1 A car journey is in two stages.

Stage 1 The car travels 110 miles in 2 hours.

Stage 2 The car travels 44 miles at the same average speed as Stage 1

Work out the time for Stage 2

Give your answer in minutes.

[3 marks]

$\text{speed}_1 : \frac{110}{2} = 55$ (1)

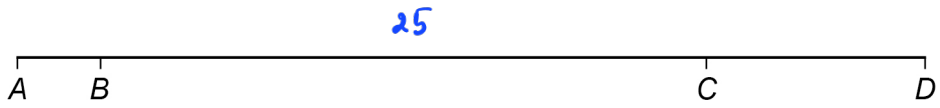
$\text{time}_2 : \frac{44}{55} = 0.8$ hours (1)

$0.8 \times 60 = 48$ min (1)

Answer 48 minutes

2 *A*, *B*, *C* and *D* are junctions on a motorway.

Not drawn accurately



distance *CD* = 3 × distance *AB*

distance *BC* = 25 miles

Salma drives from *A* to *C*.

She drives for 30 minutes at an average speed of 62 miles per hour.

Work out the distance *AD*.

[4 marks]

$62 = \frac{25 + AB}{30 \div 60}$

(0.5) $62 = 25 + AB$ (1)

(1)

$31 = 25 + AB$

$AB = 6$ miles

$CD = 3 \times 6$ (1)

$= 18$

$AD = 6 + 25 + 18 = 49$ (1)

Answer 49 miles

3 Tom and Adil are the two runners in a 200-metre race.

Tom completes the race in 24 seconds.

Adil completes the race at an average speed of 28.8 kilometres per hour.

Who wins the race?

You **must** show your working.

[3 marks]

Speed in m/s :

$\text{Tom} = \frac{200\ \text{m}}{24\ \text{s}} = 8.33\ \text{ms}^{-1}$ (1)

$\text{Adil} = \frac{28.8\ \text{km}}{1\ \text{hour}} \times \frac{1000\ \text{m}}{1\ \text{km}} \times \frac{1\ \text{hour}}{3600\ \text{s}}$

$= 8\ \text{ms}^{-1}$ (1)

Tom wins. (1)

Answer Tom

4 Liz travels 18 miles in 20 minutes.

Work out her average speed in miles per hour.

[3 marks]

$\frac{18 \text{ miles}}{20 \text{ mins}} = 0.9 \text{ miles per minutes}$ (1)

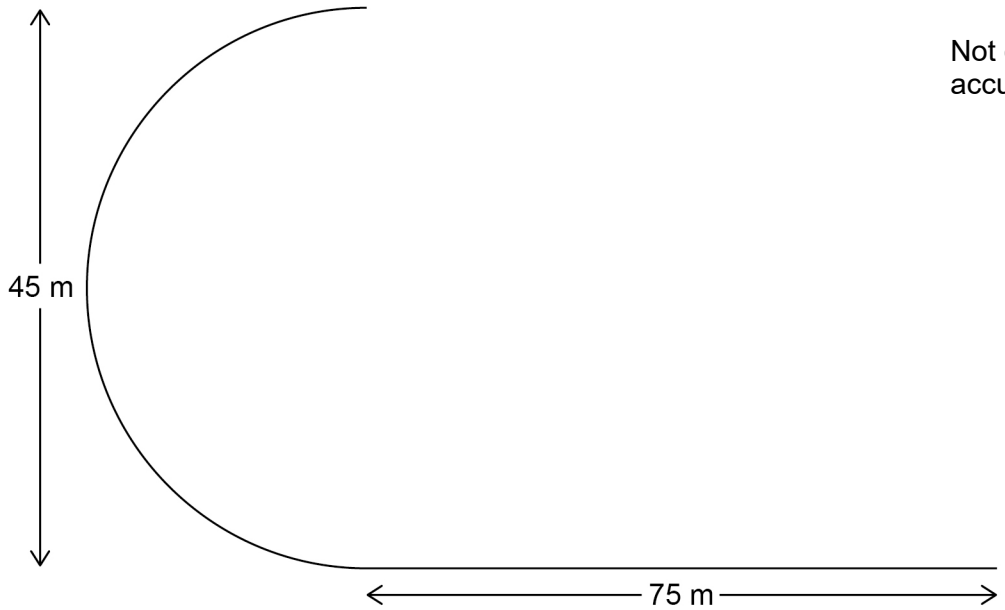
$\frac{0.9 \text{ miles}}{1 \text{ mins}} \times \frac{60 \text{ minutes}}{1 \text{ hour}} = 54 \text{ mph}$ (1) (1)

Answer 54 mph

5 Part of a running track is the arc of a semicircle joined to a straight line.

The semicircle has diameter 45 metres.

The straight line has length 75 metres.



Not drawn accurately

Abby runs once along this part of the track in 18 seconds.

Work out her average speed.

Give your answer to 2 significant figures.

[4 marks]

Arc length = $\frac{1}{2} \times \pi \times 45 = 22.5\pi$ (1)

Total length = $22.5\pi + 75$

$= 145.695$ (1)

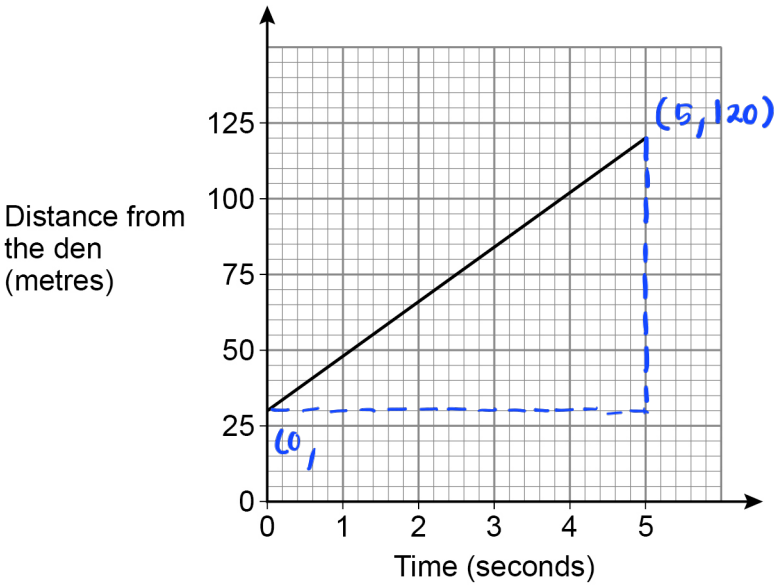
Average speed = $\frac{145.695}{18}$ (1) $= 8.09$

$= 8.1$ (1)

Answer 8.1 m/s

6 A lion is sprinting in a straight line away from its den.

The graph shows the lion's distance from the den.



Work out the speed of the lion in metres per second.

[3 marks]

Speed = distance / time

= (120 − 30) / 5 ✓0

= 90 / 5 ✓0

= 18 ms^{-1} ✓0

Answer 18 m/s

7 (a) On Monday, Larrs swims 50 metres in 40 **seconds** at a constant speed.

On Tuesday, Larrs swims 1.5 kilometres.

Assume he swims at the same constant speed as on Monday.

How many **minutes** does he swim for on Tuesday?

[5 marks]

Speed $= \frac{50\ m}{40\ s} = 1.25\ ms^{-1}$

Time on Tuesday: $\frac{1500\ m}{t} = 1.25\ ms^{-1}$ ✓(1)

$t = \frac{1500}{1.25} = 1200\ s$ (2)

$= 1200\ s \times \frac{1\ min}{60\ s}$ ✓(1)

$= 20\ min$

Answer 20 ✓(1) minutes

7 (b) In fact, on Tuesday Larrs swims at a slower constant speed than on Monday.

What does this mean about the number of minutes he swims for on Tuesday?

Tick the correct box.

[1 mark]

- ☐ It is less than the answer to part (a)
- ☐ It is the same as the answer to part (a)
- ☑ It is greater than the answer to part (a) ✓(1)
- ☐ It is not possible to say