

## Problem 43

A commonly used unit of mass in the English system is the pound-mass, abbreviated lbm, where  $1 \text{ lbm} = 0.454 \text{ kg}$ . What is the density of water in pound-mass per cubic foot?

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### Solution

The density of water is given on page 25:  $10^3 \text{ kg/m}^3$ . Convert it to the desired units by multiplying by the appropriate conversion factors.

$$10^3 \frac{\text{kg}}{\text{m}^3} = 10^3 \frac{\cancel{\text{kg}}}{\cancel{\text{m}^3}} \times \frac{1 \text{ lbm}}{0.454 \cancel{\text{kg}}} \times \left( \frac{381 \cancel{\text{m}}}{1250 \text{ ft}} \right)^3 \approx 62.4 \frac{\text{lbm}}{\text{ft}^3}$$