



Problem of the Week

Problem C and Solution

Painting the Way

**Problem**

Alexia, Benito, and Carmen won a team art competition at their local park. As part of their prize, they can paint the 5 km (5000 m) paved path through the park any way they like. They decided Alexia will paint the first 70 m, then Benito will paint the next 15 m, then Carmen will paint the next 35 m. They will keep repeating this pattern until they reach the end of the 5 km path. What percentage of the path will each person paint?

Solution

After each person paints their first section, they will have covered $70 + 15 + 35 = 120$ m in total. We will call this one cycle. The number of cycles in 5000 m is

$$\frac{5000}{120} = \frac{125}{3} = 41\frac{2}{3}.$$

So, there are 41 complete cycles and $\frac{2}{3}$ of another cycle. The total distance covered in 41 cycles is $41 \times 120 = 4920$ m. That means there are $5000 - 4920 = 80$ m remaining. Alexia would paint the first 70 m, leaving the last 10 m for Benito to paint.

We can organize this information in a table to calculate the total distance each person will paint.

	Distance Painted by Each Person (m)		
	Alexia	Benito	Carmen
First 41 cycles	$41 \times 70 = 2870$	$41 \times 15 = 615$	$41 \times 35 = 1435$
Last partial cycle	70	10	0
Total	$2870 + 70 = 2940$	$615 + 10 = 625$	1435

We can now calculate the percentage of the path each person will paint.

$$\text{Alexia: } \frac{2940}{5000} \times 100\% = 58.8\%$$

$$\text{Benito: } \frac{625}{5000} \times 100\% = 12.5\%$$

$$\text{Carmen: } \frac{1435}{5000} \times 100\% = 28.7\%$$

Therefore, Alexia will paint 58.8% of the path, Benito will paint 12.5% of the path, and Carmen will paint 28.7% of the path.