Problem of the Week
Problem B and Solution
Sap to Syrup

Problem

In order to make sap into maple syrup, the sap must be boiled down to $\frac{1}{40}$ of its original volume. (This means that 40 L of sap will make only 1 L of maple syrup.)

a) How much maple syrup would you get from boiling down 160 L of sap?

b) In a previous Problem of the Week, we found that 403.2 L of sap can been collected from 28 trees.
Approximately how many litres of maple syrup would result from this amount of sap?

c) You have four 1 L bottles and six 500 mL bottles for the maple syrup from part b). If you fill those bottles first and then put the remaining maple syrup into 125 mL bottles, how many 125 mL bottles can you completely fill?

Solution

a) The sap to maple syrup ratio is 40 : 1. Therefore, 160 L of sap would yield $\frac{1}{40} \times 160 = 4$ L of maple syrup.

b) Given the 403.2 L of sap collected, and noting that $403.2 \approx 10 \times 40$, then with a ratio of 40 : 1, we see that about 10 L of maple syrup would result. More precisely, if we do the division, we get $403.2 \text{ L} \div 40 = 10.08$ L of maple syrup.

c) The six 500 mL bottles will hold $6 \times 500 = 3\,000$ mL or 3 L of maple syrup. So, combined with the four 1 L bottles, there would be enough capacity to bottle 7 of the 10 L of maple syrup from part b), leaving 3 L to be bottled in the 125 mL bottles. Since $8 \times 125 \text{ mL} = 1\,000 \text{ mL} = 1$ L, you will need $3 \times 8 = 24$ of the 125 mL bottles for the 3 L of maple syrup.