

学習日 月 日

年 組 番 氏名

1 次の計算をなさい。(高校入試問題に挑戦しよう)

(1) $(\sqrt{6}-2)(\sqrt{6}-1)$ H24

(2) $(\sqrt{3}+3)(\sqrt{3}-1)$ H23

(3) $(\sqrt{7}+1)(\sqrt{7}-3)$ H22

(4) $(\sqrt{3}+1)(\sqrt{3}+2)$ H21

(5) $(\sqrt{3}-1)^2$ H20

(6) $\sqrt{2}(\sqrt{3}-\sqrt{2})$ H19

2 次の計算をなさい。(p. 54)

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

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

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

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

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

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

1

$$\begin{aligned} (1) & (\sqrt{6}-2)(\sqrt{6}-1) && \text{H24} \\ & = (\sqrt{6})^2 + (-2-1)\times\sqrt{6} + (-2)\times(-1) \\ & = 6 - 3\sqrt{6} + 2 \\ & = 8 - 3\sqrt{6} \end{aligned}$$

$$\begin{aligned} (3) & (\sqrt{7}+1)(\sqrt{7}-3) && \text{H22} \\ & = (\sqrt{7})^2 + (1-3)\times\sqrt{7} + 1\times(-3) \\ & = 7 - 2\sqrt{7} - 3 \\ & = 4 - 2\sqrt{7} \end{aligned}$$

$$\begin{aligned} (5) & (\sqrt{3}-1)^2 && \text{H20} \\ & = (\sqrt{3})^2 - 2\times 1\times\sqrt{3} + 1^2 \\ & = 3 - 2\sqrt{3} + 1 \\ & = 4 - 2\sqrt{3} \end{aligned}$$

毎年、平方根の計算問題が出題されているね。

$$\begin{aligned} (2) & (\sqrt{3}+3)(\sqrt{3}-1) && \text{H23} \\ & = (\sqrt{3})^2 + \{3+(-1)\}\times\sqrt{3} + 3\times(-1) \\ & = 3 + 2\sqrt{3} - 3 \\ & = 2\sqrt{3} \end{aligned}$$

$$\begin{aligned} (4) & (\sqrt{3}+1)(\sqrt{3}+2) && \text{H21} \\ & = (\sqrt{3})^2 + (1+2)\times\sqrt{3} + 1\times 2 \\ & = 3 + 3\sqrt{3} + 2 \\ & = 5 + 3\sqrt{3} \end{aligned}$$

$$\begin{aligned} (6) & \sqrt{2}(\sqrt{3}\sqrt{2}-\sqrt{2}) && \text{H19} \\ & = \sqrt{2}(4\sqrt{2}-\sqrt{2}) \\ & = \sqrt{2}\times 4\sqrt{2} - \sqrt{2}\times\sqrt{2} \\ & = 4\times(\sqrt{2})^2 - (\sqrt{2})^2 \\ & = 4\times 2 - 2 \\ & = 8 - 2 \\ & = 6 \end{aligned}$$



別解 分配法則

$$\begin{aligned} & \sqrt{2}(\sqrt{3}\sqrt{2}-\sqrt{2}) \\ & = \sqrt{6}\sqrt{4}-\sqrt{4} \\ & = 8-2 \\ & = 6 \end{aligned}$$

2

$$\begin{aligned} (1) & (\sqrt{5}-3)(\sqrt{5}+5) + \sqrt{5}(\sqrt{5}-2) \\ & = (\sqrt{5})^2 + (-3+5)\times\sqrt{5} + (-3)\times 5 + (\sqrt{5})^2 + \sqrt{5}\times(-2) \\ & = 5 + 2\sqrt{5} - 15 + 5 - 2\sqrt{5} \\ & = 5 + 5 - 15 + 2\sqrt{5} - 2\sqrt{5} \\ & = -5 \end{aligned}$$

$$\begin{aligned} (3) & (\sqrt{7}-\sqrt{2})^2 - (\sqrt{7}+\sqrt{2})^2 \\ & = (\sqrt{7})^2 - 2\times\sqrt{2}\times\sqrt{7} + (\sqrt{2})^2 - \{(\sqrt{7})^2 + 2\times\sqrt{2}\times\sqrt{7} + (\sqrt{2})^2\} \\ & = 7 - 2\sqrt{14} + 2 - (7 + 2\sqrt{14} + 2) \\ & = 7 - 2\sqrt{14} + 2 - 7 - 2\sqrt{14} - 2 \\ & = 7 - 7 + 2 - 2 - 2\sqrt{14} - 2\sqrt{14} \\ & = -4\sqrt{14} \end{aligned}$$

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

$$\begin{aligned} (2) & (\sqrt{2}+4)(\sqrt{2}-4) - (\sqrt{6}+4)(\sqrt{6}-3) \\ & = (\sqrt{2})^2 - 4^2 - \{(\sqrt{6})^2 + (4-3)\sqrt{6} + 4\times(-3)\} \\ & = 2 - 16 - (6 + \sqrt{6} - 12) \\ & = 2 - 16 - 6 - \sqrt{6} + 12 \\ & = 2 + 12 - 16 - 6 - \sqrt{6} \\ & = -8 - \sqrt{6} \end{aligned}$$

$$\begin{aligned} (4) & \sqrt{3}(-2+4\sqrt{3}) + (-2+\sqrt{3})^2 \\ & = \sqrt{3}\times(-2) + 4\times(\sqrt{3})^2 + (-2)^2 + 2\times\sqrt{3}\times(-2) + (\sqrt{3})^2 \\ & = -2\sqrt{3} + 4\times 3 + 4 - 4\sqrt{3} + 3 \\ & = -2\sqrt{3} + 12 + 4 - 4\sqrt{3} + 3 \\ & = 12 + 4 + 3 - 2\sqrt{3} - 4\sqrt{3} \\ & = 19 - 6\sqrt{3} \end{aligned}$$

$$\begin{aligned} (6) & (2\sqrt{2}-3)(3\sqrt{2}+2) - (\sqrt{2}-5)^2 \\ & = 2\sqrt{2}\times 3\sqrt{2} + 2\sqrt{2}\times 2 - 3\times 3\sqrt{2} - 3\times 2 \\ & \quad - \{(\sqrt{2})^2 - 2\times 5\times\sqrt{2} + 5^2\} \\ & = 2\times 3\times(\sqrt{2})^2 + 2\sqrt{2}\times 2 - 3\times 3\sqrt{2} - 3\times 2 \\ & \quad - (2 - 10\sqrt{2} + 25) \\ & = 12 + 4\sqrt{2} - 9\sqrt{2} - 6 - 2 + 10\sqrt{2} - 25 \\ & = 12 - 6 - 2 - 25 + 4\sqrt{2} - 9\sqrt{2} + 10\sqrt{2} \\ & = -21 + 5\sqrt{2} \end{aligned}$$

2(3), (5)は工夫すると速く計算できます。No. 17で学習します。

