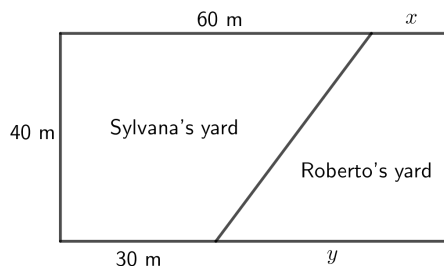# Problem of the Week
Problem B and Solution
Seeking Parts Unknown...

Problem

Sylvana and Roberto divide a 40 m by 75 m rectangular lot to form two yards, as shown in the diagram below.

The area of Roberto's yard is 40% of the total area of the two properties.

(a) What are the values of x and y, the missing dimensions of Roberto's yard?

(b) What is the area of each yard?

Solution

(a) From the two sides of the rectangle of length 75 m, we must have $60\,\text{m} + x = 75$ m and $30\,\text{m} + y = 75$ m. Thus, the missing dimensions of Roberto's yard are $x = 75 - 60 = 15$ m and $y = 75 - 30 = 45$ m.

(b) The total area of the two yards is $40\,\text{m} \times 75\,\text{m} = 3000$ m². The area of each yard can be found in a variety of ways:

- The area of Roberto's yard is 40% of the total area. Thus, the area of Roberto's yard is 40% of 3000, or $0.4 \times 3000 = 1200$ m², and the area of Sylvana's yard is $3000 - 1200 = 1800$ m².

- Alternatively, since the area of Roberto's yard is 40% of the total area, the area of Sylvana's yard must be $100\% - 40\% = 60\%$ of the total area. Thus, the area of Sylvana's yard is $0.6 \times 3000 = 1800$ m², and the area of Roberto's yard is $3000 - 1800 = 1200$ m².

- We can find the area of one of the yards, and subtract that from the total area to find the area of the other yard. We will show how to find the area of Sylvana's yard. Notice that Sylvana's yard is shaped like a trapezoid. We can calculate the area of Sylvana's yard by dividing the trapezoid into a 40 m by 30 m rectangle (shown in red) and a triangle with a base of 30 m and a height of 40 m (shown in blue).

  The area of the rectangle is $40 \times 30 = 1200$ m² and the area of the triangle is $\frac{40 \times 30}{2} = 600$ m².
  Thus, the total area of Sylvana's yard is $1200 + 600 = 1800$ m², and so the total area of Roberto's yard is $3000 - 1800 = 1200$ m².