中学数学 3 2章 平方根	年	組	番
	名前		

1 次の数の平方根を求めなさい。

(1) 16

± 4

(2) 900

± 30

(3) 0.16

± 0.4

(4) $\frac{81}{100}$

$\pm \frac{9}{10}$

2 次の数を，根号を使わずに表しなさい。

(1) $\sqrt{10000}$

100

(2) $-\sqrt{0.04}$

-0.2

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

-3

(4) $(-\sqrt{11})^2$

11

3 次の各組の数の大小を，不等号を使って表しなさい。

(1) $\sqrt{10}, \sqrt{11}$

$\sqrt{10} < \sqrt{11}$

(2) $\sqrt{80}, 9$

$\sqrt{80} < 9$

(3) $-5, -\sqrt{26}$

$-5 > -\sqrt{26}$

(4) $7, 8, \sqrt{55}$

$7 < \sqrt{55} < 8$

4 次の数のうち，無理数はどれですか。

㉗ $-\sqrt{100}$

㉘ $\sqrt{200}$

㉙ $\sqrt{0.01}$

㉚ $\sqrt{\frac{25}{4}}$

㉘

5 次の数を， $\sqrt{a}$ の形で表しなさい。

(1) $5\sqrt{3}$

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

$=\sqrt{25 \times 3}$

$=\sqrt{75}$

(2) $10\sqrt{2}$

$=\sqrt{100} \times \sqrt{2}$

$=\sqrt{100 \times 2}$

$=\sqrt{200}$

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

$=\frac{\sqrt{10}}{\sqrt{9}}$

$=\sqrt{\frac{10}{9}}$

6 次の数を， $a\sqrt{b}$ の形で表しなさい。

(1) $\sqrt{72}$

$=\sqrt{6^2 \times 2}$

$=\sqrt{6^2} \times \sqrt{2}$

$=6\sqrt{2}$

(2) $\sqrt{150}$

$=\sqrt{5^2 \times 6}$

$=\sqrt{5^2} \times \sqrt{6}$

$=5\sqrt{6}$

(3) $\sqrt{1000}$

$=\sqrt{10^2 \times 10}$

$=\sqrt{10^2} \times \sqrt{10}$

$=10\sqrt{10}$

7 次の計算をなさい。

$$\begin{aligned}(1) \quad & \sqrt{2} \times \sqrt{6} \\ & = \sqrt{2} \times \sqrt{2} \times \sqrt{3} \\ & = 2\sqrt{3}\end{aligned}$$

$$\begin{aligned}(2) \quad & \sqrt{32} \times 2\sqrt{8} \\ & = 4\sqrt{2} \times 2 \times 2\sqrt{2} \\ & = 32\end{aligned}$$

$$\begin{aligned}(3) \quad & \sqrt{2} \times \sqrt{5} \times \sqrt{20} \\ & = \sqrt{2} \times \sqrt{5} \times 2\sqrt{5} \\ & = 10\sqrt{2}\end{aligned}$$

$$\begin{aligned}(4) \quad & 10\sqrt{10} \div 5\sqrt{2} \\ & = \frac{10\sqrt{10}}{5\sqrt{2}} \\ & = 2\sqrt{5}\end{aligned}$$

$$\begin{aligned}(5) \quad & 2\sqrt{75} \div 5\sqrt{3} \\ & = \frac{2\sqrt{75}}{5\sqrt{3}} \\ & = \frac{2 \times 5\sqrt{3}}{5\sqrt{3}} \\ & = 2\end{aligned}$$

$$\begin{aligned}(6) \quad & \sqrt{8} \times \sqrt{20} \times \sqrt{10} \\ & = 2\sqrt{2} \times 2\sqrt{5} \times \sqrt{2} \times \sqrt{5} \\ & = 40\end{aligned}$$

$$\begin{aligned}(7) \quad & \sqrt{8} \times \sqrt{10} \div 4\sqrt{5} \\ & = \frac{\sqrt{8} \times \sqrt{10}}{4\sqrt{5}} \\ & = \frac{2\sqrt{2} \times \sqrt{2} \times \sqrt{5}}{4\sqrt{5}} \\ & = 1\end{aligned}$$

$$\begin{aligned}(8) \quad & \sqrt{30} \div 2\sqrt{75} \times \sqrt{10} \\ & = \frac{\sqrt{30} \times \sqrt{10}}{2\sqrt{75}} \\ & = \frac{\sqrt{3} \times \sqrt{10} \times \sqrt{10}}{2 \times 5\sqrt{3}} \\ & = 1\end{aligned}$$

8 次の数の分母を有理化しなさい。

$$\begin{aligned}(1) \quad & \frac{5}{\sqrt{2}} \\ & = \frac{5 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} \\ & = \frac{5\sqrt{2}}{2}\end{aligned}$$

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

$$\begin{aligned}(3) \quad & \frac{2\sqrt{21}}{\sqrt{14}} \\ & = \frac{2 \times \sqrt{3} \times \sqrt{7}}{\sqrt{2} \times \sqrt{7}} \\ & = \frac{2\sqrt{3}}{\sqrt{2}} \\ & = \frac{2\sqrt{3} \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} \\ & = \sqrt{6}\end{aligned}$$

$$\begin{aligned}(4) \quad & \frac{5\sqrt{6}}{\sqrt{75}} \\ & = \frac{5\sqrt{6}}{5\sqrt{3}} \\ & = \sqrt{2}\end{aligned}$$

9 次の計算をなさい。

$$\begin{aligned}(1) \quad & 3\sqrt{2} + 5\sqrt{2} \\ & = (3+5)\sqrt{2} \\ & = 8\sqrt{2}\end{aligned}$$

$$\begin{aligned}(2) \quad & 3\sqrt{10} - 5\sqrt{10} \\ & = (3-5)\sqrt{10} \\ & = -2\sqrt{10}\end{aligned}$$

$$\begin{aligned}(3) \quad & \sqrt{8} + 3\sqrt{2} \\ & = 2\sqrt{2} + 3\sqrt{2} \\ & = (2+3)\sqrt{2} \\ & = 5\sqrt{2}\end{aligned}$$

$$\begin{aligned}(4) \quad & 2\sqrt{27} - 5\sqrt{3} \\ & = 6\sqrt{3} - 5\sqrt{3} \\ & = (6-5)\sqrt{3} \\ & = \sqrt{3}\end{aligned}$$

$$\begin{aligned}(5) \quad & 5\sqrt{12} - 2\sqrt{27} \\ & = 10\sqrt{3} - 6\sqrt{3} \\ & = (10-6)\sqrt{3} \\ & = 4\sqrt{3}\end{aligned}$$

$$\begin{aligned}(6) \quad & \sqrt{20} + \sqrt{5} - \sqrt{45} \\ & = 2\sqrt{5} + \sqrt{5} - 3\sqrt{5} \\ & = (2+1-3)\sqrt{5} \\ & = 0\end{aligned}$$

$$\begin{aligned}(7) \quad & \sqrt{2} + 3\sqrt{8} - \sqrt{50} \\ & = \sqrt{2} + 6\sqrt{2} - 5\sqrt{2} \\ & = (1+6-5)\sqrt{2} \\ & = 2\sqrt{2}\end{aligned}$$

$$\begin{aligned}(8) \quad & \sqrt{125} + \sqrt{150} - 10\sqrt{5} \\ & = 5\sqrt{5} + 5\sqrt{6} - 10\sqrt{5} \\ & = (5-10)\sqrt{5} + 5\sqrt{6} \\ & = -5\sqrt{5} + 5\sqrt{6}\end{aligned}$$

10 次の計算をなさい。

$$\begin{aligned}(1) \quad & \sqrt{2}(\sqrt{8} + 3\sqrt{2}) \\ & = \sqrt{2}(2\sqrt{2} + 3\sqrt{2}) \\ & = \sqrt{2} \times 5\sqrt{2} \\ & = 10\end{aligned}$$

$$\begin{aligned}(2) \quad & (\sqrt{10} + 5)(\sqrt{10} - 1) \\ & = (\sqrt{10})^2 + (5-1)\sqrt{10} - 5 \\ & = 10 + 4\sqrt{10} - 5 \\ & = 5 + 4\sqrt{10}\end{aligned}$$

$$\begin{aligned}(3) \quad & (\sqrt{7} + \sqrt{2})^2 \\ & = (\sqrt{7})^2 + 2 \times \sqrt{7} \times \sqrt{2} + (\sqrt{2})^2 \\ & = 7 + 2\sqrt{14} + 2 \\ & = 9 + 2\sqrt{14}\end{aligned}$$

$$\begin{aligned}(4) \quad & (2\sqrt{3} - \sqrt{5})^2 \\ & = (2\sqrt{3})^2 - 2 \times 2\sqrt{3} \times \sqrt{5} + (\sqrt{5})^2 \\ & = 12 - 4\sqrt{15} + 5 \\ & = 17 - 4\sqrt{15}\end{aligned}$$

$$\begin{aligned}(5) \quad & (3 + \sqrt{10})(3 - \sqrt{10}) \\ & = 3^2 - (\sqrt{10})^2 \\ & = 9 - 10 \\ & = -1\end{aligned}$$

$$\begin{aligned}(6) \quad & (2\sqrt{7} + 3\sqrt{2})(2\sqrt{7} - 3\sqrt{2}) \\ & = (2\sqrt{7})^2 - (3\sqrt{2})^2 \\ & = 28 - 18 \\ & = 10\end{aligned}$$

11 $a = \sqrt{7} - 3$, $b = \sqrt{7} + 3$ のとき, 次の式の値を求めなさい。

(1) ab

$$\begin{aligned} &= (\sqrt{7} - 3)(\sqrt{7} + 3) \\ &= (\sqrt{7})^2 - 3^2 \\ &= 7 - 9 \\ &= -2 \end{aligned}$$

(2) $a^2 + 2ab + b^2$

$$\begin{aligned} &= (a + b)^2 \\ &= \{(\sqrt{7} - 3) + (\sqrt{7} + 3)\}^2 \\ &= (2\sqrt{7})^2 \\ &= 28 \end{aligned}$$

(3) $a^2 - b^2$

$$\begin{aligned} &= (a + b)(a - b) \\ &= \{(\sqrt{7} - 3) + (\sqrt{7} + 3)\} \{(\sqrt{7} - 3) - (\sqrt{7} + 3)\} \\ &= 2\sqrt{7} \times (-6) \\ &= -12\sqrt{7} \end{aligned}$$

(4) $a^2 + b^2$

$$\begin{aligned} &= (a + b)^2 - 2ab \\ &= \{(\sqrt{7} - 3) + (\sqrt{7} + 3)\}^2 - 2 \times (-2) \\ &= 28 + 4 \\ &= 32 \end{aligned}$$

[別解]

$$\begin{aligned} &a^2 + b^2 \\ &= (\sqrt{7} - 3)^2 + (\sqrt{7} + 3)^2 \\ &= 7 - 6\sqrt{7} + 9 + 7 + 6\sqrt{7} + 9 \\ &= 32 \end{aligned}$$

12 2点間の距離をはかったところ, 次のような値を得ました。このとき, それぞれの真の値を a m とし, a の範囲を, 不等号を使って表しなさい。

(1) 12.0m

$$11.95 \leq a < 12.05$$

(2) 8.73m

$$8.725 \leq a < 8.735$$

13 ある品物の重さを, 最小の目もりが 100g のはかりではかったら, 7300g になりました。このとき, この重さを, 整数部分が 1 桁の数と 10 の累乗の積の形で表しなさい。

$$7.3 \times 10^3 \text{g}$$