

いろいろな計算② 解答と解説

1 解答 (1) 8 (2) 2

$$\begin{aligned}(1) \quad \sqrt{5}x - \sqrt{3}y &= \sqrt{5}(\sqrt{5} + \sqrt{3}) - \sqrt{3}(\sqrt{5} - \sqrt{3}) \\ &= \sqrt{5} \times \sqrt{5} + \sqrt{5} \times \sqrt{3} - \sqrt{3} \times \sqrt{5} + \sqrt{3} \times \sqrt{3} \\ &= 5 + 3 \\ &= 8\end{aligned}$$

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

2 解答 (1) 14 (2) 66 (3) 22

$$\begin{aligned}(1) \quad x + y &= (\sqrt{5} + \sqrt{2}) + (\sqrt{5} - \sqrt{2}) = 2\sqrt{5} \\ xy &= (\sqrt{5} + \sqrt{2})(\sqrt{5} - \sqrt{2}) = 5 - 2 = 3 \\ \text{このとき} \quad x^2 + y^2 &= (x + y)^2 - 2xy \\ &= (2\sqrt{5})^2 - 2 \times 3 \\ &= 20 - 6 \\ &= 14\end{aligned}$$

$$\begin{aligned}(2) \quad x + y &= (3 - \sqrt{2}) + (3 + \sqrt{2}) = 6 \\ xy &= (3 - \sqrt{2})(3 + \sqrt{2}) = 9 - 2 = 7 \\ \text{このとき} \quad 3x^2 + 3y^2 &= 3(x^2 + y^2) \\ &= 3\{(x + y)^2 - 2xy\} \\ &= 3(6^2 - 2 \times 7) \\ &= 3 \times 22 \\ &= 66\end{aligned}$$

$$\begin{aligned}(3) \quad x + y &= (\sqrt{6} + \sqrt{5}) + (\sqrt{6} - \sqrt{5}) = 2\sqrt{6} \\ xy &= (\sqrt{6} + \sqrt{5})(\sqrt{6} - \sqrt{5}) = 6 - 5 = 1 \\ \text{このとき} \quad \frac{y}{x} + \frac{x}{y} &= \frac{y^2 + x^2}{xy} \\ &= \frac{(x + y)^2 - 2xy}{xy} \\ &= \frac{(2\sqrt{6})^2 - 2 \times 1}{1} \\ &= 24 - 2 \\ &= 22\end{aligned}$$