

平方根の有理化(2) 素因数分解が必要な数字が大きい有理化

例題 2 次の数の分母を有理化せよ。

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

(2) $\frac{2\sqrt{3}}{\sqrt{18}}$

(3) $\frac{3\sqrt{28}}{4\sqrt{75}}$

答

答

答

練習 2A 次の計算をせよ。

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

(3) $\frac{6}{\sqrt{20}}$

答

答

(2) $\frac{3\sqrt{3}}{\sqrt{20}}$

(4) $\frac{4}{3\sqrt{24}}$

答

答

練習 2B 次の計算をせよ。

(1) $\frac{2\sqrt{5}}{\sqrt{24}}$

答

(2) $\frac{5\sqrt{7}}{\sqrt{60}}$

答

(3) $\frac{3\sqrt{5}}{\sqrt{40}}$

答

(4) $\frac{3\sqrt{2}}{\sqrt{18}}$

答

(5) $\frac{4\sqrt{10}}{\sqrt{24}}$

答

(6) $\frac{5\sqrt{2}}{\sqrt{15}}$

答

平方根の有理化(2) 素因数分解が必要な数字が大きい有理化

例題2 次の数の分母を有理化せよ。

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

★

$$\begin{aligned} \frac{3}{\sqrt{12}} &= \frac{3}{2\sqrt{3}} = \frac{3 \times \sqrt{3}}{2\sqrt{3} \times \sqrt{3}} \\ &= \frac{\overset{1}{\cancel{3}}\sqrt{3}}{\underset{2}{\cancel{6}}} \\ &= \frac{\sqrt{3}}{2} \end{aligned}$$

答 $\frac{\sqrt{3}}{2}$

(2) $\frac{2\sqrt{3}}{\sqrt{18}}$

★

$$\begin{aligned} \frac{2\sqrt{3}}{\sqrt{18}} &= \frac{2\sqrt{\overset{1}{\cancel{3}}6}}{\sqrt{\overset{1}{\cancel{3}}6}} = \frac{2}{\sqrt{6}} \\ &= \frac{2 \times \sqrt{6}}{\sqrt{6} \times \sqrt{6}} = \frac{\overset{1}{\cancel{2}}\sqrt{6}}{\underset{3}{\cancel{6}}} \\ &= \frac{\sqrt{6}}{3} \end{aligned}$$

答 $\frac{\sqrt{6}}{3}$

(3) $\frac{3\sqrt{28}}{4\sqrt{75}}$

★

$$\begin{aligned} \frac{3\sqrt{28}}{4\sqrt{75}} &= \frac{3 \times \overset{1}{\cancel{2}}\sqrt{7}}{\underset{2}{\cancel{4}} \times 5\sqrt{3}} = \frac{3\sqrt{7}}{10\sqrt{3}} \\ &= \frac{3\sqrt{7} \times \sqrt{3}}{10\sqrt{3} \times \sqrt{3}} \\ &= \frac{\overset{1}{\cancel{3}}\sqrt{21}}{\underset{30}{\cancel{30}}} \\ &= \frac{\sqrt{21}}{10} \end{aligned}$$

答 $\frac{\sqrt{21}}{10}$

練習2A 次の計算をせよ。

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

★

$$\begin{aligned} \frac{\sqrt{3}}{\sqrt{8}} &= \frac{\sqrt{3}}{2\sqrt{2}} \\ &= \frac{\sqrt{3} \times \sqrt{2}}{2\sqrt{2} \times \sqrt{2}} \\ &= \frac{\sqrt{6}}{4} \end{aligned}$$

答 $\frac{\sqrt{6}}{4}$

(2) $\frac{3\sqrt{3}}{\sqrt{20}}$

★

$$\begin{aligned} \frac{3\sqrt{3}}{\sqrt{20}} &= \frac{3\sqrt{3}}{2\sqrt{5}} \\ &= \frac{3\sqrt{3} \times \sqrt{5}}{2\sqrt{5} \times \sqrt{5}} \\ &= \frac{3\sqrt{15}}{10} \end{aligned}$$

答 $\frac{3\sqrt{15}}{10}$

(3) $\frac{6}{\sqrt{20}}$

★

$$\begin{aligned} \frac{6}{\sqrt{20}} &= \frac{\overset{3}{\cancel{6}}}{\underset{1}{\cancel{2}}\sqrt{5}} \\ &= \frac{3 \times \sqrt{5}}{\sqrt{5} \times \sqrt{5}} \\ &= \frac{3\sqrt{5}}{5} \end{aligned}$$

答 $\frac{3\sqrt{5}}{5}$

(4) $\frac{4}{3\sqrt{24}}$

★

$$\begin{aligned} \frac{4}{3\sqrt{24}} &= \frac{\overset{4}{\cancel{4}}}{3 \times \overset{1}{\cancel{2}}\sqrt{6}} \\ &= \frac{2 \times \sqrt{6}}{3\sqrt{6} \times \sqrt{6}} \\ &= \frac{\overset{1}{\cancel{2}}\sqrt{6}}{\underset{18}{\cancel{18}}} \\ &= \frac{\sqrt{6}}{9} \end{aligned}$$

答 $\frac{\sqrt{6}}{9}$

練習 2B 次の計算をせよ。

(1) $\frac{2\sqrt{5}}{\sqrt{24}}$

★

$$\begin{aligned} \frac{2\sqrt{5}}{\sqrt{24}} &= \frac{2\sqrt{5}}{2\sqrt{6}} \\ &= \frac{\sqrt{5} \times \sqrt{6}}{\sqrt{6} \times \sqrt{6}} \\ &= \frac{\sqrt{30}}{6} \end{aligned}$$

答 $\frac{\sqrt{30}}{6}$

(2) $\frac{5\sqrt{7}}{\sqrt{60}}$

★

$$\begin{aligned} \frac{5\sqrt{7}}{\sqrt{60}} &= \frac{5\sqrt{7}}{2\sqrt{15}} \\ &= \frac{5\sqrt{7} \times \sqrt{15}}{2\sqrt{15} \times \sqrt{15}} \\ &= \frac{5\sqrt{105}}{30} \\ &= \frac{\sqrt{105}}{6} \end{aligned}$$

答 $\frac{\sqrt{105}}{6}$

(3) $\frac{3\sqrt{5}}{\sqrt{40}}$

★

$$\begin{aligned} \frac{3\sqrt{5}}{\sqrt{40}} &= \frac{3\sqrt{5}}{\sqrt{40}} = \frac{3}{2\sqrt{2}} \\ &= \frac{3 \times \sqrt{2}}{2\sqrt{2} \times \sqrt{2}} \\ &= \frac{3\sqrt{2}}{4} \end{aligned}$$

答 $\frac{3\sqrt{2}}{4}$

(4) $\frac{3\sqrt{2}}{\sqrt{18}}$

★

$$\begin{aligned} \frac{3\sqrt{2}}{\sqrt{18}} &= \frac{3\sqrt{2}}{3\sqrt{2}} \\ &= 1 \end{aligned}$$

答 1

(5) $\frac{4\sqrt{10}}{\sqrt{24}}$

★

$$\begin{aligned} \frac{4\sqrt{10}}{\sqrt{24}} &= \frac{4\sqrt{10}}{\sqrt{24}} = \frac{4\sqrt{5}}{\sqrt{12}} \\ &= \frac{2\sqrt{5} \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} \\ &= \frac{2\sqrt{15}}{3} \end{aligned}$$

答 $\frac{2\sqrt{15}}{3}$

(6) $\frac{5\sqrt{2}}{\sqrt{15}}$

★

$$\begin{aligned} \frac{5\sqrt{2}}{\sqrt{15}} &= \frac{5\sqrt{2}}{\sqrt{15}} = \frac{5\sqrt{2} \times \sqrt{3}}{\sqrt{15} \times \sqrt{3}} \\ &= \frac{5\sqrt{6}}{15} \\ &= \frac{\sqrt{6}}{3} \end{aligned}$$

答 $\frac{\sqrt{30}}{3}$