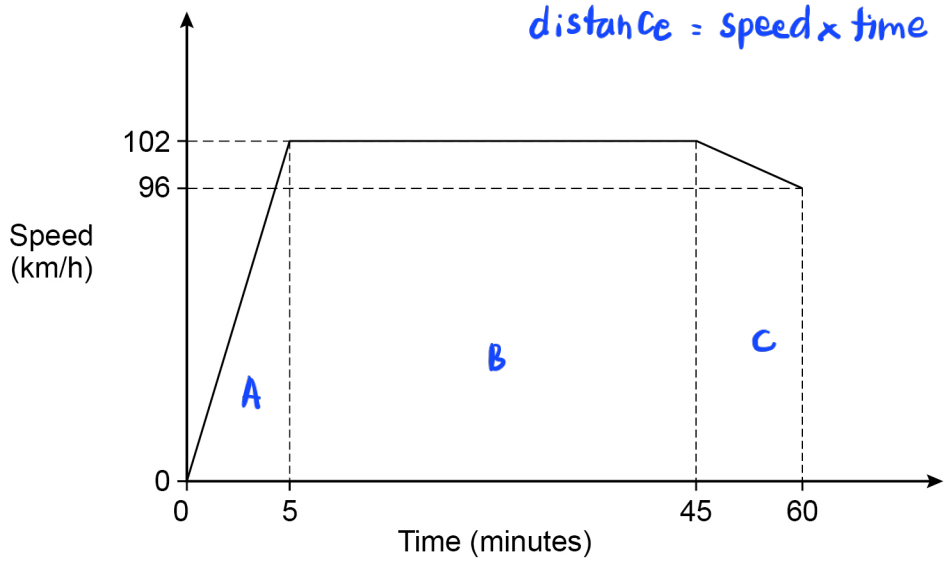
1 Here is a sketch of a speed-time graph for the first part of a journey.



The total distance for the journey is 130 kilometres.

How far is left to travel?

[4 marks]

Area A : $\frac{1}{2} \times \frac{5}{60} \times 102 = 4.25$ (1)

Area B : $\left(\frac{45-5}{60}\right) \times 102 = 68$

Area C : $\frac{1}{2} \times \left(\frac{60-45}{60}\right) \times (102+96) = 24.75$

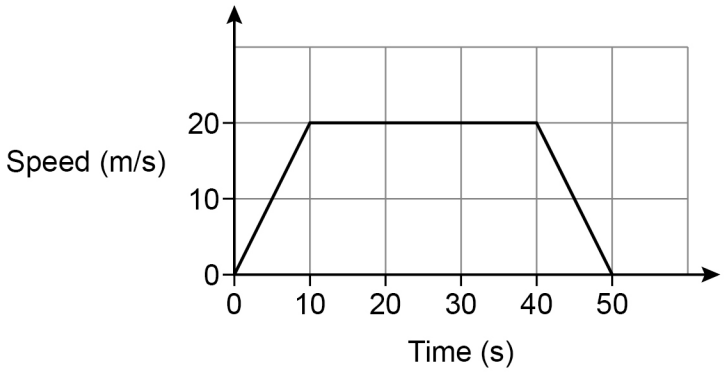
Total area : $4.25 + 68 + 24.75 = 97$ (1)

$130 - 97 = 33$ (1)

(1)

Answer 33 km

2 Here is the speed-time graph for a 50-second journey.



2 (a) Circle the acceleration, in m/s^2, halfway through the journey.

[1 mark]

0 (1) 2 20 25

2 (b) Work out the total distance travelled.

[2 marks]

Distance = area under the graph

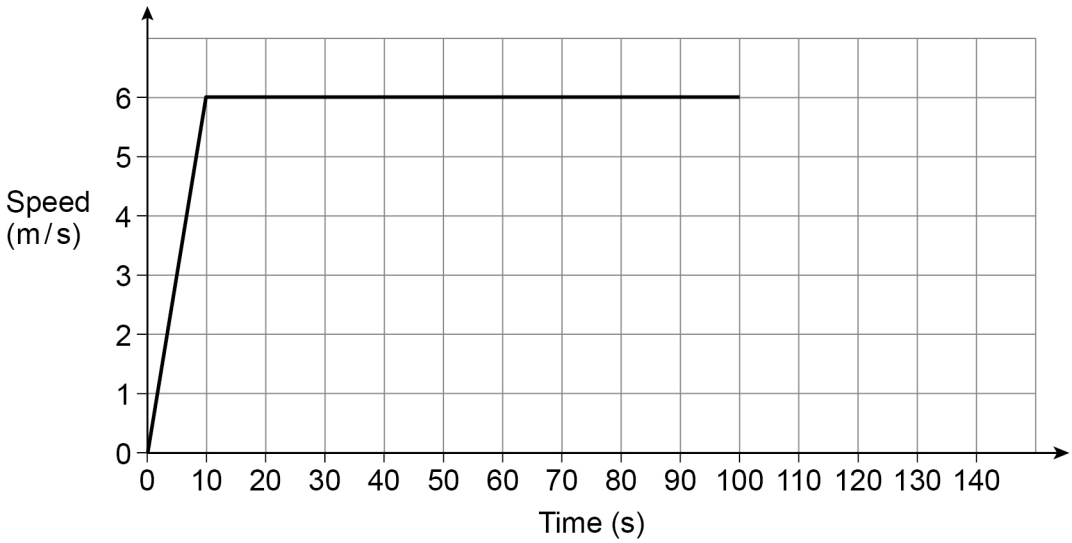
$\frac{1}{2} \times 20 \times (50 + 30)$ (1)

= 800 m

Answer 800 (1) m

3 Helena ran an 800-metre race in 140 seconds.

The speed-time graph represents the first 100 seconds of her run.



Helena ran the last 40 seconds with constant deceleration.

Work out her speed as she finished the race.

[4 marks]

distance$_1$ = $\frac{1}{2} \times 10 \times 6 = 30$ m (1)

distance$_2$ = $6 \times 90 = 540$ m

distance ran = $30 + 540 = 570$ m

$800 - 570 = 230$ m balance (1)

$\frac{1}{2} \times (v+6) \times 40 = 230$ (1)

$v + 6 = 11.5$

$v = 5.5$ (1)

Answer 5.5 metres per second