

問) $(1 + \frac{1}{\sqrt[4]{8+\sqrt{2}+\sqrt[4]{2+1}}})^{20}$ の値を求めよ。

$$\begin{aligned}\frac{1}{\sqrt[4]{8+\sqrt{2}+\sqrt[4]{2+1}}} &= \frac{\sqrt[4]{2}-1}{(\sqrt[4]{2}-1)(\sqrt[4]{8+\sqrt{2}+\sqrt[4]{2+1}})} \\ &= \frac{\sqrt[4]{2}-1}{2-1}\end{aligned}$$

$$\begin{aligned}(1 + \frac{1}{\sqrt[4]{8+\sqrt{2}+\sqrt[4]{2+1}}})^{20} &= (1 + \frac{\sqrt[4]{2}-1}{2-1})^{20} = \sqrt[4]{2}^{20} \\ &= 2^5 = 32\end{aligned}$$