Puzzle: The Train Trouble

A 150-meter-long train crosses a man standing on a platform in 10 seconds. It takes the same train **18 seconds** to cross a platform.

Question:
What is the length of the platform?

Step 1:

Let the speed of the train be S meters/second.

From the first condition:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{150}{10} = 15 \text{ m/s}$$

Step 2:

Now, let the length of the platform be P meters.

The train takes 18 seconds to cross the platform, so:

$$\text{Total distance covered} = \text{Train length} + \text{Platform length} = 150 + P$$

$$\text{Speed} = \frac{150 + P}{18}$$

We already found the speed to be 15 m/s. So:

$$15 = \frac{150 + P}{18} \Rightarrow 150 + P = 27 \downarrow P = 270 - 150 = \boxed{120 \text{ meters}}$$

Puzzle: Boat in the River

A boat takes **8 hours** to travel 48 km **downstream** and back **upstream** to the starting point. If the speed of the river current is 2 km/h, what is the speed of the boat in still water?

✅ **Answer:**

Let the speed of the boat in still water be x km/h.

- **Downstream speed** = $x + 2$ km/h
- **Upstream speed** = $x - 2$ km/h

Time taken to go downstream 48 km:

$$\frac{48}{x+2}$$

Time taken to return upstream 48 km:

$$\frac{48}{x-2}$$

Total time = 8 hours:

$$\frac{48}{x+2} + \frac{48}{x-2} = 8$$

Multiply through by $(x+2)(x-2)$:

$$48(x-2) + 48(x+2) = 8(x^2-4)$$

$$48x - 96 + 48x + 96 = 8x^2 - 32 \Rightarrow 96x = 8x^2 - 32$$

Divide both sides by 8:

$$12x = x^2 - 4 \Rightarrow x^2 - 12x - 4 = 0$$

Solve using the quadratic formula:

$$x = \frac{12 \pm \sqrt{144+16}}{2} = \frac{12 \pm \sqrt{160}}{2} \Rightarrow x = \frac{12 \pm 4\sqrt{10}}{2} = 6 \pm 2\sqrt{10}$$

Take the **positive root** (since speed can't be negative):

$$\boxed{x = 6 + 2\sqrt{10}} \approx \boxed{12.32 \text{ km/h (approx)}}$$
