Primary Division: Problems II
Solutions

P2.1.

Three models – Miss Pink, Miss Green and Miss Blue - are on the catwalk. Their dresses are pink, green and blue. “It’s strange.” Miss Blue remarks to the others, “We are named Pink, Green and Blue and our dresses are pink, green and blue, but none of us is wearing the dress that matches her name.” “That’s a coincidence,” replies the girl in green. What colour is each model’s dress?

Solution

Since the girl in green replies to Miss Blue, Miss Blue is not wearing green.
So Miss Blue must be wearing pink.

Hence Miss Green is not wearing pink or green and so must be wearing blue.

This leaves Miss Pink to be wearing green.

So the models and their colours are:

Miss Pink	Miss Green	Miss Blue
green	blue	pink

P2.2.

When the new library opened there were step-stools so the pupils could reach the books on the top shelf.
When Anne stood on the stool she was 36 cm taller than her brother Ben.
When Ben stood on the stool he was 22 cm taller than Anne.
What is the height of the stool?

Solution

Let the heights of Anne, Ben and the stool be A cm, B cm, S cm. Then

$$A + S = B + 36$$
$$B + S = A + 22$$

Adding

$$A + B + 2S = A + B + 58$$
$$2S = 58$$
$$S = 29$$

So the stool is 29 cm high.

Non-algebraic solution

Heights of stool + Anne = Ben + 36cm.

Also

heights of stool + Ben = Anne + 22cm.

Now imagine two equal height columns, one with Ben standing on the stool on top of Anne standing on the stool, and the other with Anne +2 2cm floating above Ben + 36cm.

Anne's and Ben's heights appear in both columns, and so cancel out.

Hence 2 stool heights = 22cm = 36cm = 58cm.
i.e. stool height = 29cm.

P2.3.

A cyclist rides 3 miles along a straight, level railway path against the wind in 15 minutes. On the way back, with the wind, it takes him 10 minutes. Assuming the wind speed has remained constant throughout, how long would it take the cyclist for the same return trip if there were no wind?

Solution

Speed out against wind = 3 miles / ($\frac{1}{4}$ hour) = 12 mph
Speed back with wind = 3 miles / ($\frac{1}{6}$ hour) = 18 mph

So the cyclist's speed without any wind would be (12 + 18)/2 = 15 mph. The return trip of 6 miles would take

6 miles / (15 mph) = 2/5 hours = 24 minutes.