

1 なぜ有理化をするのか？

$\frac{1}{\sqrt{2}}$ は どのくらい の値??

⇒ 有理化してみよう。

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

$$\sqrt{2} \approx 1.414$$

$$\frac{\sqrt{2}}{2} \approx 0.707$$

2 次の値を求めよ。

(1) $\sqrt{81}$

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

(3) $\sqrt{(-2)(-8)}$

(4) $-\sqrt{\frac{9}{4}}$

(1) $\sqrt{81} = \sqrt{9^2} = 9$

(2) $\sqrt{(-7)^2} = \sqrt{49} = 7$

(3) $\sqrt{16} = 4$

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

3 次の式を計算せよ。

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

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

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

(4) $\frac{\sqrt{7}}{\sqrt{28}}$

(1) $\sqrt{3} \times \sqrt{12} = \sqrt{3^2 \times 4} = 6$

(2) $\sqrt{15} \times \sqrt{6} = \sqrt{3^2 \times 10} = 3\sqrt{10}$

(3) $\sqrt{\frac{54}{3}} = \sqrt{18} = 3\sqrt{2}$

(4) $\sqrt{\frac{7}{28}} = \sqrt{\frac{1}{4}} = \frac{1}{2}$

4 次の式を計算せよ。

(1) $3\sqrt{7} + \sqrt{7} - 2\sqrt{7}$

(2) $\sqrt{3} + \sqrt{27} - \sqrt{75}$

(3) $\sqrt{50} - 2\sqrt{32} + \sqrt{72}$

(4) $\sqrt{3}(2\sqrt{3} - \sqrt{6})$

(5) $(3\sqrt{5} - 2\sqrt{3})(4\sqrt{5} + 3\sqrt{3})$

(6) $(\sqrt{7} + \sqrt{2})(\sqrt{7} - \sqrt{2})$

(7) $(\sqrt{5} - \sqrt{10})^2$

(8) $(5\sqrt{2} + 2\sqrt{3})^2$

(1) $3\sqrt{7} + \sqrt{7} - 2\sqrt{7} = 2\sqrt{7}$

(2) $\sqrt{3} + 3\sqrt{3} - 5\sqrt{3} = -\sqrt{3}$

(3) $5\sqrt{2} - 8\sqrt{2} + 6\sqrt{2} = 3\sqrt{2}$

(4) $2 \times 3 - 3\sqrt{2} = 6 - 3\sqrt{2}$

(5) $(3\sqrt{5} - 2\sqrt{3})(4\sqrt{5} + 3\sqrt{3}) = 12 \times 5 + 9\sqrt{15} - 8\sqrt{15} - 6 \times 3 = 60 + \sqrt{15} - 18 = 42 + \sqrt{15}$

(6) $(\sqrt{7} + \sqrt{2})(\sqrt{7} - \sqrt{2}) = 7 - 2 = 5$

(7) $(\sqrt{5} - \sqrt{10})^2 = 5 - 2\sqrt{50} + 10 = 15 - 10\sqrt{2}$

(8) $(5\sqrt{2} + 2\sqrt{3})^2 = 25 \cdot 2 + 20\sqrt{2} \cdot \sqrt{3} + 4 \cdot 3 = 50 + 20\sqrt{6} + 12 = 62 + 20\sqrt{6}$

先に共通因数 $\sqrt{5}$ と前へ出す

5) 次の式の分母を有理化せよ。

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

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

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

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

(1) $\frac{4}{3\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$
 $= \frac{4\sqrt{2}}{3 \cdot 2}$
 $= \frac{2\sqrt{2}}{3}$

(2) $\frac{2}{\sqrt{3}+1} \times \frac{\sqrt{3}-1}{\sqrt{3}-1}$
 $= \frac{2(\sqrt{3}-1)}{3-1}$
 $= \sqrt{3}-1$

(3) $\frac{\sqrt{2}+1}{\sqrt{2}-1} \times \frac{\sqrt{2}+1}{\sqrt{2}+1}$
 $= \frac{2+2\sqrt{2}+1}{2-1}$
 $= 3+2\sqrt{2}$

(4) $\frac{\sqrt{3}}{2-\sqrt{5}} \times \frac{2+\sqrt{5}}{2+\sqrt{5}}$
 $= \frac{\sqrt{3}(2+\sqrt{5})}{4-5} = -2\sqrt{3}-\sqrt{15}$

6) 次の式を計算せよ。(3), (4) は分母を有理化せよ。

(1) $\sqrt{20} - (\sqrt{45} - 4\sqrt{5})$

(2) $(\sqrt{12} - \sqrt{8})(\sqrt{48} + \sqrt{32})$

(3) $\frac{1}{\sqrt{5}-\sqrt{3}}$

(4) $\frac{2-\sqrt{3}}{2+\sqrt{3}}$

(1) $2\sqrt{5} - (3\sqrt{5} - 4\sqrt{5})$
 $= 3\sqrt{5}$

(2) $(2\sqrt{3} - 2\sqrt{2})(4\sqrt{3} + 4\sqrt{2})$
 $= 2(\sqrt{3} - \sqrt{2}) \times 4(\sqrt{3} + \sqrt{2})$
 $= 8(\sqrt{3} - \sqrt{2})(\sqrt{3} + \sqrt{2})$
 $= 8(3 - 2) = 8$

(3) $\frac{1}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}}$
 $= \frac{\sqrt{5}+\sqrt{3}}{5-3}$
 $= \frac{\sqrt{5}+\sqrt{3}}{2}$

(4) $\frac{2-\sqrt{3}}{2+\sqrt{3}} \times \frac{2-\sqrt{3}}{2-\sqrt{3}}$
 $= \frac{4-4\sqrt{3}+3}{4-3}$
 $= 7-4\sqrt{3}$

16) (2) $(2\sqrt{3}-2\sqrt{2})(4\sqrt{3}+4\sqrt{2})$

これは、この符号分配法則に注意して

式を計算すると

結果として、2, 4 を <<> 出ると $(\sqrt{3}-\sqrt{2})(\sqrt{3}+\sqrt{2})$

が 3-2=1 !!

式を計算する練習です。

<今日のふりかえり>

