

6HP3, 5.4.2018

$$\begin{aligned} \textcircled{1} \text{ a) } \sqrt[4]{\frac{1}{10'000^3}} &= \sqrt[4]{\frac{1}{(10^4)^3}} = \left(\frac{1}{10^{12}}\right)^{1/4} \\ &= (10^{-12})^{1/4} = 10^{-12 \cdot \frac{1}{4}} = 10^{-3} \\ &= \underline{\underline{0.001}} \end{aligned}$$

$$\text{b) } \sqrt[15]{8^{101}} = \sqrt[15]{(2^3)^{101}} = (2^{30})^{1/5} = 2^2 = \underline{\underline{4}}$$

$$\textcircled{2} \text{ a) } -3^{-1} = -(3^{-1}) = -\left(\frac{1}{3}\right) = \underline{\underline{-\frac{1}{3}}}$$

$$\text{b) } (-10)^{-2} = \frac{1}{(-10)^2} = \frac{1}{100} = \underline{\underline{0.01}}$$

$$\text{c) } -10^{-2} = -(10^{-2}) = -\frac{1}{10^2} = -\frac{1}{100} = -0.01$$

-0.01

$$\begin{aligned} \text{d) } (-10^{-1})^{-2} &= (-(10^{-1}))^{-2} \\ &= \left(-\frac{1}{10}\right)^{-2} = (-10)^2 = \underline{\underline{100}} \end{aligned}$$

$$\textcircled{3} \text{ a) } \frac{a^{-1}b^{-2}}{c^{-3}d^{-4}} = \underline{\underline{a^{-1}b^{-2}c^3d^4}}$$

$$\begin{aligned} \text{b) } \left(\frac{a^2b^{-2}}{a^{-2}b^2}\right)^{-1} &= (a^2 \cdot a^2 \cdot b^{-2} \cdot b^{-2})^{-1} \\ &= (a^4b^{-4})^{-1} = a^{-4}b^4 = \underline{\underline{a^{-4}b^4}} \end{aligned}$$

$$(4) \quad a) \quad ((ab)^2)^{-1} = (ab)^{-2} = \frac{1}{(ab)^2} = \frac{1}{a^2b^2}$$

$$b) \quad ((xy)^2 \cdot (xy)^3)^{-1} = ((xy)^5)^{-1} = (xy)^{-5} \\ = \frac{1}{(xy)^5} = \frac{1}{x^5y^5}$$

$$(5) \quad a) \quad \sqrt{x^5} = \underline{\underline{x^{5/2}}}$$

$$b) \quad \sqrt{\sqrt{x^5}} = ((x^5)^{1/2})^{1/2} = x^{5 \cdot \frac{1}{2} \cdot \frac{1}{2}} = \underline{\underline{x^{5/4}}}$$

$$c) \quad \frac{1}{\sqrt[5]{x}} = \frac{1}{x^{1/5}} = \underline{\underline{x^{-1/5}}}$$

$$d) \quad \frac{\sqrt[5]{x^3}}{\sqrt[5]{y}} = \frac{x^{3/5}}{y^{1/5}} = \underline{\underline{x^{3/5}y^{-1/5}}} = \underline{\underline{(x^3y^{-1})^{1/5}}}$$

$$(6) \quad a) \quad \sqrt[3]{x^2} \sqrt{x^3} = x^{2/3} x^{3/2} = x^{4/6} x^{9/6} = x^{13/6} \\ = \underline{\underline{x^{13/6}}}$$

$$b) \quad \sqrt[3]{(xy)^2} \sqrt{xy} = (xy)^{2/3} (xy)^{1/2} = (xy)^{2/3 + 1/2} \\ = (xy)^{4/6 + 3/6} = \underline{\underline{(xy)^{7/6}}}$$

$$(5) \quad x^{5/2} / x^{5/4} / x^{-1/5} / x^{3/5} y^{-1/5}$$