

2015年第1問

1 $\frac{\sqrt{3} + \sqrt{2} + 1}{\sqrt{3} - \sqrt{2} + 1}$ の分母を有理化せよ.

$$\begin{aligned}
 (\text{与式}) &= \frac{(\sqrt{3} + \sqrt{2} + 1)^2}{\{(\sqrt{3} + 1) - \sqrt{2}\} \{(\sqrt{3} + 1) + \sqrt{2}\}} \\
 &= \frac{3 + 2 + 1 + 2\sqrt{6} + 2\sqrt{3} + 2\sqrt{2}}{(\sqrt{3} + 1)^2 - 2} \\
 &= \frac{6 + 2\sqrt{6} + 2\sqrt{3} + 2\sqrt{2}}{2 + 2\sqrt{3}} \\
 &= \frac{3 + \sqrt{6} + \sqrt{3} + \sqrt{2}}{\sqrt{3} + 1} \\
 &= \frac{(3 + \sqrt{6} + \sqrt{3} + \sqrt{2})(\sqrt{3} - 1)}{(\sqrt{3} + 1)(\sqrt{3} - 1)} \\
 &= \frac{3\sqrt{3} - 3 + 3\sqrt{2} - \sqrt{6} + 3 - \sqrt{3} + \sqrt{6} - \sqrt{2}}{2} \\
 &= \frac{2\sqrt{3} + 2\sqrt{2}}{2} \\
 &= \underline{\underline{\sqrt{3} + \sqrt{2}}} //
 \end{aligned}$$