



Stage 3 ★ Mixed Selection 3 - Solutions

1. Roman distances

$$8 \text{ stadia} = 8 \times 125 \text{ passus} = 8 \times 125 \times 5 \text{ pedes} = 5000 \text{ pedes}$$

So Marcus has to walk 5000 *pedes*. 1 circuit of his atrium is $50 \times 4 = 200$ *pedes* long, so he has to walk round his atrium

$$\frac{5000}{200} = 25 \text{ times.}$$

In Roman numerals, 25 is XXV.

2. Walking in the mountains

Before lunch Peter and Heidi have walked for 60 minutes covering a distance which the sign indicates should take 1 hour

and 40 minutes. So the pair take only $\frac{60}{100} = \frac{3}{5}$ of the time indicated by the sign.

They stop for 15 minutes, then cover the remaining distance in $\frac{3}{5} \times 75 = 45$ minutes.

The journey takes $60 + 15 + 45 = 120$ minutes in total, so they reach Salzbau at 2pm.

3. Thunder and lightning

The distance is roughly $6 \times 330 \approx 2000m$.

4. Dean's mountain

On the way up Dean runs at 8km/h for 1 hour.

The distance is therefore: Distance = 8 km/h \times 1 hour = 8 km.

On the way down, he runs at 12km/h.

The time is therefore: $8/12 = 2/3$ hours, so it takes Dean 40 minutes to run down the mountain.

These problems are adapted from UKMT Mathematical Challenge problems (ukmt.org.uk)