

GCSE Maths: Speed, distance and time (Higher): answers

GCSE Maths - Units and Compound Measures - Higher - Lesson 16.4

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch16-units-compound-measures/higher/speed-distance-and-time/

Exercise 16E Speed, distance and time Calculator allowed

1 Work out the average speed in each case.

- (a) 120 km in 2 hours

Answer: 60 km/h

- (b) 90 miles in 1.5 hours

Answer: 60 mph

- (c) 200 m in 25 seconds

Answer: 8 m/s

- (d) 15 km in 30 minutes (give the speed in km/h)

Answer: 30 km/h

- (e) 450 km in 5 hours

Answer: 90 km/h

- (f) 18 miles in 45 minutes (give the speed in mph)

Answer: 24 mph

2 Work out the distance travelled in each case.

- (a) 60 km/h for 3 hours

Answer: 180 km

- (b) 40 mph for 2.5 hours

Answer: 100 miles

- (c) 8 m/s for 15 seconds

Answer: 120 m

- (d) 80 km/h for 12 minutes

Answer: 16 km

- (e) 36 km/h for 45 minutes

Answer: 27 km

- (f) 72 km/h for 15 minutes

Answer: 18 km

3 Work out the time taken in each case. Give times in hours and minutes where sensible.

(a) 180 km at 60 km/h

Answer: 3 hours

(b) 150 miles at 40 mph

Answer: 3 hours 45 minutes

(c) 100 m at 8 m/s

Answer: 12.5 seconds

(d) 90 km at 36 km/h

Answer: 2 hours 30 minutes

(e) 45 km at 30 km/h

Answer: 1 hour 30 minutes

(f) 270 km at 72 km/h

Answer: 3 hours 45 minutes

4 A train leaves Penford at 09:15 and travels 210 km at an average speed of 84 km/h. At what time does it arrive?

Answer: 11:45

5 Car A travels 150 km in 2 hours. Car B travels 200 km in 2.5 hours. Which car has the greater average speed?

Answer: Car B (80 km/h compared with 75 km/h)

6 Zoe says: "If I double my speed, the time my journey takes will be halved." Is she correct? Give an example to support your answer.

Answer: Yes, if the distance stays the same (e.g. 120 km: 3 h at 40 km/h, 1.5 h at 80 km/h)

7 Usain runs 100 m in 9.58 seconds. Work out his average speed in m/s, to 2 decimal places.

Answer: 10.44 m/s

8 Joe cycles at 15 km/h for 2 hours 24 minutes. How far does he cycle?

Answer: 36 km

9 Which of these is a sensible average speed for a person riding a bicycle: 5 km/h, 20 km/h or 200 km/h? Give a reason.

Answer: 20 km/h

10 A bus travels at an average speed of 30 mph. How many minutes does it take to travel 12 miles?

Answer: 24 minutes

11 A ferry leaves port at 13:40 and arrives at 15:10. The crossing is 36 miles. Work out the average speed in mph.

Answer: 24 mph

12 A car travels $(3x + 6)$ km in $(x + 2)$ hours, where x is greater than 0. Show that its speed is constant and find it.

Answer: 3 km/h

- 13** Dilara wants to drive 240 km in 3 hours 20 minutes at a constant speed. Work out the speed she needs to drive at.

Answer: 72 km/h

- 14** Two cyclists start 90 km apart and ride towards each other along the same road. Amy cycles at 18 km/h and Ben cycles at 12 km/h. (a) How long until they meet? (b) How far has Amy ridden when they meet?

- (a) Time until they meet

Answer: 3 hours

- (b) Distance Amy rides

Answer: 54 km

Exercise 16F Average speed and changing speed units

Calculator allowed

- 1** Change each speed to m/s.

- (a) 36 km/h

Answer: 10 m/s

- (b) 54 km/h

Answer: 15 m/s

- (c) 90 km/h

Answer: 25 m/s

- (d) 144 km/h

Answer: 40 m/s

- 2** Change each speed to km/h.

- (a) 5 m/s

Answer: 18 km/h

- (b) 12 m/s

Answer: 43.2 km/h

- (c) 25 m/s

Answer: 90 km/h

- (d) 40 m/s

Answer: 144 km/h

- 3** Work out the average speed (in km/h) for each journey.

- (a) 24 km in 30 minutes, then 36 km in 30 minutes

Answer: 60 km/h

- (b) 20 km in 24 minutes, then 30 km in 36 minutes

Answer: 50 km/h

- (c) 30 km in 45 minutes, then 10 km in 15 minutes

Answer: 40 km/h

- (d) 45 km in 30 minutes, then 25 km in 30 minutes

Answer: 70 km/h

- 4 A coach leaves at 09:00 and arrives at 11:30. It travels 135 miles and has a 30 minute stop on the way. Work out (a) the average speed for the whole journey, (b) the average speed while moving.

- (a) Whole journey

Answer: 54 mph

- (b) While moving

Answer: 67.5 mph

- 5 A car travels 40 km at 50 km/h and then 60 km at 120 km/h. Work out the average speed for the whole journey, to 1 decimal place.

Answer: 76.9 km/h

- 6 Ravi drives to his grandmother at an average speed of 60 km/h and returns along the same road at 40 km/h. He says his average speed for the whole round trip is 50 km/h. Show that he is wrong.

Answer: The average speed is 48 km/h, not 50 km/h

- 7 A sprinter runs at 10 m/s. A car is travelling at 40 km/h. Which is faster?

Answer: The car (the sprinter is only 36 km/h)

- 8 You see lightning and hear the thunder 6 seconds later. Sound travels at 340 m/s. How far away was the lightning? Give your answer in kilometres.

Answer: 2.04 km

- 9 A speed camera measures a car travelling 600 m in 40 seconds. The speed limit is 50 km/h. Is the car breaking the limit? Show your working.

Answer: Yes. The car travels at 15 m/s = 54 km/h, which is over 50 km/h

- 10 Show that a speed of 4 m/s is equal to 14.4 km/h.

Answer: $4 \times 3600 = 14\,400$ m per hour = 14.4 km per hour

- 11 A runner runs 5 km in 24 minutes at a steady speed. (a) Work out her speed in km/h. (b) How long would she take to run 10 km at the same speed?

- (a) Speed

Answer: 12.5 km/h

- (b) Time for 10 km

Answer: 48 minutes

- 12 Show that a speed of v km/h is the same as $\frac{5v}{18}$ m/s.

Answer: $v \times 1000 \div 3600 = 5v/18$

- 13** A train 200 m long passes a signal pole in 8 seconds at a steady speed. (a) Work out the speed of the train in m/s and in km/h. (b) The train then takes 24 seconds to completely cross a bridge. How long is the bridge?

(a) Speed

Answer: 25 m/s = 90 km/h

(b) Bridge length

Answer: 400 m