

## R11a Part 1 Speed, distance, and time © BossMaths

Warm-up activity



**Work out the following**

a)  $15 \div 5$

b)  $28 \div 4$

c)  $56 \div 7$

d)  $310 \div 10$

e)  $112 \div 8$

f)  $108 \div 9$

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Spot the links...



**Work out the average speed of the car in km/h in each case.**

Try to spot what is changing from each question to the next to help you.

- a) A car travels 80 km in 2 hours
  
- b) A car travels 40 km in 2 hours
  
- c) A car travels 40 km in 1 hour
  
- d) A car travels 40 km in 30 minutes
  
- e) A car travels 20 km in 30 minutes
  
- f) A car travels 20 km in 20 minutes
  
- g) A car travels 20 km in 40 minutes
  
- h) A car travels 60 km in 40 minutes

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### Alpha Exercise

- a) Pascal is training for a marathon. He runs **42 km** in **3 hours**. Work out his average speed in km/h.
- b) A plane travels **4200 miles** in **7 hours**. Work out its average speed in mph.
- c) Jon runs **10 km** in **30 minutes**. Find his average speed in km/h.

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### Beta Exercise

- a) Chris walks **2.8 km** in **30 minutes**. Work out his average speed in km/h.
- b) Laura cycles a lap of the park at **12 metres per second**. The lap takes **58 seconds**. What distance does she cover?
- c) Roberto is a racing driver. He completes a **500 mile** race at an average speed of **125 miles per hour**. How long did it take him to complete the race?



## Gamma Exercise

- a) Jules runs **9 km** in **40 min**. What is her average speed in km/h?
- b) A sprinter runs **100 metres** in **10 seconds**. Work out his average speed in m/s. What is this speed in km/h?
- c) The average speed on a moderately busy motorway is **48 mph**. How many minutes will it take to complete **4 miles** at this speed?
- d) At what speed would you need to travel to complete a **3 mile journey** in **18 minutes**?

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Explain the mistake

Kat answers this question as follows:

A train covers 27 km in 18 minutes. Find the average speed of the train.

$$\text{Speed} = \frac{\text{Distance}}{\text{time}} = \frac{27}{18} = 1.5 \text{ km/h}$$

**Kat has made a mistake.** What is it?

### Exam-style question 1

A tortoise and a hare have an 800 metre race.  
The hare completes the first **half** of the race in 50 seconds.

- (a) What is the hare's average speed for this part of the race? Give your answer in m/s.

The tortoise completes the first **half** of the race in 15 minutes.

- (b) What is the tortoise's average speed for this part of the race? Give your answer in km/h.

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### Exam-style question 2

A cyclist travels a distance of 7.2 km, correct to the nearest 0.1 km.

The cyclist took 12 minutes to cover this distance, to the nearest minute.

- a) Work out the upper bound for the speed of the cyclist in m/s, correct to 3 significant figures.

- b) What is the upper bound for the speed of the cyclist in km/h, correct to 3 significant figures?

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### Challenge

Carlos and Luis are travelling by car from Barcelona to Madrid.

Carlos drives the first half of the distance at an average speed of 60 km/h.  
Luis drives the second half of the distance at an average speed of 40 km/h.

Assuming that the time spent swapping drivers at the halfway point took a negligible amount of time, what was the average speed over the whole journey?