

From Mathematics to Generic Programming

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4.3

Solution.

We are asked to show that:

$$\sqrt[3]{16} + \sqrt[3]{54} = \sqrt[3]{250}$$

We heed the hint in the text regarding the value of $\sqrt[3]{2}$, which may be assigned an arbitrary symbol even if its exact value cannot be easily computed.

$$\begin{aligned}\sqrt[3]{16} + \sqrt[3]{54} &= \sqrt[3]{25} \\ \sqrt[3]{2^3 \cdot 2} + \sqrt[3]{3^3 \cdot 2} &= \sqrt[3]{5^3 \cdot 2} \\ 2 \cdot \sqrt[3]{2} + 3 \cdot \sqrt[3]{2} &= 5 \cdot \sqrt[3]{2} \\ 5 \cdot \sqrt[3]{2} &= 5 \cdot \sqrt[3]{2}\end{aligned}$$

Whatever the $\sqrt[3]{2}$ happens to be, our arithmetic shows that the given expression is truly an equality.