From Mathematics to Generic Programming

Brooks Mershon

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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.

$$\begin{aligned}
\sqrt[3]{(16)} + \sqrt[3]{(54)} &= \sqrt[3]{(250)} \\
\sqrt[3]{(2^3 x 2)} + \sqrt[3]{(3^3 x 2)} &= \sqrt[3]{(5^3 x 2)} \\
2x\sqrt[3]{(2)} + 2x\sqrt[3]{(2)} &= 5x\sqrt[3]{(2)} \\
5x\sqrt[3]{(2)} &= 5x\sqrt[3]{(2)}
\end{aligned}$$

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