

数学Ⅰ

2重根号 課題

(    )年(    )組(    )番(    )

1. 次の式を計算せよ。

Calculate the following expression.

例題

①

$$\begin{aligned} &(\sqrt{5} + \sqrt{2})^2 \\ &= (\sqrt{5})^2 + 2 \times \sqrt{5} \times \sqrt{2} + (\sqrt{2})^2 \\ &= 5 + 2\sqrt{10} + 2 = \underline{\underline{7 + 2\sqrt{10}}} \end{aligned}$$

問題

①

$$(\sqrt{5} + \sqrt{3})^2$$

例題

②

$$\begin{aligned} &(\sqrt{5} - \sqrt{2})^2 \\ &= (\sqrt{5})^2 - 2 \times \sqrt{5} \times \sqrt{2} + (\sqrt{2})^2 \\ &= 5 - 2\sqrt{10} + 2 = \underline{\underline{7 - 2\sqrt{10}}} \end{aligned}$$

問題

②

$$(\sqrt{5} - \sqrt{3})^2$$

例題

③

$$\begin{aligned} &(\sqrt{6} + \sqrt{3})^2 \\ &= (\sqrt{6})^2 + 2 \times \sqrt{6} \times \sqrt{3} + (\sqrt{3})^2 \\ &= 6 + 2\sqrt{18} + 3 = \underline{\underline{9 + 6\sqrt{2}}} \end{aligned}$$

問題

③

$$(\sqrt{2} + 3)^2$$

例題

④

$$\begin{aligned} &\left(\frac{\sqrt{6} + \sqrt{2}}{2}\right)^2 \\ &= \frac{6 + 2\sqrt{12} + 2}{4} = \frac{8 + 4\sqrt{3}}{4} \\ &= \underline{\underline{2 + \sqrt{3}}} \end{aligned}$$

問題

④

$$\left(\frac{\sqrt{5} + \sqrt{3}}{2}\right)^2$$

2. 次の式の2重根号を外しなさい。

Simplify the double radical in the following equation.

例題

①

$$\begin{aligned} &\sqrt{7 + 2\sqrt{10}} \\ &= \sqrt{(5 + 2) + 2\sqrt{5 \times 2}} \\ &= \underline{\underline{\sqrt{5} + \sqrt{2}}} \end{aligned}$$

問題

①

$$\sqrt{8 + 2\sqrt{15}}$$

例題

②

$$\begin{aligned} &\sqrt{7 - 2\sqrt{10}} \\ &= \sqrt{(5 + 2) - 2\sqrt{5 \times 2}} \\ &= \underline{\underline{\sqrt{5} - \sqrt{2}}} \end{aligned}$$

問題

②

$$\sqrt{8 - 2\sqrt{15}}$$

例題

③

$$\begin{aligned} &\sqrt{9 + 6\sqrt{2}} \\ &= \sqrt{9 + 2\sqrt{18}} = \sqrt{(6 + 3) + 2\sqrt{6 \times 3}} \\ &= \underline{\underline{\sqrt{6} + \sqrt{3}}} \end{aligned}$$

問題

③

$$\sqrt{11 + 6\sqrt{18}}$$

例題

④

$$\begin{aligned} &\sqrt{2 + \sqrt{3}} \\ &= \frac{\sqrt{4 + 2\sqrt{3}}}{\sqrt{2}} = \frac{\sqrt{(3 + 1) + 2\sqrt{3 \times 1}}}{\sqrt{2}} \\ &= \frac{\sqrt{3} + \sqrt{1}}{\sqrt{2}} = \underline{\underline{\frac{\sqrt{6} + \sqrt{2}}{2}}} \end{aligned}$$

問題

④

$$\sqrt{4 + \sqrt{15}}$$

1. 次の式を計算せよ。

Calculate the following expression.

例題

①

$$\begin{aligned} &(\sqrt{3} + \sqrt{2})^2 \\ &= (\sqrt{3})^2 + 2 \times \sqrt{3} \times \sqrt{2} + (\sqrt{2})^2 \\ &= 3 + 2\sqrt{6} + 2 = \underline{\underline{5 + 2\sqrt{6}}} \end{aligned}$$

問題

①

$$(\sqrt{7} + \sqrt{2})^2$$

例題

②

$$\begin{aligned} &(\sqrt{3} - 1)^2 \\ &= (\sqrt{3})^2 - 2 \times \sqrt{3} \times 1 + 1^2 \\ &= 3 - 2\sqrt{3} + 1 = \underline{\underline{4 - 2\sqrt{3}}} \end{aligned}$$

問題

②

$$(\sqrt{5} - 1)^2$$

例題

③

$$\begin{aligned} &(\sqrt{6} + \sqrt{2})^2 \\ &= (\sqrt{6})^2 + 2 \times \sqrt{6} \times \sqrt{2} + (\sqrt{2})^2 \\ &= 6 + 2\sqrt{12} + 2 = \underline{\underline{8 + 4\sqrt{3}}} \end{aligned}$$

問題

③

$$(\sqrt{5} + 2)^2$$

例題

④

$$\begin{aligned} &\left(\frac{\sqrt{10} + \sqrt{2}}{2}\right)^2 \\ &= \frac{10 + 2\sqrt{20} + 2}{4} = \frac{12 + 4\sqrt{5}}{4} \\ &= \underline{\underline{3 + \sqrt{5}}} \end{aligned}$$

問題

④

$$\left(\frac{\sqrt{14} - \sqrt{6}}{2}\right)^2$$

2. 次の式の2重根号を外しなさい。

Simplify the double radical in the following equation.

例題

①

$$\begin{aligned} &\sqrt{5 + 2\sqrt{6}} \\ &= \sqrt{(3 + 2) + 2\sqrt{3} \times 2} \\ &= \underline{\underline{\sqrt{3} + \sqrt{2}}} \end{aligned}$$

問題

①

$$\sqrt{9 + 2\sqrt{14}}$$

例題

②

$$\begin{aligned} &\sqrt{4 - 2\sqrt{3}} \\ &= \sqrt{(3 + 1) - 2\sqrt{3} \times 1} \\ &= \sqrt{3} - \sqrt{1} = \underline{\underline{\sqrt{3} - 1}} \end{aligned}$$

問題

②

$$\sqrt{6 - 2\sqrt{5}}$$

例題

③

$$\begin{aligned} &\sqrt{8 + 4\sqrt{3}} \\ &= \sqrt{8 + 2\sqrt{12}} = \sqrt{(6 + 2) + 2\sqrt{6} \times 2} \\ &= \underline{\underline{\sqrt{6} + \sqrt{2}}} \end{aligned}$$

問題

③

$$\sqrt{9 + 4\sqrt{5}}$$

例題

④

$$\begin{aligned} &\sqrt{3 + \sqrt{5}} \\ &= \frac{\sqrt{6 + 2\sqrt{5}}}{\sqrt{2}} = \frac{\sqrt{(5 + 1) + 2\sqrt{5} \times 1}}{\sqrt{2}} \\ &= \frac{\sqrt{5} + \sqrt{1}}{\sqrt{2}} = \underline{\underline{\frac{\sqrt{10} + \sqrt{2}}{2}}} \end{aligned}$$

問題

④

$$\sqrt{5 - \sqrt{21}}$$

1. 次の式を計算せよ。

Calculate the following expression.

例題

①

$$\begin{aligned} &(\sqrt{7} + \sqrt{3})^2 \\ &= (\sqrt{7})^2 + 2 \times \sqrt{7} \times \sqrt{3} + (\sqrt{3})^2 \\ &= 7 + 2\sqrt{21} + 3 = \underline{\underline{10 + 2\sqrt{21}}} \end{aligned}$$

問題

①

$$(\sqrt{7} + \sqrt{5})^2$$

例題

②

$$\begin{aligned} &(\sqrt{6} - 1)^2 \\ &= (\sqrt{6})^2 - 2 \times \sqrt{6} \times 1 + 1^2 \\ &= 6 - 2\sqrt{6} + 1 = \underline{\underline{7 - 2\sqrt{6}}} \end{aligned}$$

問題

②

$$(\sqrt{7} - 1)^2$$

例題

③

$$\begin{aligned} &(\sqrt{12} + 1)^2 \\ &= (\sqrt{12})^2 + 2 \times \sqrt{12} \times 1 + 1^2 \\ &= 12 + 2\sqrt{12} + 1 = \underline{\underline{13 + 4\sqrt{3}}} \end{aligned}$$

問題

③

$$(\sqrt{8} + 1)^2$$

例題

④

$$\begin{aligned} &(3 - \sqrt{2})^2 \\ &= 3^2 - 2 \times 3 \times \sqrt{2} + (\sqrt{2})^2 \\ &= 11 - 6\sqrt{2} + 2 = \underline{\underline{13 - 6\sqrt{2}}} \end{aligned}$$

問題

④

$$(3 - \sqrt{3})^2$$

2. 次の式の2重根号を外しなさい。

Simplify the double radical in the following equation.

例題

①

$$\begin{aligned} &\sqrt{7 + 2\sqrt{21}} \\ &= \sqrt{(7 + 3) + 2\sqrt{7} \times 3} \\ &= \underline{\underline{\sqrt{7} + \sqrt{3}}} \end{aligned}$$

問題

①

$$\sqrt{12 + 2\sqrt{35}}$$

例題

②

$$\begin{aligned} &\sqrt{7 - 2\sqrt{6}} \\ &= \sqrt{(6 + 1) - 2\sqrt{6} \times 1} \\ &= \sqrt{6} - \sqrt{1} = \underline{\underline{\sqrt{6} - 1}} \end{aligned}$$

問題

②

$$\sqrt{8 - 2\sqrt{7}}$$

例題

③

$$\begin{aligned} &\sqrt{13 + 4\sqrt{3}} \\ &= \sqrt{13 + 2\sqrt{12}} = \sqrt{(12 + 1) + 2\sqrt{12} \times 1} \\ &= \sqrt{12} + 1 = \underline{\underline{2\sqrt{3} + 1}} \end{aligned}$$

問題

③

$$\sqrt{9 + 4\sqrt{2}}$$

例題

④

$$\begin{aligned} &\sqrt{11 - 6\sqrt{2}} \\ &= \sqrt{11 - 2\sqrt{18}} = \sqrt{(9 + 2) - 2\sqrt{9} \times 2} \\ &= \sqrt{9} - \sqrt{2} = \underline{\underline{3 - \sqrt{2}}} \end{aligned}$$

問題

④

$$\sqrt{12 - 6\sqrt{3}}$$