

## Speed

### Starter

1. (Review of last lesson)

Tomatoes are sold in a supermarket at 85p per kilo or 30p per lb. Which is the lower price?

**Working:** 30p per lb  $\equiv 30 \times 2.2 = 66$ p per kilo.  
So 30p per lb is cheaper.

2. (Review of previous material)

Convert: (a) 17 m/s to km/h (b) 65 mph to metres per second

**Working:** (a)  $17 \text{ m/s} \equiv 17 \times 60 \text{ m/min}$   
 $\equiv 17 \times 60 \times 60 \text{ m/h}$   
 $\equiv \frac{17 \times 60 \times 60}{1000} \text{ km/h}$   
 $= 61.2 \text{ km/h}$

(b)  $65 \text{ mph} \equiv 65 \times 1.6 \text{ km/h}$   
 $\equiv 65 \times 1.6 \times 1000 \text{ m/h}$   
 $\equiv \frac{65 \times 1.6 \times 1000}{60} \text{ m/min}$   
 $\equiv \frac{65 \times 1.6 \times 1000}{60 \times 60} \text{ m/s}$   
 $= 28.8 \text{ m/s}$

3. How long would it take a runner to complete 5 km if they are travelling at 16 km/h?

**Working:**  $\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{5}{16} = 0.3125 \text{ hours}$   
 $\equiv 18.75 \text{ minutes}$   
 $\equiv 18 \text{ minutes } 45 \text{ seconds}$

**E.g. 1** Find the distance travelled at a speed of 80 mph for 25 minutes.

**Working:**  $25 \text{ minutes} \equiv \frac{25}{60} \text{ hours}$   
 $\text{Distance} = 80 \times \frac{25}{60} = 33.\dot{3} \text{ miles}$

**E.g. 2** A racing car completed a distance of 544 km in 3 hours 24 minutes. What was her average speed in?

**Working:**  $3 \text{ hours } 24 \text{ minutes} \equiv 3\frac{24}{60} \text{ hours}$   
 $\text{Speed} = \frac{\text{Distance}}{\text{Time}}: \quad \text{Average speed} = \frac{544}{3\frac{24}{60}} = 160 \text{ km/h}$

**E.g. 3** A car travelling at 70 km/h is 700 m behind another car travelling at 68 km/h in the same direction. How long will it take for the first car to catch the second?

**Working:** The relative speed of the cars is 2 km/h.  
The distance between the cars is 0.7 km.  
$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}: \quad \text{Time} = \frac{0.7}{2} = 0.35 \text{ hours}$$
$$\equiv 0.35 \times 60 = 21 \text{ minutes}$$
It will take 21 minutes for the first car to catch the second.

**E.g. 4** A car travels 120 km at an average speed of 70 km/h. On its return, traffic causes its average speed to drop to 60 km/h. Calculate its average speed for the journey to 3 s.f..

**Working:** Time taken for outward journey =  $\frac{120}{70} = \frac{12}{7}$  hours  
Time taken for return journey =  $\frac{120}{60} = 2$  hours  
Average speed for whole journey =  $\frac{2 \times 120}{\frac{12}{7} + 2} = 64.6$  kmh

**Video:** [Speed, distance, time](#)

[Solutions to Starter and E.g.s](#)

### Exercise

9-1 class textbook: p310 M10.3 Qu 1-15 odd  
A\*-G class textbook: p273 M10.3 Qu 1-17 odd  
9-1 homework book: p104 M10.3 Qu 1-14  
A\*-G homework book: p76 M10.3 Qu 1-10