

平方根の有理化(1) 約分を忘れないように。素因数分解が必要ない問題

例題 1 次の数の分母を有理化せよ。

(1) $\frac{3}{\sqrt{2}}$

(2) $\frac{\sqrt{3}}{\sqrt{2}}$

(3) $\sqrt{\frac{3}{5}}$

(4) $\frac{10}{3\sqrt{2}}$

答

答

答

答

練習 1A 次の数の分母を有理化せよ。

(1) $\frac{1}{\sqrt{2}}$

答

(2) $\frac{\sqrt{2}}{\sqrt{3}}$

答

(3) $\sqrt{\frac{5}{2}}$

答

(4) $\frac{8}{\sqrt{3}}$

答

(5) $\frac{\sqrt{2}}{\sqrt{11}}$

答

(6) $\sqrt{\frac{7}{3}}$

答

練習 1B 次の数の分母を有理化せよ。

(1) $\frac{11}{\sqrt{3}}$

答

(2) $\frac{3}{5\sqrt{5}}$

答

(3) $\frac{12}{\sqrt{10}}$

答

(4) $\frac{9}{2\sqrt{3}}$

答

(5) $\frac{6}{5\sqrt{2}}$

答

(6) $\frac{5}{2\sqrt{5}}$

答

(7) $\frac{4}{3\sqrt{2}}$

答

(8) $\frac{9}{2\sqrt{6}}$

答

練習 1C 次の数の分母を有理化せよ。

(1) $\frac{6}{\sqrt{3}}$

答

(2) $\frac{21}{\sqrt{7}}$

答

(3) $\frac{10}{\sqrt{2}}$

答

(4) $\frac{8}{\sqrt{2}}$

答

(5) $\frac{12}{\sqrt{3}}$

答

(4) $\frac{7}{2\sqrt{7}}$

答

(5) $\frac{5}{4\sqrt{5}}$

答

(8) $\frac{2\sqrt{5}}{3\sqrt{2}}$

答

練習 1D 次の数の分母を有理化せよ。

(1) $\sqrt{\frac{3}{7}}$

答

(2) $\frac{3}{2\sqrt{2}}$

答

(3) $\frac{15}{\sqrt{5}}$

答

(4) $\frac{15}{4\sqrt{3}}$

答

(5) $\frac{54}{5\sqrt{3}}$

答

(6) $\frac{35}{4\sqrt{7}}$

答

(7) $\frac{289}{2\sqrt{17}}$

答

(8) $\frac{323}{3\sqrt{19}}$

答

平方根の有理化(1)

例題 1 次の数の分母を有理化せよ。

(1) $\frac{3}{\sqrt{2}}$

★

$$\frac{3}{\sqrt{2}} = \frac{3 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}}$$

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

答 $\frac{3\sqrt{2}}{2}$

(2) $\frac{\sqrt{3}}{\sqrt{2}}$

★

$$\frac{\sqrt{3}}{\sqrt{2}} = \frac{\sqrt{3} \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}}$$

$$= \frac{\sqrt{6}}{2}$$

答 $\frac{\sqrt{6}}{2}$

(3) $\sqrt{\frac{3}{5}}$

★

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

$$= \frac{\sqrt{3} \times \sqrt{5}}{\sqrt{5} \times \sqrt{5}}$$

$$= \frac{\sqrt{15}}{5}$$

答 $\frac{\sqrt{15}}{5}$

(4) $\frac{10}{3\sqrt{2}}$

★

$$\frac{10}{3\sqrt{2}} = \frac{10 \times \sqrt{2}}{3 \times \sqrt{2} \times \sqrt{2}}$$

$$= \frac{10\sqrt{2}}{6}$$

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

答 $\frac{5\sqrt{2}}{3}$

練習 1A 次の数の分母を有理化せよ。

(1) $\frac{1}{\sqrt{2}}$

★

$$\frac{1}{\sqrt{2}} = \frac{1 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}}$$

$$= \frac{\sqrt{2}}{2}$$

答 $\frac{\sqrt{2}}{2}$

(2) $\frac{\sqrt{2}}{\sqrt{3}}$

★

$$\frac{\sqrt{2}}{\sqrt{3}} = \frac{\sqrt{2} \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}}$$

$$= \frac{\sqrt{6}}{3}$$

答 $\frac{\sqrt{6}}{3}$

(3) $\sqrt{\frac{5}{2}}$

★

$$\sqrt{\frac{5}{2}} = \frac{\sqrt{5}}{\sqrt{2}} = \frac{\sqrt{5} \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}}$$

$$= \frac{\sqrt{10}}{2}$$

答 $\frac{\sqrt{10}}{2}$

(4) $\frac{8}{\sqrt{3}}$

★

$$\frac{8}{\sqrt{3}} = \frac{8 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}}$$

$$= \frac{8\sqrt{3}}{3}$$

答 $\frac{8\sqrt{3}}{3}$

(5) $\frac{\sqrt{2}}{\sqrt{11}}$

★

$$\frac{\sqrt{2}}{\sqrt{11}} = \frac{\sqrt{2} \times \sqrt{11}}{\sqrt{11} \times \sqrt{11}}$$

$$= \frac{\sqrt{22}}{11}$$

答 $\frac{\sqrt{22}}{11}$

(6) $\sqrt{\frac{7}{3}}$

★

$$\sqrt{\frac{7}{3}} = \frac{\sqrt{7}}{\sqrt{3}} = \frac{\sqrt{7} \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}}$$

$$= \frac{\sqrt{21}}{3}$$

答 $\frac{\sqrt{21}}{3}$

練習 1B 次の数の分母を有理化せよ。

(1) $\frac{11}{\sqrt{3}}$

★

$$\frac{11}{\sqrt{3}} = \frac{11 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{11\sqrt{3}}{3}$$

答 $\frac{11\sqrt{3}}{3}$

(2) $\frac{3}{5\sqrt{5}}$

★

$$\frac{3}{5\sqrt{5}} = \frac{3 \times \sqrt{5}}{5 \times \sqrt{5} \times \sqrt{5}} = \frac{3\sqrt{5}}{25}$$

答 $\frac{3\sqrt{5}}{25}$

(3) $\frac{12}{\sqrt{10}}$

★

$$\frac{12}{\sqrt{10}} = \frac{12 \times \sqrt{10}}{\sqrt{10} \times \sqrt{10}} = \frac{12\sqrt{10}}{10} = \frac{6\sqrt{10}}{5}$$

答 $\frac{6\sqrt{10}}{5}$

(4) $\frac{9}{2\sqrt{3}}$

★

$$\frac{9}{2\sqrt{3}} = \frac{9 \times \sqrt{3}}{2 \times \sqrt{3} \times \sqrt{3}} = \frac{9\sqrt{3}}{6} = \frac{3\sqrt{3}}{2}$$

答 $\frac{3\sqrt{3}}{2}$

(5) $\frac{6}{5\sqrt{2}}$

★

$$\frac{6}{5\sqrt{2}} = \frac{6 \times \sqrt{2}}{5 \times \sqrt{2} \times \sqrt{2}} = \frac{6\sqrt{2}}{10} = \frac{3\sqrt{2}}{5}$$

答 $\frac{3\sqrt{2}}{5}$

(6) $\frac{5}{2\sqrt{5}}$

★

$$\frac{5}{2\sqrt{5}} = \frac{5 \times \sqrt{5}}{2 \times \sqrt{5} \times \sqrt{5}} = \frac{5\sqrt{5}}{10} = \frac{\sqrt{5}}{2}$$

答 $\frac{\sqrt{5}}{2}$

(7) $\frac{4}{3\sqrt{2}}$

★

$$\frac{4}{3\sqrt{2}} = \frac{4 \times \sqrt{2}}{3 \times \sqrt{2} \times \sqrt{2}} = \frac{4\sqrt{2}}{6} = \frac{2\sqrt{2}}{3}$$

答 $\frac{2\sqrt{2}}{3}$

(8) $\frac{9}{2\sqrt{6}}$

★

$$\frac{9}{2\sqrt{6}} = \frac{9 \times \sqrt{6}}{2 \times \sqrt{6} \times \sqrt{6}} = \frac{9\sqrt{6}}{12} = \frac{3\sqrt{6}}{4}$$

答 $\frac{3\sqrt{6}}{4}$

練習 1C 次の数の分母を有理化せよ。

(1) $\frac{6}{\sqrt{3}}$

★

$$\begin{aligned} \frac{6}{\sqrt{3}} &= \frac{6 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} \\ &= \frac{6\sqrt{3}}{3} \\ &= 2\sqrt{3} \end{aligned}$$

答 $2\sqrt{3}$

(2) $\frac{21}{\sqrt{7}}$

★

$$\begin{aligned} \frac{21}{\sqrt{7}} &= \frac{21 \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}} \\ &= \frac{21\sqrt{7}}{7} \\ &= 3\sqrt{7} \end{aligned}$$

答 $3\sqrt{7}$

(3) $\frac{10}{\sqrt{2}}$

★

$$\begin{aligned} \frac{10}{\sqrt{2}} &= \frac{10 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} \\ &= \frac{10\sqrt{2}}{2} \\ &= 5\sqrt{2} \end{aligned}$$

答 $5\sqrt{2}$

(4) $\frac{8}{\sqrt{2}}$

★

$$\begin{aligned} \frac{8}{\sqrt{2}} &= \frac{8 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{8\sqrt{2}}{2} \\ &= 4\sqrt{2} \end{aligned}$$

答 $4\sqrt{2}$

(5) $\frac{12}{\sqrt{3}}$

★

$$\begin{aligned} \frac{12}{\sqrt{3}} &= \frac{12 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} \\ &= \frac{12\sqrt{3}}{3} \\ &= 4\sqrt{3} \end{aligned}$$

答 $4\sqrt{3}$

(4) $\frac{7}{2\sqrt{7}}$

★

$$\frac{7}{2\sqrt{7}} = \frac{7 \times \sqrt{7}}{2\sqrt{7} \times \sqrt{7}} = \frac{7\sqrt{7}}{14} = \frac{\sqrt{7}}{2}$$

答 $\frac{\sqrt{7}}{2}$

(5) $\frac{5}{4\sqrt{5}}$

★

$$\frac{5}{4\sqrt{5}} = \frac{5 \times \sqrt{5}}{4\sqrt{5} \times \sqrt{5}} = \frac{5\sqrt{5}}{20} = \frac{\sqrt{5}}{4}$$

答 $\frac{\sqrt{5}}{4}$

(8) $\frac{2\sqrt{5}}{3\sqrt{2}}$

★

$$\begin{aligned} \frac{2\sqrt{5}}{3\sqrt{2}} &= \frac{2\sqrt{5} \times \sqrt{2}}{3 \times \sqrt{2} \times \sqrt{2}} \\ &= \frac{2\sqrt{10}}{6} \\ &= \frac{\sqrt{10}}{3} \end{aligned}$$

答 $\frac{\sqrt{10}}{3}$

練習 1D 次の数の分母を有理化せよ。

(1) $\sqrt{\frac{3}{7}}$

★

$$\sqrt{\frac{3}{7}} = \frac{\sqrt{3}}{\sqrt{7}} = \frac{\sqrt{3} \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}} = \frac{\sqrt{21}}{7}$$

答 $\frac{\sqrt{21}}{7}$

(2) $\frac{3}{2\sqrt{2}}$

★

$$\frac{3}{2\sqrt{2}} = \frac{3 \times \sqrt{2}}{2 \times \sqrt{2} \times \sqrt{2}} = \frac{3\sqrt{2}}{4}$$

答 $\frac{3\sqrt{2}}{4}$

(3) $\frac{15}{\sqrt{5}}$

★

$$\frac{15}{\sqrt{5}} = \frac{15 \times \sqrt{5}}{\sqrt{5} \times \sqrt{5}} = \frac{15\sqrt{5}}{5} = 3\sqrt{5}$$

答 $3\sqrt{5}$

(4) $\frac{15}{4\sqrt{3}}$

★

$$\frac{15}{4\sqrt{3}} = \frac{15 \times \sqrt{3}}{4 \times \sqrt{3} \times \sqrt{3}} = \frac{15\sqrt{3}}{12} = \frac{5\sqrt{3}}{4}$$

答 $\frac{5\sqrt{3}}{4}$

(5) $\frac{54}{5\sqrt{3}}$

★

$$\frac{54}{5\sqrt{3}} = \frac{54 \times \sqrt{3}}{5 \times \sqrt{3} \times \sqrt{3}} = \frac{54\sqrt{3}}{15} = \frac{18\sqrt{3}}{5}$$

答 $\frac{18\sqrt{3}}{5}$

(6) $\frac{35}{4\sqrt{7}}$

★

$$\frac{35}{4\sqrt{7}} = \frac{35 \times \sqrt{7}}{4 \times \sqrt{7} \times \sqrt{7}} = \frac{35\sqrt{7}}{28} = \frac{5\sqrt{7}}{4}$$

答 $\frac{5\sqrt{7}}{4}$

(7) $\frac{289}{2\sqrt{17}}$

★

$$\frac{289}{2\sqrt{17}} = \frac{289 \times \sqrt{17}}{2 \times \sqrt{17} \times \sqrt{17}} = \frac{289\sqrt{17}}{34} = \frac{17\sqrt{17}}{2}$$

答 $\frac{17\sqrt{17}}{2}$

(8) $\frac{323}{3\sqrt{19}}$

★

$$\frac{323}{3\sqrt{19}} = \frac{323 \times \sqrt{19}}{3 \times \sqrt{19} \times \sqrt{19}} = \frac{323\sqrt{19}}{57} = \frac{17\sqrt{19}}{3}$$

答 $\frac{17\sqrt{19}}{3}$