

Kinematics, Distance-Time & Speed-Time Graphs

Question Paper 3

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Paper Type	Extended
Topic	Algebra and graphs
Sub-Topic	Kinematics, Distance-Time & Speed-Time Graphs
Booklet	Question Paper 3

Time Allowed: 65 minutes

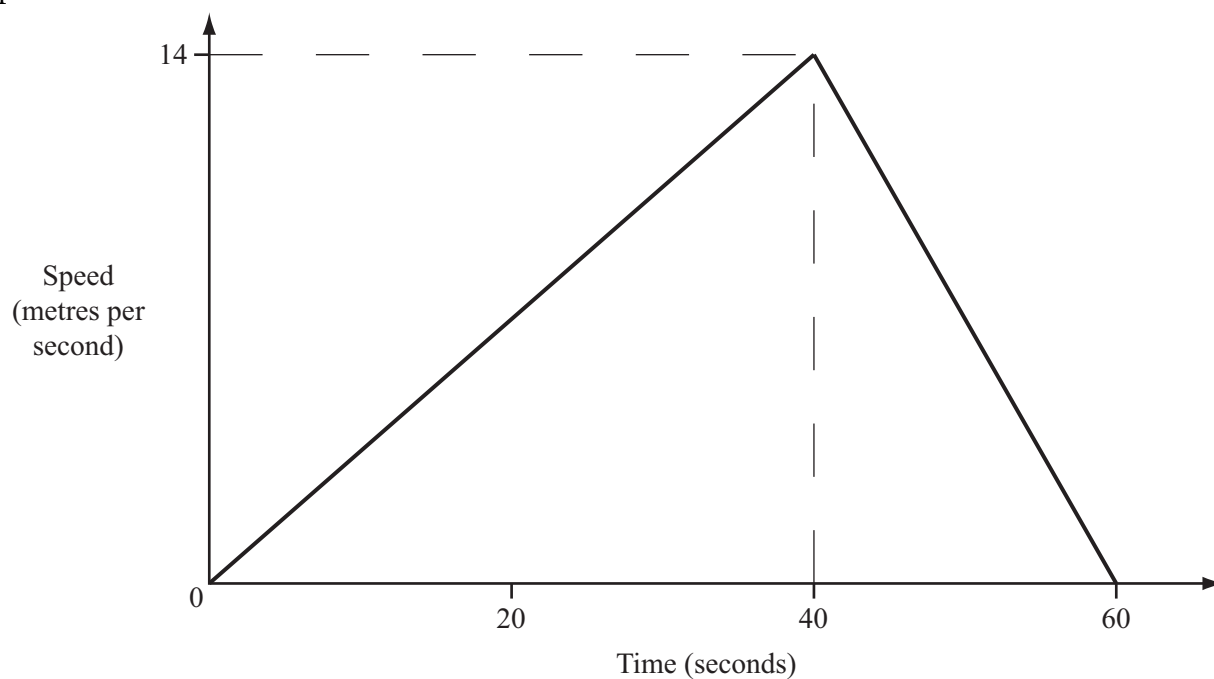
Score: /54

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1



The diagram shows the speed-time graph of a bus journey between two bus stops.

Hamid runs at a constant speed of 4 m/s along the bus route.

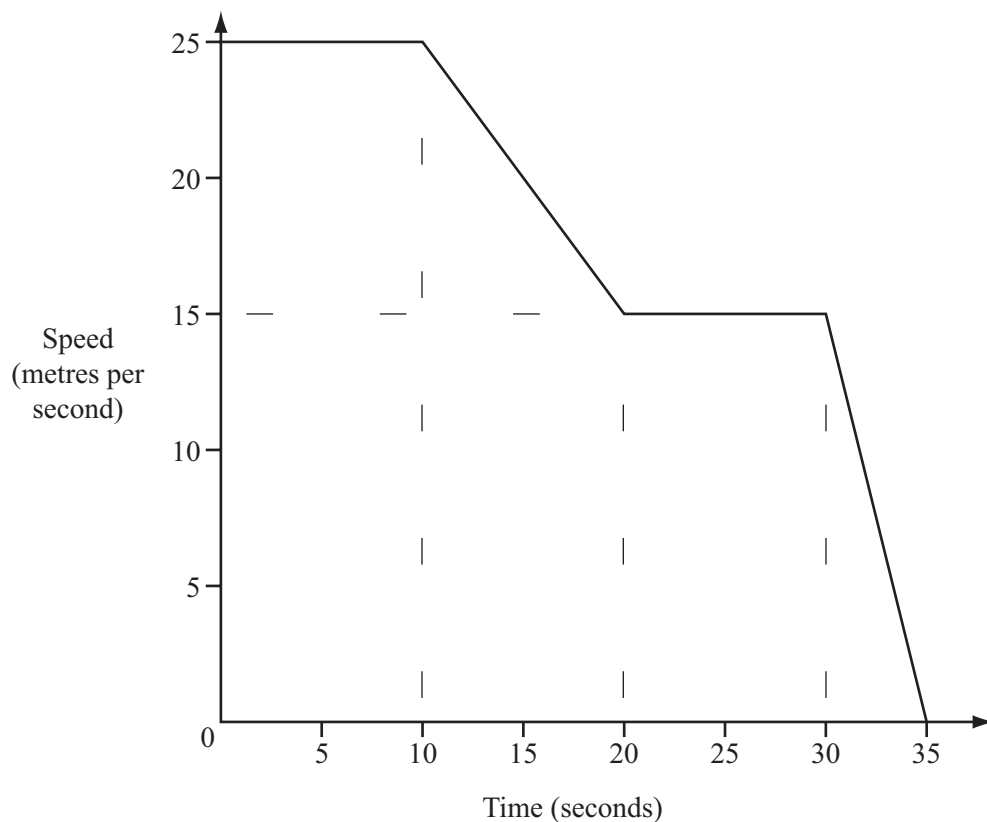
He passes the bus as it leaves the first bus stop.

The bus arrives at the second bus stop after 60 seconds.

How many metres from the bus is Hamid at this time?

Answer m [3]

2



The diagram shows the speed-time graph for the last 35 seconds of a car journey.

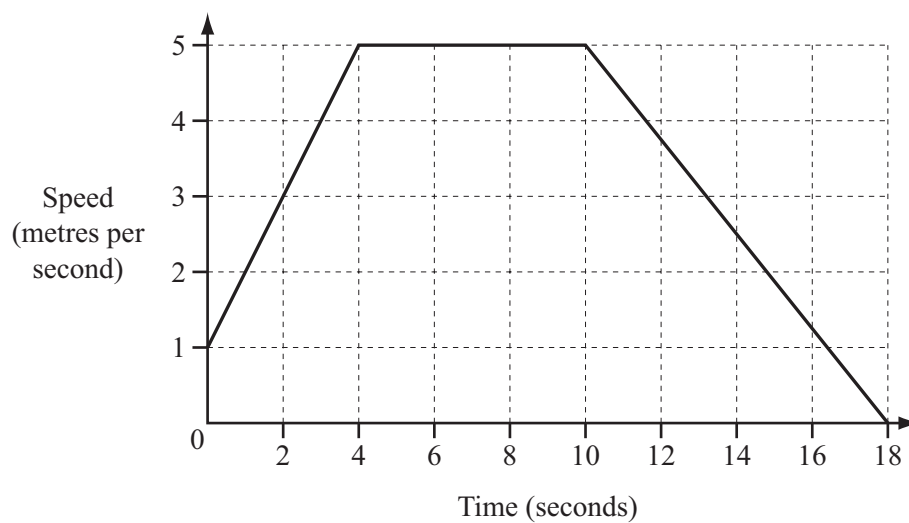
- (a) Find the deceleration of the car as it came to a stop.

Answer(a) m/s^2 [1]

- (b) Calculate the total distance travelled by the car in the 35 seconds.

Answer(b) m [3]

3



The diagram shows the speed-time graph for the last 18 seconds of Roman's cycle journey.

(a) Calculate the deceleration.

Answer(a) m/s^2 [1]

(b) Calculate the total distance Roman travels during the 18 seconds.

Answer(b) m [3]

- 4 Distances from the Sun can be measured in astronomical units, AU.
Earth is a distance of 1 AU from the Sun.
One AU is approximately 1.496×10^8 km.

The table shows distances from the Sun.

Name	Distance from the Sun in AU	Distance from the Sun in kilometres
Earth	1	1.496×10^8
Mercury	0.387	
Jupiter		7.79×10^8
Pluto		5.91×10^9

- (a) Complete the table. [3]

- (b) Light travels at approximately 300 000 kilometres per second.

- (i) How long does it take light to travel from the Sun to Earth?
Give your answer in seconds.

Answer(b)(i) s [2]

- (ii) How long does it take light to travel from the Sun to Pluto?
Give your answer in minutes.

Answer(b)(ii) min [2]

- (c) One light year is the distance that light travels in one year (365 days).

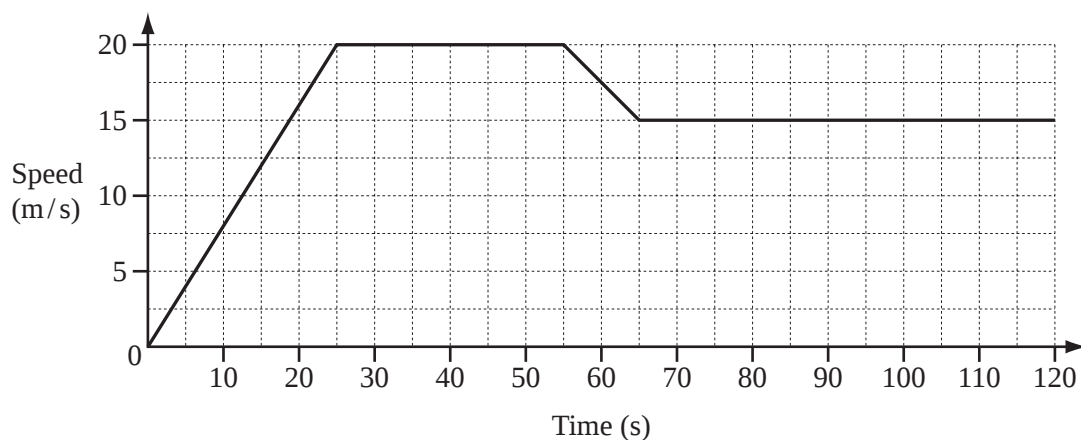
How far is one light year in kilometres?
Give your answer in standard form.

Answer(c) km [3]

- (d) How many astronomical units (AU) are equal to one light year?

Answer(d) AU [2]

5



The diagram shows the speed-time graph for the first 120 seconds of a car journey.

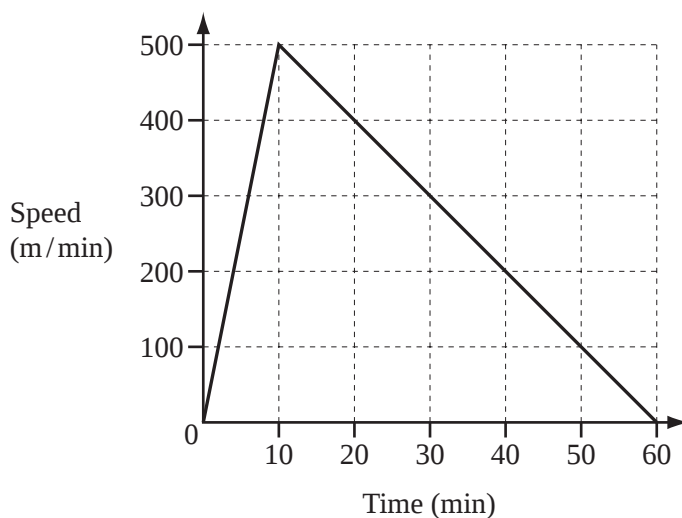
(a) Calculate the acceleration of the car during the first 25 seconds.

Answer(a) m/s^2 [1]

(b) Calculate the distance travelled by the car in the first 120 seconds.

Answer(b) m [4]

6



The diagram shows the speed-time graph for a boat journey.

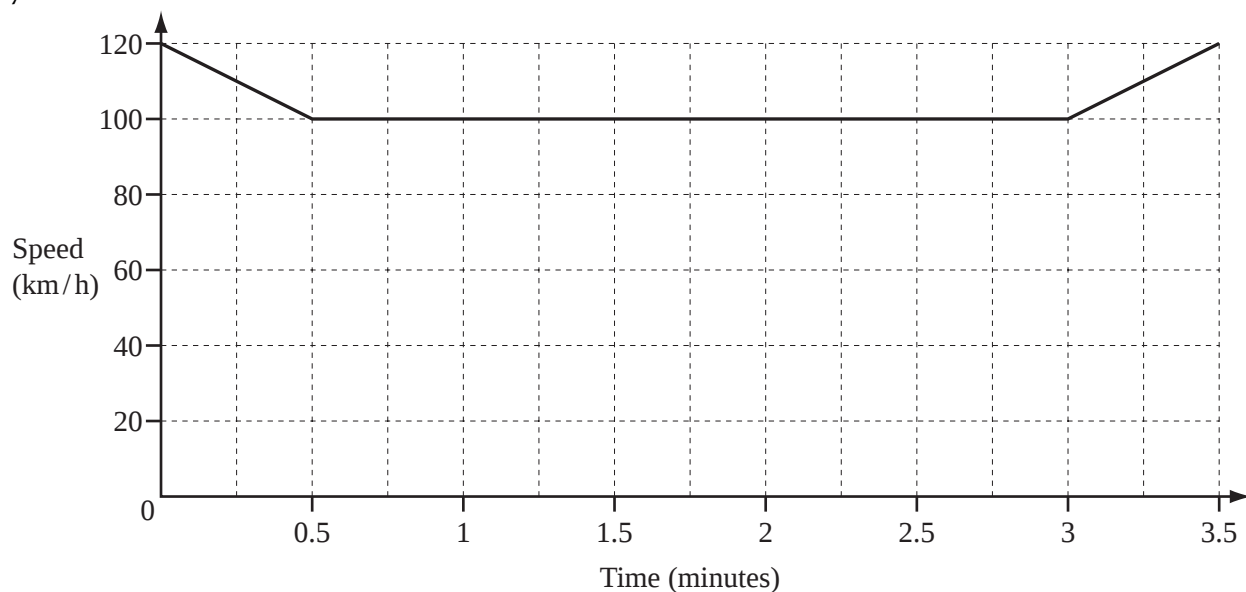
- (a) Work out the acceleration of the boat in metres/minute².

Answer(a) m/min² [1]

- (b) Calculate the total distance travelled by the boat.
Give your answer in **kilometres**.

Answer(b) km [2]

7



The diagram shows the speed-time graph for part of a car journey.
The speed of the car is shown in kilometres/**hour**.

Calculate the distance travelled by the car during the 3.5 **minutes** shown in the diagram.
Give your answer in kilometres.

Answer km [4]

8 A train travels from Paris to Milan.

(a) The train departs from Paris at 20 28 and the journey takes 9 hours 10 minutes.

(i) Find the time the train arrives in Milan.

Answer(a)(i) [1]

(ii) The distance between Paris and Milan is 850 km.

Calculate the average speed of the train.

Answer(a)(ii) km/h [2]

(b) The total number of passengers on the train is 640.

- (i) 160 passengers have tickets which cost \$255 each.
330 passengers have tickets which cost \$190 each.
150 passengers have tickets which cost \$180 each.

Calculate the mean cost of a ticket.

Answer(b)(i) \$ [3]

- (ii) There are men, women and children on the train in the ratio

$$\text{men} : \text{women} : \text{children} = 4 : 3 : 1.$$

Show that the number of women on the train is 240.

Answer(b)(ii)

[2]

- (iii) 240 is an increase of 60% on the number of women on the train the previous day.

Calculate the number of women on the train the previous day.

Answer(b)(iii) [3]

- (c) The length of the train is 210 m.

It passes through a station of length 340 m, at a speed of 180 km/h.

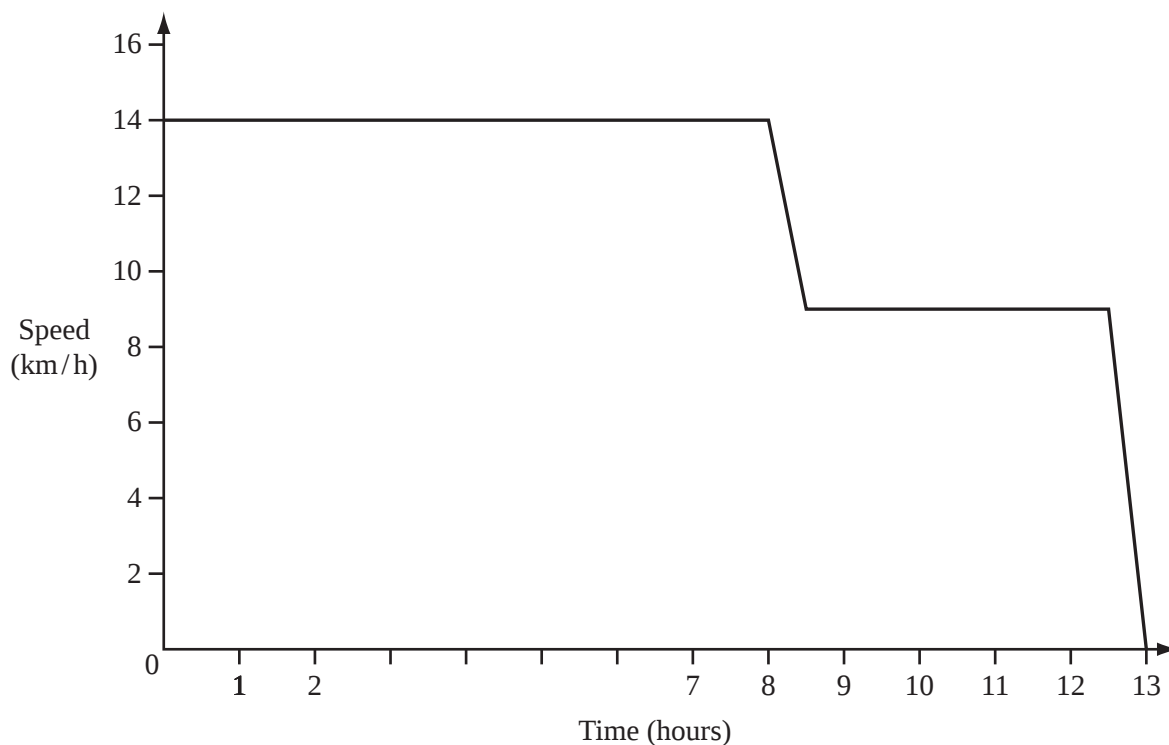
Calculate the number of seconds the train takes to pass completely through the station.

Answer(c) s [3]

- 9 A container ship travelled at 14 km/h for 8 hours and then slowed down to 9 km/h over a period of 30 minutes.

It travelled at this speed for another 4 hours and then slowed to a stop over 30 minutes.

The speed-time graph shows this voyage.



- (a) Calculate the total distance travelled by the ship.

Answer(a) km [4]

- (b) Calculate the average speed of the ship for the whole voyage.

Answer(b) km/h [1]