

$\sqrt{2}$ の小数部分を
 a とすると次の式の
 値はどれだけか。

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

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

$$\begin{aligned} (a-1)^2 &= (\sqrt{2} - 1 - 1)^2 \\ &= (\sqrt{2} - 2)^2 \\ &= (\sqrt{2})^2 - 2 \cdot \sqrt{2} \cdot 2 + 2^2 \\ &= 6 - 4\sqrt{2} \\ &= a^2 - 2a + 1 \\ &= (3 - 2\sqrt{2}) - 2(\sqrt{2} - 1) + 1 \\ &= 3 - 2\sqrt{2} - 2\sqrt{2} + 2 + 1 \\ &= 6 - 4\sqrt{2} \end{aligned}$$

$\sqrt{5}$ の小数部分を a
 整数部分を
 b とするとき
 次の式の値を求めよ

$$\begin{aligned} a &= \sqrt{5} - 2 \\ b &= 2 \end{aligned}$$

$$\begin{aligned} (a+b)^2 &= \{[\sqrt{5} - 2] + 2\}^2 \\ &= (\sqrt{5} - 2 + 2)^2 \\ &= 5 \end{aligned}$$

$$\begin{aligned} (a-b)^2 &= \{[\sqrt{5} - 2] - 2\}^2 \\ &= (\sqrt{5} - 4)^2 \\ &= 21 - 8\sqrt{5} \end{aligned}$$

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

$$\begin{array}{lll}
 (\sqrt{2}-1)(\sqrt{2}-1) & (\sqrt{2}-2)(\sqrt{2}-2) & (\sqrt{2}-3)(\sqrt{2}-3) \\
 = 2-2\sqrt{2}+1 & = 2-4\sqrt{2}+4 & = 2-6\sqrt{2}+9 \\
 = 3-2\sqrt{2} & = 6-4\sqrt{2} & = 11-6\sqrt{2}
 \end{array}$$

$$\begin{array}{lll}
 (\sqrt{2}-1)(\sqrt{2}-2) & (\sqrt{2}-2)(\sqrt{2}-3) & (\sqrt{2}-3)(\sqrt{2}-4) \\
 = 2-3\sqrt{2}+2 & = 2-5\sqrt{2}+6 & = 2-7\sqrt{2}+12 \\
 = 4-3\sqrt{2} & = 8-5\sqrt{2} & = 14-7\sqrt{2}
 \end{array}$$

$$\begin{array}{lll}
 (\sqrt{2}-1)(\sqrt{2}-2) & (\sqrt{2}-2)(\sqrt{2}-4) & (\sqrt{2}-3)(\sqrt{2}-5) \\
 = 2-4\sqrt{2}+3 & = 2-6\sqrt{2}+8 & = 2-8\sqrt{2}+15 \\
 = 5-4\sqrt{2} & = 10-6\sqrt{2} & = 17-8\sqrt{2}
 \end{array}$$

$$\begin{array}{lll}
 (\sqrt{2}-1)(\sqrt{2}-3) & (\sqrt{2}-2)(\sqrt{2}-5) & (\sqrt{2}-3)(\sqrt{2}-6) \\
 = 2-4\sqrt{2}+3 & = 2-7\sqrt{2}+10 & = 2-9\sqrt{2}+18 \\
 = 5-4\sqrt{2} & = 12-7\sqrt{2} & = 20-9\sqrt{2}
 \end{array}$$

$$\begin{array}{lll}
 (\sqrt{2}-1)(\sqrt{2}-4) & (\sqrt{2}-2)(\sqrt{2}-6) & (\sqrt{2}-3)(\sqrt{2}-7) \\
 = 2-5\sqrt{2}+4 & = 2-8\sqrt{2}+12 & = 2-10\sqrt{2}+21 \\
 = 6-5\sqrt{2} & = 14-8\sqrt{2} & = 23-10\sqrt{2}
 \end{array}$$

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

$$\begin{aligned}
 & (\sqrt{2}+2)^2 \\
 = & 2+2\cdot 2\sqrt{2}+4 \\
 = & 6+4\sqrt{2}
 \end{aligned}$$

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

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

$$\begin{aligned}
 & (\sqrt{2}+3)^2 \\
 = & 2+2\times 3\sqrt{2}+9 \\
 = & 11+6\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{3}+3)^2 \\
 = & 3+2\times 3\sqrt{3}+9 \\
 = & 12+6\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{5}+1)^2 \\
 = & 5+2\sqrt{5}+1 \\
 = & 6+2\sqrt{5}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{2}+4)^2 \\
 = & 2+2\times 4\sqrt{2}+16 \\
 = & 18+8\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{3}+4)^2 \\
 = & 3+2\times 4\sqrt{3}+16 \\
 = & 19+8\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{6}+1)^2 \\
 = & 6+2\sqrt{6}+1 \\
 = & 7+2\sqrt{6}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{2}+5)^2 \\
 = & 2+2\times 5\sqrt{2}+25 \\
 = & 27+10\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{3}+5)^2 \\
 = & 3+2\times 5\sqrt{3}+25 \\
 = & 28+10\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{7}+1)^2 \\
 = & 7+2\sqrt{7}+1 \\
 = & 8+2\sqrt{7}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{2}+6)^2 \\
 = & 2+2\times 6\sqrt{2}+36 \\
 = & 38+12\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{3}+6)^2 \\
 = & 3+2\times 6\sqrt{3}+36 \\
 = & 39+12\sqrt{3}
 \end{aligned}$$

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

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

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

$$\begin{aligned}
 & (\sqrt{3}-1)^2 \\
 = & 3-2\sqrt{3}-1 \\
 = & 4-2\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{2}-3)^2 \\
 = & 2-2\times 3\sqrt{2}+9 \\
 = & 11-6\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{3}-3)^2 \\
 = & 3-2\times 3\sqrt{3}+9 \\
 = & 12-6\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{5}-1)^2 \\
 = & 5-2\sqrt{5}+1 \\
 = & 6-2\sqrt{5}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{2}-4)^2 \\
 = & 2-2\times 4\sqrt{2}+16 \\
 = & 18-8\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{3}-4)^2 \\
 = & 3-2\times 4\sqrt{3}+16 \\
 = & 19-8\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{6}-1)^2 \\
 = & 6-2\sqrt{6}+1 \\
 = & 7-2\sqrt{6}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{2}-5)^2 \\
 = & 2-2\times 5\sqrt{2}+25 \\
 = & 27-10\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{3}-5)^2 \\
 = & 3-2\times 5\sqrt{3}+25 \\
 = & 28-10\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{7}-1)^2 \\
 = & 7-2\sqrt{7}+1 \\
 = & 8-2\sqrt{7}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{2}-6)^2 \\
 = & 2-2\times 6\sqrt{2}+36 \\
 = & 38-12\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 & (\sqrt{3}-6)^2 \\
 = & 3-2\times 6\sqrt{3}+36 \\
 = & 39-12\sqrt{3}
 \end{aligned}$$

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

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

$$\begin{aligned}(\sqrt{5} + 1)^2 &= 5 + 2\sqrt{5} + 1 \\ &= 6 + 2\sqrt{5}\end{aligned}$$

$$\begin{aligned}(\sqrt{5} - 1)^2 &= 5 - 2\sqrt{5} + 1 \\ &= 6 - 2\sqrt{5}\end{aligned}$$

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

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

$$\begin{aligned}(\sqrt{5} + 3)^2 &= 5 + 2 \times 3\sqrt{5} + 9 \\ &= 14 + 6\sqrt{5}\end{aligned}$$

$$\begin{aligned}(\sqrt{5} - 3)^2 &= 5 - 2 \times 3\sqrt{5} + 9 \\ &= 14 - 6\sqrt{5}\end{aligned}$$

$$\begin{aligned}
 (\sqrt{3} + \sqrt{2})^2 &= 3 + 2\sqrt{3} \cdot \sqrt{2} + 2 \\
 &= 5 + 2\sqrt{6}
 \end{aligned}$$

$$\begin{aligned}
 (\sqrt{3} - \sqrt{2})^2 &= 3 - 2\sqrt{3} \cdot \sqrt{2} + 2 \\
 &= 5 - 2\sqrt{6}
 \end{aligned}$$

$$\begin{aligned}
 (\sqrt{5} + \sqrt{2})^2 &= 5 + 2 \cdot \sqrt{5} \cdot \sqrt{2} + 2 \\
 &= 7 + 2\sqrt{10}
 \end{aligned}$$

$$\begin{aligned}
 (\sqrt{5} - \sqrt{2})^2 &= 5 - 2 \cdot \sqrt{5} \cdot \sqrt{2} + 2 \\
 &= 7 - 2\sqrt{10}
 \end{aligned}$$

$$\begin{aligned}
 (\sqrt{5} + \sqrt{3})^2 &= 5 + 2 \cdot \sqrt{5} \cdot \sqrt{3} + 3 \\
 &= 8 + 2\sqrt{15}
 \end{aligned}$$

$$\begin{aligned}
 (\sqrt{5} - \sqrt{3})^2 &= 5 - 2 \cdot \sqrt{5} \cdot \sqrt{3} + 3 \\
 &= 8 - 2\sqrt{15}
 \end{aligned}$$

$$\begin{aligned}
 (\sqrt{6} + \sqrt{5})^2 &= 6 + 2 \cdot \sqrt{6} \cdot \sqrt{5} + 5 \\
 &= 11 + 2\sqrt{30}
 \end{aligned}$$

$$\begin{aligned}
 (\sqrt{6} - \sqrt{5})^2 &= 6 - 2 \cdot \sqrt{6} \cdot \sqrt{5} + 5 \\
 &= 11 - 2\sqrt{30}
 \end{aligned}$$

$$\begin{aligned} (2\sqrt{5} + \sqrt{3})^2 &= 20 + 2 \cdot 2\sqrt{5} \cdot \sqrt{3} + 3 \\ &= 23 + 4\sqrt{15} \end{aligned}$$

$$\begin{aligned} (2\sqrt{5} - \sqrt{3})^2 &= 20 - 2 \cdot 2\sqrt{5} \cdot \sqrt{3} + 3 \\ &= 23 - 4\sqrt{15} \end{aligned}$$

$$\begin{aligned} (2\sqrt{5} + \sqrt{2})^2 &= 20 + 2 \cdot 2\sqrt{5} \cdot \sqrt{2} + 2 \\ &= 22 + 4\sqrt{10} \end{aligned}$$

$$\begin{aligned} (2\sqrt{5} - \sqrt{2})^2 &= 20 - 2 \cdot 2\sqrt{5} \cdot \sqrt{2} + 2 \\ &= 22 - 4\sqrt{10} \end{aligned}$$

$$\begin{aligned} (5\sqrt{2} + \sqrt{5})^2 &= 50 + 2 \cdot 5\sqrt{2} \cdot \sqrt{5} + 5 \\ &= 55 + 10\sqrt{10} \end{aligned}$$

$$\begin{aligned} (5\sqrt{2} - \sqrt{5})^2 &= 50 - 2 \cdot 5\sqrt{2} \cdot \sqrt{5} + 5 \\ &= 55 - 10\sqrt{10} \end{aligned}$$

$$\begin{aligned} (5\sqrt{2} + 2\sqrt{5})^2 &= 50 + 2 \cdot 5\sqrt{2} \cdot 2\sqrt{5} + 20 \\ &= 70 + 20\sqrt{10} \end{aligned}$$

$$\begin{aligned} (5\sqrt{2} - 2\sqrt{5})^2 &= 50 - 2 \cdot 5\sqrt{2} \cdot 2\sqrt{5} + 20 \\ &= 70 - 20\sqrt{10} \end{aligned}$$

$$\begin{aligned}
 (2\sqrt{3} + \sqrt{2})^2 & \\
 &= 12 + 2 \cdot 2\sqrt{3} \cdot \sqrt{2} + 2 \\
 &= 14 + 4\sqrt{6}
 \end{aligned}$$

$$\begin{aligned}
 (2\sqrt{3} - \sqrt{2})^2 & \\
 &= 12 - 2 \cdot 2\sqrt{3} \cdot \sqrt{2} + 2 \\
 &= 14 - 4\sqrt{6}
 \end{aligned}$$

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

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

$$\begin{aligned}
 (3\sqrt{2} + \sqrt{3})^2 & \\
 &= 18 + 2 \cdot 3\sqrt{2} \cdot \sqrt{3} + 3 \\
 &= 21 + 6\sqrt{6}
 \end{aligned}$$

$$\begin{aligned}
 (3\sqrt{2} - \sqrt{3})^2 & \\
 &= 18 - 2 \cdot 3\sqrt{2} \cdot \sqrt{3} + 3 \\
 &= 21 - 6\sqrt{6}
 \end{aligned}$$

$$\begin{aligned}
 (5\sqrt{2} + 2\sqrt{3})^2 & \\
 &= 50 + 2 \cdot 5\sqrt{2} \cdot 2\sqrt{3} + 12 \\
 &= 62 + 20\sqrt{6}
 \end{aligned}$$

$$\begin{aligned}
 (5\sqrt{2} - 2\sqrt{3})^2 & \\
 &= 50 - 2 \cdot 5\sqrt{2} \cdot 2\sqrt{3} + 12 \\
 &= 62 - 20\sqrt{6}
 \end{aligned}$$

$$\begin{aligned} & \sqrt{2}+1 \text{ に} \\ & \sqrt{2}-1 \text{ をかけると} \\ & (\sqrt{2}+1)(\sqrt{2}-1) \\ & = 2-1 \\ & = 1 \quad \text{となり} \end{aligned}$$

整数化できる

この事を使って

$$\frac{1}{\sqrt{2}+1} \text{ の}$$

分母の有理化が

可能となる

$$\begin{aligned} & \frac{1}{\sqrt{2}+1} \\ & = \frac{\sqrt{2}-1}{(\sqrt{2}+1)(\sqrt{2}-1)} \\ & = \frac{\sqrt{2}-1}{1} \\ & = \sqrt{2}-1 \end{aligned}$$

同じように

$$\begin{aligned} & \frac{1}{\sqrt{3}+1} \\ & = \frac{\sqrt{3}-1}{(\sqrt{3}+1)(\sqrt{3}-1)} \\ & = \frac{\sqrt{3}-1}{2} \end{aligned}$$

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

$\sqrt{a}+\sqrt{b}$ に

$$\begin{aligned} & \sqrt{a}-\sqrt{b} \text{ をかけると} \\ & (\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b}) \\ & = a-b^2 \text{ となり} \end{aligned}$$

整数化できる。

$$\begin{aligned} & \frac{1}{\sqrt{2}+1} & \frac{1}{\sqrt{3}+\sqrt{2}} & \frac{\sqrt{3}}{\sqrt{3}+\sqrt{2}} \\ = & \frac{\sqrt{2}-1}{(\sqrt{2}+1)(\sqrt{2}-1)} & = \frac{\sqrt{3}-\sqrt{2}}{(\sqrt{3}+\sqrt{2})(\sqrt{3}-\sqrt{2})} & = \frac{\sqrt{3}(\sqrt{3}-\sqrt{2})}{(\sqrt{3}+\sqrt{2})(\sqrt{3}-\sqrt{2})} \\ = & \sqrt{2}-1 & = \sqrt{3}-\sqrt{2} & = \sqrt{3}-\sqrt{2} \end{aligned}$$

$$\begin{aligned} & \frac{1}{\sqrt{3}+1} & \frac{1}{\sqrt{3}-\sqrt{2}} & \frac{\sqrt{2}}{\sqrt{3}-\sqrt{2}} \\ = & \frac{\sqrt{3}-1}{(\sqrt{3}+1)(\sqrt{3}-1)} & = \frac{\sqrt{3}+\sqrt{2}}{(\sqrt{3}-\sqrt{2})(\sqrt{3}+\sqrt{2})} & = \frac{\sqrt{2}(\sqrt{3}+\sqrt{2})}{(\sqrt{3}-\sqrt{2})(\sqrt{3}+\sqrt{2})} \\ = & \frac{\sqrt{3}-1}{2} & = \sqrt{3}+\sqrt{2} & = \sqrt{6}+2 \end{aligned}$$

$$\begin{aligned} & \frac{1}{\sqrt{5}+1} & \frac{1}{\sqrt{5}+\sqrt{2}} & \frac{\sqrt{5}}{\sqrt{5}+\sqrt{2}} \\ = & \frac{\sqrt{5}-1}{(\sqrt{5}+1)(\sqrt{5}-1)} & = \frac{\sqrt{5}-\sqrt{2}}{(\sqrt{5}+\sqrt{2})(\sqrt{5}-\sqrt{2})} & = \frac{\sqrt{5}(\sqrt{5}-\sqrt{2})}{(\sqrt{5}+\sqrt{2})(\sqrt{5}-\sqrt{2})} \\ = & \frac{\sqrt{5}-1}{4} & = \frac{\sqrt{5}-\sqrt{2}}{3} & = \frac{5-\sqrt{10}}{3} \end{aligned}$$

$$\begin{aligned} & \frac{1}{\sqrt{6}+1} & \frac{1}{\sqrt{5}-\sqrt{2}} & \frac{\sqrt{2}}{\sqrt{5}-\sqrt{2}} \\ = & \frac{\sqrt{6}-1}{(\sqrt{6}+1)(\sqrt{6}-1)} & = \frac{\sqrt{5}+\sqrt{2}}{(\sqrt{5}-\sqrt{2})(\sqrt{5}+\sqrt{2})} & = \frac{\sqrt{2}(\sqrt{5}+\sqrt{2})}{(\sqrt{5}-\sqrt{2})(\sqrt{5}+\sqrt{2})} \\ = & \frac{\sqrt{6}-1}{5} & = \frac{\sqrt{5}+\sqrt{2}}{3} & = \frac{\sqrt{10}+2}{3} \end{aligned}$$

$$\frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}}$$

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

$$= 3\sqrt{2}-2\sqrt{3}$$

$$\frac{\sqrt{15}}{\sqrt{5}+\sqrt{3}}$$

$$= \frac{5\sqrt{3}-3\sqrt{5}}{2}$$

$$\frac{\sqrt{2}}{\sqrt{6}+\sqrt{5}}$$

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

$$= 2\sqrt{3}-\sqrt{10}$$

$$\frac{\sqrt{6}}{\sqrt{3}-\sqrt{2}}$$

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

$$= 3\sqrt{2}+2\sqrt{3}$$

$$\frac{\sqrt{15}}{\sqrt{5}-\sqrt{3}}$$

$$= \frac{5\sqrt{3}+3\sqrt{5}}{2}$$

$$\frac{\sqrt{2}}{\sqrt{6}-\sqrt{5}}$$

$$= 2\sqrt{3}+\sqrt{10}$$

$$\frac{\sqrt{10}}{\sqrt{5}+\sqrt{2}}$$

$$= \frac{\sqrt{10}(\sqrt{5}-\sqrt{2})}{(\sqrt{5}+\sqrt{2})(\sqrt{5}-\sqrt{2})}$$

$$= \frac{5\sqrt{2}-2\sqrt{5}}{3}$$

$$\frac{\sqrt{12}}{\sqrt{6}+\sqrt{2}}$$

$$= \frac{6\sqrt{2}-2\sqrt{6}}{4}$$

$$\frac{\sqrt{5}}{\sqrt{6}+\sqrt{5}}$$

$$= \sqrt{30}-5$$

$$\frac{\sqrt{10}}{\sqrt{5}-\sqrt{2}}$$

$$= \frac{5\sqrt{2}+2\sqrt{5}}{3}$$

$$\frac{\sqrt{12}}{\sqrt{6}-\sqrt{2}}$$

$$= \frac{6\sqrt{2}+2\sqrt{6}}{4}$$

$$\frac{\sqrt{5}}{\sqrt{6}-\sqrt{5}}$$

$$= \sqrt{30}+5$$

$$x = \sqrt{3} + \sqrt{2}$$

$$y = \sqrt{3} - \sqrt{2} \text{ のとき}$$

次の式の値を求めよ。

$$\begin{aligned} x+y & \\ &= (\sqrt{3} + \sqrt{2}) + (\sqrt{3} - \sqrt{2}) \\ &= 2\sqrt{3} \end{aligned}$$

$$\begin{aligned} (x+y)^2 & \\ &= (2\sqrt{3})^2 \\ &= 12 \end{aligned}$$

$$\begin{aligned} x^2 - y^2 & \\ &= (x+y)(x-y) \\ &= 2\sqrt{3} \cdot 2\sqrt{2} \\ &= 4\sqrt{6} \end{aligned}$$

$$\begin{aligned} x-y & \\ &= (\sqrt{3} + \sqrt{2}) - (\sqrt{3} - \sqrt{2}) \\ &= 2\sqrt{2} \end{aligned}$$

$$\begin{aligned} (x-y)^2 & \\ &= (2\sqrt{2})^2 \\ &= 8 \end{aligned}$$

$$\begin{aligned} x^2 + y^2 & \\ &= (x+y)^2 - 2xy \\ &= (2\sqrt{3})^2 - 2 \times 1 \\ &= 12 - 2 \\ &= 10 \end{aligned}$$

$$\begin{aligned} xy & \\ &= (\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2}) \\ &= 3 - 2 \\ &= 1 \end{aligned}$$

$$\begin{aligned} x^2 + y^2 + 2xy & \\ &= 2\sqrt{3} \cdot 2\sqrt{2} \\ &= 4\sqrt{6} \end{aligned}$$

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

$$x^2 + y^2 + 2xy$$

$$\begin{aligned} -2xy & \\ &= -2 \end{aligned}$$

$$\begin{aligned} x^2 + y^2 - 2xy & \\ &= (x-y)^2 \end{aligned}$$

$$x = \sqrt{5} + \sqrt{2}$$

$$y = \sqrt{5} - \sqrt{2} \text{ のとき}$$

次の式の値を求めよ。

$$\begin{aligned} x+y & \\ &= (\sqrt{5} + \sqrt{2}) + (\sqrt{5} - \sqrt{2}) \\ &= 2\sqrt{5} \end{aligned}$$

$$\begin{aligned} x-y & \\ &= (\sqrt{5} + \sqrt{2}) - (\sqrt{5} - \sqrt{2}) \\ &= 2\sqrt{2} \end{aligned}$$

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

$$\begin{aligned} 2xy & \\ &= 6 \end{aligned}$$

$$\begin{aligned} -2xy & \\ &= -6 \end{aligned}$$

$$\begin{aligned} (x+y)^2 & \\ &= (2\sqrt{5})^2 \\ &= 20 \end{aligned}$$

$$\begin{aligned} (x-y)^2 & \\ &= (2\sqrt{2})^2 \\ &= 8 \end{aligned}$$

$$\begin{aligned} (x+y)(x-y) & \\ &= 2\sqrt{5} \times 2\sqrt{2} \\ &= 4\sqrt{10} \end{aligned}$$

$$\begin{aligned} x^2 + 2xy + y^2 & \\ &= (x+y)^2 \\ &= (2\sqrt{5})^2 = 20 \end{aligned}$$

$$\begin{aligned} x^2 - 2xy + y^2 & \\ &= (x-y)^2 \\ &= (2\sqrt{2})^2 = 20 \end{aligned}$$

$$\begin{aligned} x^2 - y^2 & \\ &= (x+y)(x-y) \\ &= 2\sqrt{5} \times 2\sqrt{2} = 20 \end{aligned}$$

$$\begin{aligned} x^2 + y^2 & \\ &= (2\sqrt{5})^2 - 2 \cdot 2\sqrt{2} \\ &= 16 \end{aligned}$$

$$x = \sqrt{5} + \sqrt{3}$$

$$y = \sqrt{5} - \sqrt{3} \text{ のとき}$$

次の式の値を求めよ。

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

$$\begin{aligned} x^2 + y^2 & \\ &= (x+y)^2 - 2xy \\ &= (2\sqrt{5})^2 - 2 \cdot (5-3) \\ &= 20 - 4 \\ &= 16 \end{aligned}$$

$$x = \sqrt{3} + \sqrt{2}$$

$$y = \sqrt{3} - \sqrt{2} \text{ のとき}$$

次の式の値を求めよ。

$$\begin{array}{r} x = \sqrt{3} + \sqrt{2} \\ + y = \sqrt{3} - \sqrt{2} \\ \hline 2\sqrt{3} \end{array}$$

$$(x+y)^2 = 12$$

$$(x-y)^2 = 8$$

$$\begin{array}{r} x \\ - y \\ \hline 2\sqrt{2} \end{array}$$

$$(x+y)(x-y) = 4\sqrt{6}$$

$$x^2 + 2xy + y^2 = (x+y)^2$$

$$xy = 1$$

$$\begin{aligned} x^2 - 2xy + y^2 &= (x-y)^2 \\ &= (2\sqrt{2})^2 \\ &= 8 \end{aligned}$$

$$2xy = 2$$

$$\begin{aligned} x^2 - y^2 &= (x+y)(x-y) \\ &= 2\sqrt{3} \cdot 2\sqrt{2} \\ &= 4\sqrt{6} \end{aligned}$$

$$-2xy = -2$$

$$\begin{aligned} x^2 + y^2 &= (x+y)^2 - 2xy \\ &= (2\sqrt{3})^2 - 2(3-2) \\ &= 10 \end{aligned}$$