

1 [解答] (1) $4\sqrt{6}$ (2) $3\sqrt{14}$ (3) $\frac{\sqrt{3}}{7}$ (4) $\frac{\sqrt{5}}{10}$

$$\begin{aligned} (1) \sqrt{96} &= \sqrt{2^5 \times 3} \\ &= \sqrt{4^2 \times 6} \\ &= \sqrt{4^2} \times \sqrt{6} \\ &= 4\sqrt{6} \end{aligned}$$

$$\begin{aligned} (2) \sqrt{126} &= \sqrt{2 \times 3^2 \times 7} \\ &= \sqrt{3^2 \times 14} \\ &= \sqrt{3^2} \times \sqrt{14} \\ &= 3\sqrt{14} \end{aligned}$$

$$\begin{aligned} (3) \sqrt{\frac{3}{49}} &= \frac{\sqrt{3}}{\sqrt{49}} \\ &= \frac{\sqrt{3}}{7} \end{aligned}$$

$$\begin{aligned} (4) \sqrt{0.05} &= \sqrt{\frac{5}{100}} \\ &= \frac{\sqrt{5}}{\sqrt{100}} \\ &= \frac{\sqrt{5}}{10} \end{aligned}$$

$\begin{array}{r} 2) 96 \\ \underline{2) 48} \\ 2) 24 \\ \underline{2) 12} \\ 2) 6 \\ \underline{3} \end{array}$	$\begin{array}{r} 2) 126 \\ \underline{3) 63} \\ 3) 21 \\ \underline{7} \end{array}$
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2 [解答] (1) 3 (2) $18\sqrt{3}$ (3) $3\sqrt{6}$ (4) $5\sqrt{7}$ (5) $2\sqrt{15}-4$ (6) $7\sqrt{3}$

$$\begin{aligned} (1) \sqrt{54} \div \sqrt{6} &= \frac{\sqrt{54}}{\sqrt{6}} \\ &= \sqrt{\frac{54}{6}} \\ &= \sqrt{9} \\ &= 3 \end{aligned}$$

$$\begin{aligned} (2) \sqrt{18} \times \sqrt{54} &= \sqrt{18 \times 54} \\ &= \sqrt{2 \times 3^2 \times 2 \times 3^3} \\ &= \sqrt{(2 \times 9)^2 \times 3} \\ &= 18\sqrt{3} \end{aligned}$$

$$\begin{aligned} (3) \sqrt{6} + \sqrt{24} &= \sqrt{6} + 2\sqrt{6} \\ &= 3\sqrt{6} \end{aligned}$$

$$\begin{aligned} (4) \sqrt{63} + \frac{14}{\sqrt{7}} &= 3\sqrt{7} + \frac{14 \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}} \\ &= 3\sqrt{7} + \frac{14\sqrt{7}}{7} \\ &= 3\sqrt{7} + 2\sqrt{7} \\ &= 5\sqrt{7} \end{aligned}$$

$$\begin{aligned} (5) (\sqrt{5} + 3\sqrt{3})(\sqrt{5} - \sqrt{3}) &= (\sqrt{5})^2 + \{3\sqrt{3} + (-\sqrt{3})\}\sqrt{5} + 3\sqrt{3} \times (-\sqrt{3}) \\ &= 5 + 2\sqrt{3} \times \sqrt{5} - 3 \times 3 \\ &= 5 + 2\sqrt{15} - 9 \\ &= 2\sqrt{15} - 4 \end{aligned}$$

$$\begin{aligned} (6) \sqrt{12} - \frac{3}{\sqrt{3}} + 2\sqrt{27} &= 2\sqrt{3} - \frac{3 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} + 2 \times 3\sqrt{3} \\ &= 2\sqrt{3} - \frac{3\sqrt{3}}{3} + 6\sqrt{3} \\ &= 2\sqrt{3} - \sqrt{3} + 6\sqrt{3} \\ &= 7\sqrt{3} \end{aligned}$$

3 [解答] $13-4\sqrt{5}$

$$\sqrt{4} < \sqrt{5} < \sqrt{9} \text{ であるから } 2 < \sqrt{5} < 3$$

$$\text{したがって } a = 2$$

$$\sqrt{5} \text{ から } a \text{ をひいたものが } b \text{ であるから } b = \sqrt{5} - a = \sqrt{5} - 2$$

$$\begin{aligned} \text{よって } a^2 + b^2 &= 2^2 + (\sqrt{5} - 2)^2 \\ &= 4 + (5 - 4\sqrt{5} + 4) \\ &= 13 - 4\sqrt{5} \end{aligned}$$