電気リメディアル数学講座 第8回 解答

問題 1. 次の式を $a^\square$ の形に表せ.

(1) $a^3 \times a^4 = a^{3+4} = a^7$

(2) $a^3 \div a^4 = a^{3-4} = a^{-1}$

(3) $\sqrt[3]{a} \times (\sqrt{a})^3 = a^{\frac{1}{3}} \left(a^{\frac{1}{2}}\right)^3 = a^{\frac{1}{3}} a^{\frac{1}{2} \times 3} = a^{\frac{1}{3} + \frac{3}{2}} = a^{\frac{11}{6}}$

(4) $\dfrac{\sqrt{a} \times \sqrt[6]{a}}{\sqrt[3]{a^2}} = \dfrac{a^{\frac{1}{2}} a^{\frac{1}{6}}}{a^{\frac{2}{3}}} = a^{\frac{1}{2} + \frac{1}{6} - \frac{2}{3}} = a^0 = 1$

問題 2. 次の式を計算し簡単にせよ.

(1)

有理数べきに直して指数法則を使い

$\sqrt[3]{4} \sqrt[3]{16} = \sqrt[3]{4} \sqrt[3]{4^2} = 4^{\frac{1}{3}} 4^{\frac{2}{3}} = 4^{\frac{1}{3} + \frac{2}{3}} = 4^1 = 4$

(2)

有理数べきに直して指数法則を使い

$\dfrac{\sqrt[5]{96}}{\sqrt[5]{3}} = \dfrac{(2^5 \times 3)^{\frac{1}{5}}}{3^{\frac{1}{5}}} = \dfrac{(2^5)^{\frac{1}{5}} 3^{\frac{1}{5}}}{3^{\frac{1}{5}}} = \dfrac{2^{5 \times \frac{1}{5}} 3^{\frac{1}{5}}}{3^{\frac{1}{5}}} = 2^{5 \times \frac{1}{5}} 3^{\frac{1}{5}} 3^{-\frac{1}{5}} = 2^{5 \times \frac{1}{5}} 3^{\frac{1}{5} - \frac{1}{5}} = 2^1 \, 3^0$
$\quad = 2$

(3)

有理数べきに直して指数法則を使い

$\left(\sqrt[4]{25}\right)^2 = \left(\sqrt[4]{5^2}\right)^2 = \left(5^{\frac{2}{4}}\right)^2 = 5^{\frac{2}{4} \times 2} = 5^1 = 5.$

(4)

有理数べきに直して指数法則を使い

$\sqrt[3]{16} + \sqrt[6]{4} = \sqrt[3]{2^4} + \sqrt[6]{2^2} = 2^{\frac{4}{3}} + 2^{\frac{1}{3}} = 2^{1 + \frac{1}{3}} + 2^{\frac{1}{3}} = 2 \times 2^{\frac{1}{3}} + 2^{\frac{1}{3}} = 3 \times 2^{\frac{1}{3}}.$

(5) $4^{\frac{1}{2}} \times 16^{\frac{1}{4}} = (2^2)^{\frac{1}{2}} \times (2^4)^{\frac{1}{4}} = 2^{2 \times \frac{1}{2}} \times 2^{4 \times \frac{1}{4}} = 2^1 \times 2^1 = 4.$

(6) $8^{-\frac{1}{2}} \div 4^{-\frac{1}{2}} = 2^{3\times(-\frac{1}{2})} \div 2^{2\times(-\frac{1}{2})} = 2^{-\frac{3}{2}} \div 2^{-1} = 2^{-\frac{3}{2}-(-1)} = 2^{-\frac{1}{2}}.$

(7) $\sqrt[3]{8} \times \sqrt[4]{16} = (2^3)^{\frac{1}{3}} \times (2^4)^{\frac{1}{4}} = 4.$

(8) $\sqrt{48} - \sqrt{75} = \sqrt{3\times4^2} - \sqrt{3\times5^2} = 4\sqrt{3} - 5\sqrt{3} = -\sqrt{3}.$