



# Ratio, Proportion and Rates of Change

## Age 11+ Level ★★ Worksheet 1

### 1. Don't Be Late

Mary drove to Birmingham Airport at 45 miles per hour for the first two hours and then at 70 miles per hour for the remainder of the journey. Her average speed for the entire journey was 60 miles per hour. How long did Mary's journey to Birmingham Airport take?

### 2. Decimal Clock

In the late 18th century, a decimal clock was proposed, in which there were 100 'minutes' in one 'hour' and 10 'hours' in one day. Assuming that such a clock started from 0:00 at midnight, what time would it show when an ordinary clock showed 6am?

### 3. Sharing Sweets

Maria and Lucy spun a coin 30 times. Whenever the coin showed heads, Maria gave 2 sweets to Lucy. Whenever the coin showed tails, Lucy gave 3 sweets to Maria.

After all 30 spins, both Maria and Lucy had the same number of sweets that they started with. How many times was tails spun?

### 4. Leg It

Amina and Bhavi are both training for a 100 metre race. Amina's average time to run 100 metres is 12 seconds, and Bhavi's is 15 seconds. To make their training sessions more competitive, they want to run 'fair' races against each other - so that if they ran at their average speeds, they would finish at the same time.

a) If Amina starts 100 metres from the finish line, how many metres in front of her should Bhavi start to make the race 'fair'?

b) If Bhavi starts 100 metres from the finish line, how many metres behind her should Amina start to make the race 'fair'?

### 5. How Many Swimmers?

A swimming club has three categories of member: junior, senior and veteran. The ratio of junior to senior members is 3:2, and the ratio of senior to veteran members is 5:2. What is the least possible number of members of the swimming club?

*These problems are adapted from UKMT ([ukmt.org.uk](http://ukmt.org.uk)) and SEAMC ([seamc.asia](http://seamc.asia)) problems.*