)^{3/2}$

b) $\frac{s^{1/2}}{s^{1/3}} = s^{\frac{1}{2} - \frac{1}{3}} = s^{\frac{3}{6} - \frac{2}{6}} = s^{1/6} = \underline{\underline{\sqrt[6]{s}}}$

c) $a^{3/4} \cdot b^{3/4} = (ab)^{3/4} = \underline{\underline{\sqrt[4]{(ab)^3} = (\sqrt[4]{ab})^3}}$

d) $\sqrt[3]{xy^3} \sqrt[3]{x^2y^4} = (xy^3)^{1/2} (x^2y^4)^{1/3}$
 $= x^{\frac{1}{2}} y^{\frac{3}{2}} x^{\frac{2}{3}} y^{\frac{4}{3}} = x^{\frac{1}{2} + \frac{2}{3}} y^{\frac{3}{2} + \frac{4}{3}} = x^{7/6} y^{17/6}$

d) $x^{\frac{2}{3}} y^{-\frac{3}{2}} = \frac{x^{2/3}}{y^{3/2}} = \underline{\underline{\frac{\sqrt[3]{x^2}}{\sqrt{y^3}}}}$

4) a) $\sqrt{x^7} \cdot \sqrt{x^3} = x^{\frac{7}{2}} x^{\frac{3}{2}} = x^{\frac{7}{2} + \frac{3}{2}} = x^{\frac{10}{2}} = x^5$
 oder: $= \sqrt{x \cdot x^3} = \sqrt{x^4} = \underline{\underline{x^2}}$

b) $\sqrt{x^7} \sqrt[4]{x^7} = x^{\frac{7}{2}} x^{\frac{7}{4}} = x^{\frac{14}{4} + \frac{7}{4}} = x^{\frac{21}{4}}$

c) $\sqrt[3]{x^5} \sqrt[4]{x^3} = x^{\frac{5}{3}} x^{\frac{3}{4}} = x^{\frac{20}{12} + \frac{9}{12}} = x^{\frac{29}{12}}$

d) $\sqrt{x y^3} \sqrt[3]{x^2 y^4} = (x y^3)^{\frac{1}{2}} (x^2 y^4)^{\frac{1}{3}}$
 $= x^{\frac{1}{2}} x^{\frac{2}{3}} y^{\frac{3}{2}} y^{\frac{4}{3}} = x^{\frac{3}{6} + \frac{4}{6}} y^{\frac{9}{6} + \frac{8}{6}} = x^{\frac{7}{6}} y^{\frac{17}{6}} = \sqrt[6]{x^7 y^{17}}$
 $= \underline{\underline{\left(x^7 y^{17} \right)^{\frac{1}{6}}}}$

5) a) $(9a^{\frac{1}{2}})^{\frac{1}{2}} = 9^{\frac{1}{2}} a^{\frac{1}{4}} = \underline{\underline{3\sqrt[4]{a}}}$

b) $(16x)^{-\frac{1}{4}} = \frac{1}{16^{\frac{1}{4}} x^{\frac{1}{4}}} = \underline{\underline{\frac{1}{2\sqrt[4]{x}}}}$

c) $(a^{\frac{1}{2}})^{\frac{1}{3}} (a^{\frac{1}{5}})^{\frac{1}{3}} = a^{\frac{1}{6}} a^{\frac{1}{15}}$
 $= a^{\frac{5}{30} + \frac{2}{30}} = a^{\frac{7}{30}} = \underline{\underline{\sqrt[30]{a^7}}}$

d) $\left(\frac{a^{\frac{1}{2}} b^{-\frac{1}{3}}}{c^{-\frac{1}{4}}} \right)^2 = \left(\frac{a^{\frac{1}{2}} \cdot c^{\frac{1}{4}}}{b^{-\frac{1}{3}}} \right)^2 = \frac{a c^{\frac{1}{2}}}{b^{-\frac{2}{3}}}$
 $= \underline{\underline{\frac{a \sqrt{c}}{\sqrt[3]{b^2}}}}$

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$$a) \sqrt{\sqrt[3]{\sqrt{x}}} = \left(\left(x^{1/2} \right)^{1/3} \right)^{1/2} = \underline{\underline{x^{1/12}}}$$

$$b) \sqrt[3/4]{x} = x^{\frac{1}{4/3}} = \underline{\underline{x^{-3/4}}}$$

