

平方根の計算③ 解答と解説

1 解答 (1) $6\sqrt{10}$ (2) $10\sqrt{21}$ (3) $-6\sqrt{6}$ (4) $70\sqrt{6}$ (5) 30

(6) $\frac{\sqrt{3}}{5}$ (7) $-\frac{5}{6}$ (8) $2\sqrt{3}$ (9) -8

$$(1) \sqrt{8} \times \sqrt{45} = 2\sqrt{2} \times 3\sqrt{5} \\ = 2 \times 3 \times \sqrt{2} \times \sqrt{5} \\ = 6\sqrt{10}$$

$$(2) \sqrt{28} \times \sqrt{75} = 2\sqrt{7} \times 5\sqrt{3} \\ = 2 \times 5 \times \sqrt{7} \times \sqrt{3} \\ = 10\sqrt{21}$$

$$(3) -\sqrt{12} \times \sqrt{18} = -2\sqrt{3} \times 3\sqrt{2} \\ = -2 \times 3 \times \sqrt{3} \times \sqrt{2} \\ = -6\sqrt{6}$$

$$(4) \sqrt{20} \times \sqrt{21} \times \sqrt{70} = \sqrt{20 \times 21 \times 70} \\ = \sqrt{2^2 \times 5 \times 3 \times 7 \times 2 \times 5 \times 7} \\ = \sqrt{2^2 \times 5^2 \times 7^2 \times 2 \times 3} \\ = (2 \times 5 \times 7) \times \sqrt{2 \times 3} \\ = 70\sqrt{6}$$

$$(5) \sqrt{35} \times \sqrt{12} \times \sqrt{\frac{15}{7}} = \sqrt{35 \times 12 \times \frac{15}{7}} \\ = \sqrt{5 \times 12 \times 15} \\ = \sqrt{5 \times 2^2 \times 3 \times 3 \times 5} \\ = \sqrt{2^2 \times 3^2 \times 5^2} \\ = 2 \times 3 \times 5 \\ = 30$$

$$(6) \sqrt{45} \div \sqrt{375} = \sqrt{\frac{45}{375}} \\ = \sqrt{\frac{3^2 \times 5}{3 \times 5^3}}$$

$$= \sqrt{\frac{3}{5^2}} \\ = \frac{\sqrt{3}}{5}$$

$$(7) \sqrt{125} \div (-\sqrt{180}) = -\sqrt{\frac{125}{180}} \\ = -\sqrt{\frac{5^3}{2^2 \times 3^2 \times 5}} \\ = -\sqrt{\frac{5^2}{2^2 \times 3^2}} \\ = -\frac{5}{2 \times 3} \\ = -\frac{5}{6}$$

$$(8) \sqrt{\frac{27}{2}} \times \sqrt{80} \div \sqrt{90} = \sqrt{\frac{27}{2} \times 80 \times \frac{1}{90}} \\ = \sqrt{3 \times 4} \\ = \sqrt{2^2 \times 3} \\ = 2\sqrt{3}$$

$$(9) \sqrt{96} \div (-3\sqrt{3}) \times \sqrt{18} = \sqrt{96} \div (-\sqrt{27}) \times \sqrt{18} \\ = -\sqrt{\frac{96 \times \frac{1}{27} \times 18}{32 \times 2}} \\ = -\sqrt{\frac{64}{64}} \\ = -1$$

2 解答 (1) $\sqrt{3}$ (2) $5\sqrt{7}$ (3) $-\sqrt{2}$ (4) $\sqrt{3}$ (5) $\frac{27\sqrt{10}}{5}$

(6) $7\sqrt{3}$ (7) $\frac{\sqrt{2}}{12}$ (8) $4\sqrt{2}$ (9) $-9\sqrt{3}$

$$(1) \frac{12}{\sqrt{3}} - \sqrt{27} = \frac{12 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} - 3\sqrt{3} \\ = \frac{12\sqrt{3}}{3} - 3\sqrt{3} \\ = 4\sqrt{3} - 3\sqrt{3} \\ = \sqrt{3}$$

$$(2) \sqrt{63} + \frac{14}{\sqrt{7}} = 3\sqrt{7} + \frac{14 \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}} \\ = 3\sqrt{7} + \frac{14\sqrt{7}}{7} \\ = 3\sqrt{7} + 2\sqrt{7} \\ = 5\sqrt{7}$$

$$(3) \sqrt{8} - \frac{6}{\sqrt{2}} = 2\sqrt{2} - \frac{6 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} \\ = 2\sqrt{2} - \frac{6\sqrt{2}}{2} \\ = 2\sqrt{2} - 3\sqrt{2} \\ = -\sqrt{2}$$

$$(4) \sqrt{54} \div \sqrt{2} - \sqrt{2} \times \sqrt{6} = \sqrt{\frac{54}{2}} - \sqrt{2 \times 6} \\ = \sqrt{27} - \sqrt{12} \\ = 3\sqrt{3} - 2\sqrt{3} \\ = \sqrt{3}$$

$$(5) \sqrt{12} \times \sqrt{30} - \sqrt{18} \div \sqrt{5} = \sqrt{12 \times 30} - \frac{\sqrt{18}}{\sqrt{5}} \\ = 6\sqrt{10} - \frac{3\sqrt{2}}{\sqrt{5}} \\ = 6\sqrt{10} - \frac{3\sqrt{2} \times \sqrt{5}}{\sqrt{5} \times \sqrt{5}}$$

$$= 6\sqrt{10} - \frac{3\sqrt{10}}{5} \\ = \left(6 - \frac{3}{5}\right)\sqrt{10} \\ = \frac{27\sqrt{10}}{5}$$

$$(6) \sqrt{12} - \frac{3}{\sqrt{3}} + 2\sqrt{27} = 2\sqrt{3} - \frac{3 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} + 2 \times 3\sqrt{3} \\ = 2\sqrt{3} - \frac{3\sqrt{3}}{3} + 6\sqrt{3} \\ = 2\sqrt{3} - \sqrt{3} + 6\sqrt{3} \\ = 7\sqrt{3}$$

$$(7) \frac{6}{\sqrt{2}} - \frac{5}{2\sqrt{2}} - \frac{\sqrt{50}}{3} = \frac{6 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} - \frac{5 \times \sqrt{2}}{2\sqrt{2} \times \sqrt{2}} - \frac{5\sqrt{2}}{3} \\ = \frac{6\sqrt{2}}{2} - \frac{5\sqrt{2}}{4} - \frac{5\sqrt{2}}{3} \\ = \frac{(36 - 15 - 20)\sqrt{2}}{12} \\ = \frac{\sqrt{2}}{12}$$

$$(8) 6\sqrt{2} - 2\sqrt{8} + \sqrt{50} - \frac{6}{\sqrt{2}} = 6\sqrt{2} - 2 \times 2\sqrt{2} + 5\sqrt{2} - \frac{6 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} \\ = 6\sqrt{2} - 4\sqrt{2} + 5\sqrt{2} - 3\sqrt{2} \\ = 4\sqrt{2}$$

$$(9) \sqrt{27} - \frac{3}{\sqrt{3}} - \frac{5\sqrt{6}}{\sqrt{2}} - \frac{18}{\sqrt{3}} = 3\sqrt{3} - \frac{3 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} - \frac{5\sqrt{2} \times \sqrt{3}}{\sqrt{2}} - \frac{18 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} \\ = 3\sqrt{3} - \sqrt{3} - 5\sqrt{3} - 6\sqrt{3} \\ = -9\sqrt{3}$$