



- 1 A cyclist rides at an average speed of 24 km/h for 2.5 hours.

Work out the distance the cyclist rides.

(2 marks)

$$\text{Use distance} = \text{speed} \times \text{time}$$

$$\text{Distance} = 24 \times 2.5 = 60 \text{ km}$$

60 km

- 2 A car travels 150 miles in 3 hours.

Work out its average speed in miles per hour.

(2 marks)

$$\text{Speed} = \text{distance} \div \text{time}$$

$$= 150 \div 3$$

50 mph

- 3 A train travels at an average speed of 60 km/h.

How long does it take to travel 240 km?

(2 marks)

$$\text{Time} = \text{distance} \div \text{speed}$$

$$= 240 \div 60$$

4 hours

- 4 A bus travels at an average speed of 36 km/h for 2.5 hours.

Work out the distance it travels.

(2 marks)

$$\text{Distance} = \text{speed} \times \text{time}$$

$$= 36 \times 2.5$$

90 km

- 5 Amir drives 130 miles at an average speed of 40 miles per hour.
Work out how long the journey takes. Give your answer in hours and minutes.

(3 marks)

$$\text{Time} = \text{distance} \div \text{speed}$$

$$= 130 \div 40 = 3.25 \text{ hours}$$

$$0.25 \times 60 = 15 \text{ minutes}$$

$$\boxed{3 \text{ hours } 15 \text{ minutes}}$$

- 6 A gull flies at a speed of 15 metres per second.
Change 15 metres per second to kilometres per hour.

(2 marks)

$$\text{In 1 hour the gull flies } 15 \times 3600 = 54\,000 \text{ metres}$$

$$54\,000 \text{ m} = 54 \text{ km, so the speed is } 54 \text{ km/h}$$

$$\boxed{54 \text{ km/h}}$$

- 7 Leila leaves home at 09:40 to drive 84 km at an average speed of 48 km/h.
At what time does she arrive?

(3 marks)

$$\text{Time} = 84 \div 48 = 1.75 \text{ hours}$$

$$= 1 \text{ hour } 45 \text{ minutes}$$

$$09:40 + 1:45$$

$$\boxed{11:25}$$

- 8 Femi runs 5 km in 25 minutes. She runs at a constant speed.
How long would it take her to run 8 km at the same speed?

(3 marks)

$$25 \div 5 = 5 \text{ minutes per km}$$

$$8 \times 5 = 40 \text{ minutes}$$

$$\boxed{40 \text{ minutes}}$$

- 9 A lorry driver travels 48 km at an average speed of 64 km/h, then 63 km at an average speed of 42 km/h.

Work out the total time of the journey. Give your answer in hours and minutes.

(3 marks)

$$\text{First: } 48 \div 64 = 0.75 \text{ h} = 45 \text{ min}$$

$$\text{Second: } 63 \div 42 = 1.5 \text{ h} = 90 \text{ min}$$

$$45 + 90 = 135 \text{ min}$$

$$\boxed{2 \text{ hours } 15 \text{ minutes}}$$

10

A cyclist rides at an average speed of 18 km/h.

a. How far does she ride in 2 hours 20 minutes?

b. How long does she take to ride 63 km? Give your answer in hours and minutes.

(3 marks)

a)

$$2 \text{ h } 20 \text{ min} = \frac{7}{3} \text{ hours}$$

$$18 \times \frac{7}{3} = 42 \text{ km}$$

b)

$$63 \div 18 = 3.5 \text{ hours}$$

a) 42 km b) 3 h 30 min

11

Amber runs 15.6 km in 1 hour 30 minutes.

Work out her average speed in km/h.

(3 marks)

Convert the time to hours

$$1 \text{ hour } 30 \text{ minutes} = 1.5 \text{ hours}$$

$$\text{Use speed} = \text{distance} \div \text{time}$$

$$\text{Speed} = 15.6 \div 1.5 = 10.4 \text{ km/h}$$

10.4 km/h

12

Mia leaves at 08:25 and drives at a constant speed of 72 km/h. She arrives at 11:05.

How far does she drive?

(3 marks)

$$08:25 \text{ to } 11:05 = 2 \text{ h } 40 \text{ min}$$

$$= \frac{8}{3} \text{ hours}$$

$$72 \times \frac{8}{3} = 192$$

192 km

- 13 Jonas must travel 150 km in 2 hours 30 minutes. He drives the first 90 km at an average speed of 72 km/h.

At what average speed must he drive the remaining 60 km to arrive on time?

(4 marks)

$$\text{First: } 90 \div 72 = 1.25 \text{ h}$$

$$\text{Time left: } 2.5 - 1.25 = 1.25 \text{ h}$$

$$\text{Speed} = 60 \div 1.25$$

$$\boxed{48 \text{ km/h}}$$

- 14 Sasha cycles at 12 km/h for 45 minutes. Leo runs at 3.5 m/s for 40 minutes.

Who travels further, and by how much? Show your working.

(4 marks)

Sasha

$$45 \text{ min} = 0.75 \text{ h}$$

$$12 \times 0.75 = 9 \text{ km}$$

Leo

$$40 \text{ min} = 2400 \text{ s}$$

$$3.5 \times 2400 = 8400 \text{ m} = 8.4 \text{ km}$$

$$\boxed{\text{Sasha, by } 0.6 \text{ km}}$$

- 15 On a map, 1 cm represents 2 km. Two towns are 7.5 cm apart on the map.

A bus travels between the towns at an average speed of 30 km/h. How long does the journey take?

Give your answer in minutes.

(4 marks)

$$7.5 \times 2 = 15 \text{ km}$$

$$\text{Time} = 15 \div 30 = 0.5 \text{ h}$$

$$\boxed{30 \text{ minutes}}$$

- 16 A lorry driver has to drive 289 miles from Leeds to Plymouth.

Her average speed for the journey is 48 miles per hour.

Work out an estimate for the time the journey takes.

Round both numbers to 1 significant figure before calculating.

(4 marks)

Round each number to 1 significant figure: 289 becomes 300 and 48 becomes 50

$$\text{Time} = \text{distance} / \text{speed} = 300 / 50$$

$$300 / 50 = 6, \text{ so the journey takes about 6 hours}$$

$$\boxed{6 \text{ hours}}$$

17 Amara drives 189 km at an average speed of 62 km/h.

a. By rounding both numbers to 1 significant figure, work out an estimate for the time her journey takes.

Give your answer in hours and minutes.

b. Is your answer to part (a) an underestimate or an overestimate of the actual time?

Give a reason for your answer.

(4 marks)

a) Round to 1 significant figure: 189 becomes 200 and 62 becomes 60

$$\text{a) Time} = 200 / 60 = 3\frac{1}{3} \text{ hours} = 3 \text{ hours } 20 \text{ minutes}$$

b) Rounding the distance up gives more distance to cover, and rounding the speed down means covering it more slowly - both make the estimate bigger, so it is an overestimate

18 Priya drives 90 km on a motorway at an average speed of 60 km/h.

She then drives 50 km on country roads at an average speed of 40 km/h.

Work out her average speed for the whole journey.

Give your answer correct to 1 decimal place.

(4 marks)

Time for the motorway

$$90 \div 60 = 1.5 \text{ hours}$$

Time for the country roads

$$50 \div 40 = 1.25 \text{ hours}$$

Total distance = $90 + 50 = 140$ km and total time = $1.5 + 1.25 = 2.75$ hours

$$\text{Average speed} = 140 \div 2.75 = 50.90... = 50.9 \text{ km/h (1 d.p.)}$$

$$\boxed{50.9 \text{ km/h}}$$

19 A cyclist travels 5.4 km in 12 minutes at a steady speed.

A sprinter runs at 8 metres per second.

Show that the sprinter is faster than the cyclist.

(4 marks)

$$\text{Cyclist's speed} = 5.4 \div 12 \times 60 = 27 \text{ km/h}$$

$$27 \text{ km/h} = 27\,000 \div 3600 = 7.5 \text{ m/s}$$

7.5 m/s is less than 8 m/s, so the sprinter is faster

Alternative

$$\text{sprinter} = 8 \times 3.6 = 28.8 \text{ km/h, which is more than } 27 \text{ km/h}$$

20

A coach leaves Leeds at 09:40 and arrives in Newcastle at 12:10 on the same day.
The distance from Leeds to Newcastle by road is 175 km.
The coach company claims the average speed of the coach was more than 65 km/h.
Work out the average speed of the coach and state whether the claim is correct.

(4 marks)

$$\text{Time taken} = 09:40 \text{ to } 12:10 = 2 \text{ hours } 30 \text{ minutes} = 2.5 \text{ hours}$$

$$\text{Average speed} = 175 \div 2.5 = 70 \text{ km/h}$$

70 > 65, so the claim is correct

70 km/h, so the claim is correct

21

A lorry driver drives for 2.5 hours at an average speed of 48 miles per hour.
She then drives for 1 hour 15 minutes at an average speed of 40 miles per hour.
Work out the total distance she drives.

(4 marks)

First part

$$\text{distance} = \text{speed} \times \text{time} = 48 \times 2.5 = 120 \text{ miles}$$

$$1 \text{ hour } 15 \text{ minutes} = 1.25 \text{ hours}$$

Second part

$$40 \times 1.25 = 50 \text{ miles}$$

$$\text{Total distance} = 120 + 50 = 170 \text{ miles}$$

170 miles

22

Marcus cycles the 60 km from his home to the coast at an average speed of 30 km/h.
He cycles back home along the same route at an average speed of 20 km/h.
Marcus says, "My average speed for the whole ride was 25 km/h, because 25 is halfway between 30 and 20."

Show that Marcus is wrong, and work out his actual average speed for the whole ride.

(4 marks)

$$\text{Time out} = 60 \div 30 = 2 \text{ hours}$$

$$\text{Time back} = 60 \div 20 = 3 \text{ hours}$$

$$\text{Total distance} = 120 \text{ km and total time} = 5 \text{ hours}$$

Average speed = $120 \div 5 = 24 \text{ km/h}$, not 25 km/h , because he spends longer at the slower speed