

Kinematics, Distance-Time & Speed-Time Graphs

Question Paper 5

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 5

Time Allowed: 59 minutes

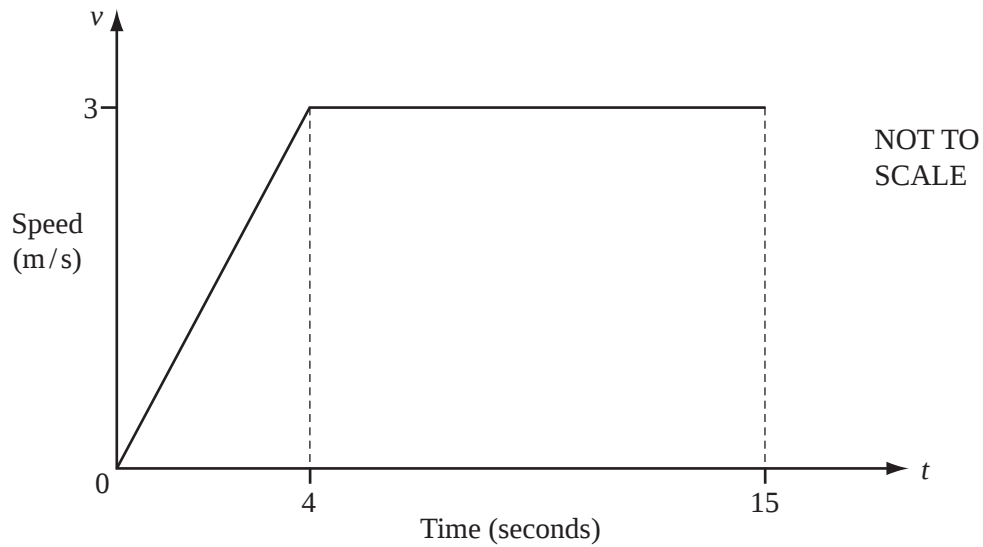
Score: /49

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 for 15 seconds of the journey of a cyclist.

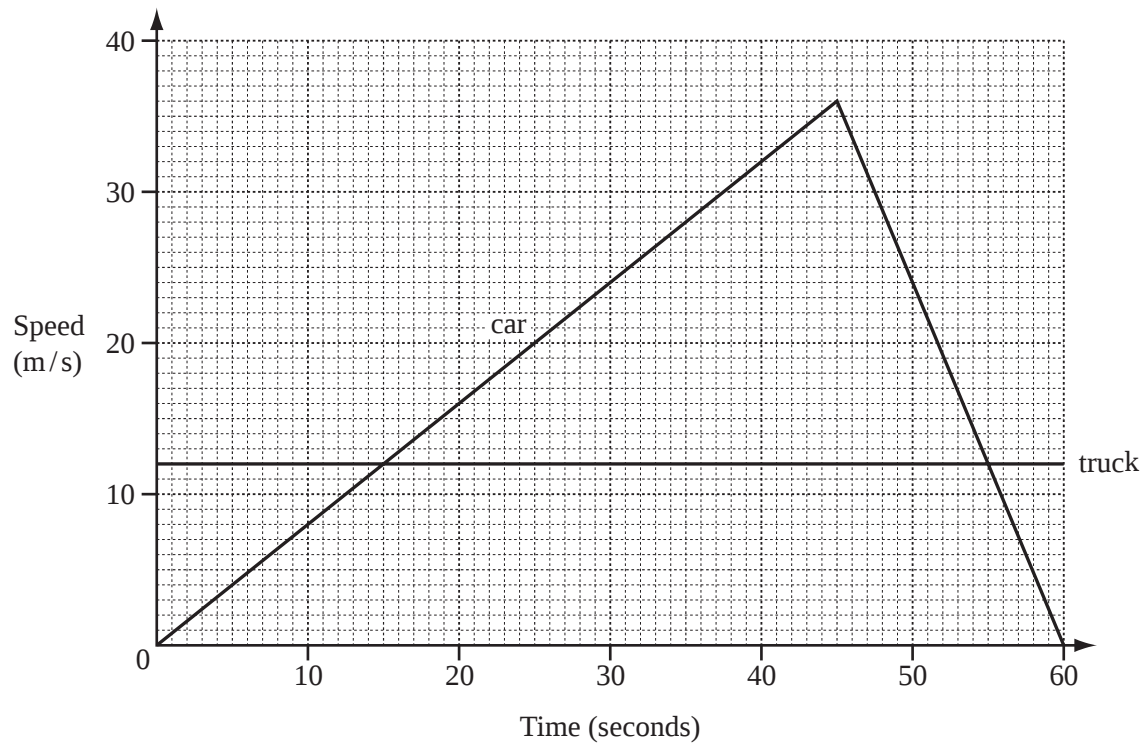
(a) Calculate the acceleration of the cyclist during the first 4 seconds.

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

(b) Calculate the average speed for the first 15 seconds.

Answer(b) m/s [3]

2



The graph shows the speed of a truck and a car over 60 seconds.

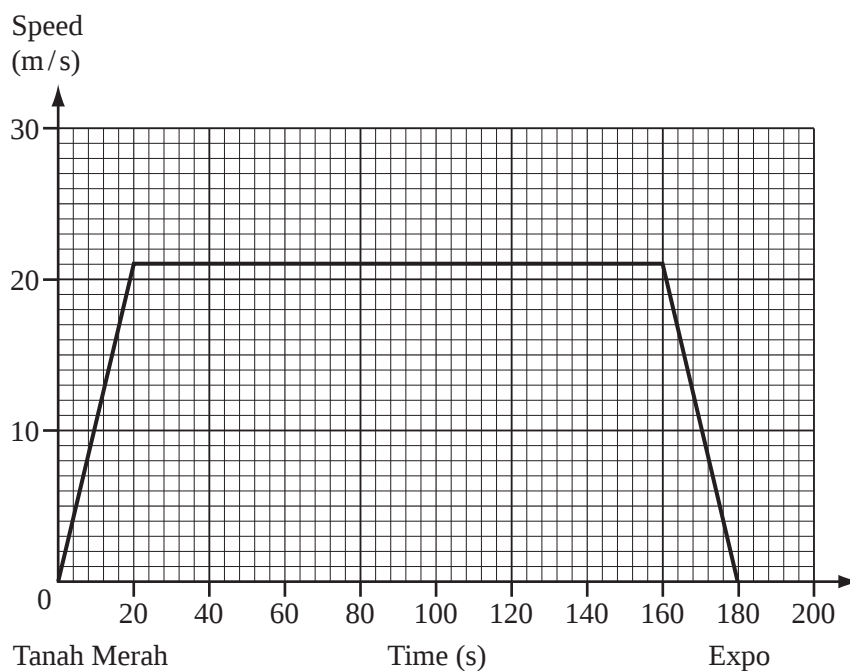
(a) Calculate the acceleration of the car over the first 45 seconds.

Answer(a) m/s² [2]

(b) Calculate the distance travelled by the car while it was travelling faster than the truck.

Answer(b) m [3]

3



The graph shows the train journey between Tanah Merah and Expo in Singapore.

Work out

- (a) the acceleration of the train when it leaves Tanah Merah,

Answer(a) m/s² [2]

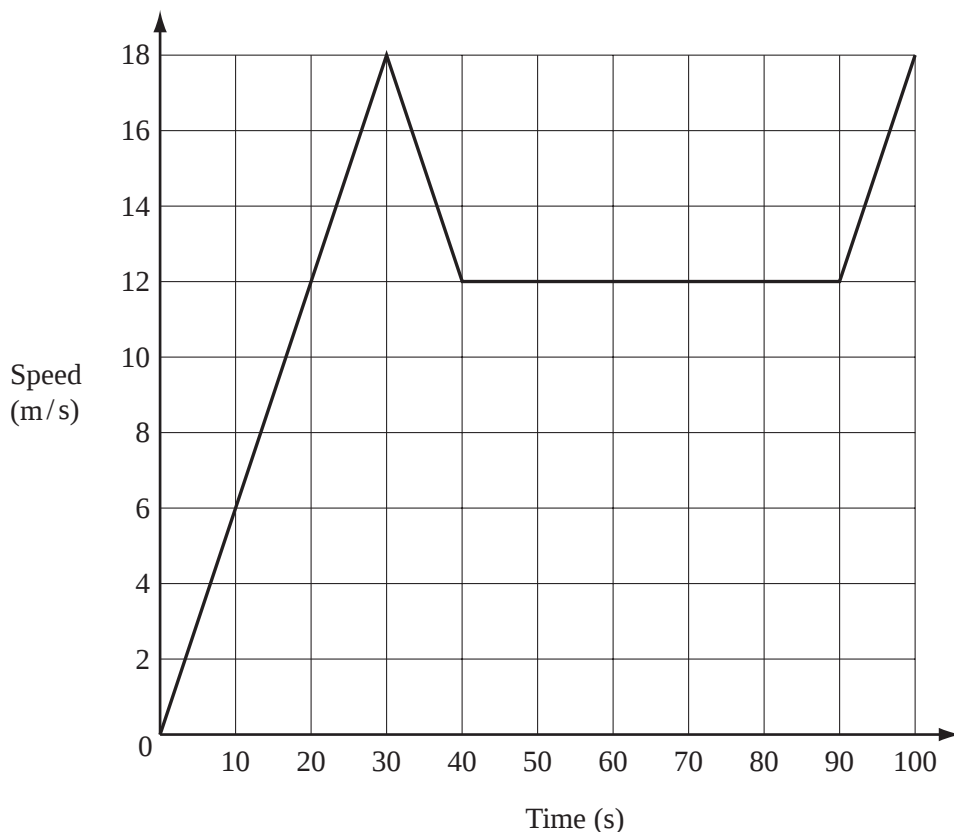
- (b) the distance between Tanah Merah and Expo,

Answer(b) m [3]

- (c) the average speed of the train for the journey.

Answer(c) m/s [1]

4



The diagram shows part of a journey by a truck.

- (a) The truck accelerates from rest to 18 m/s in 30 seconds.
Calculate the acceleration of the truck.

Answer(a) m/s² [1]

- (b) The truck then slows down in 10 seconds for some road works and travels through the road works at 12 m/s.
At the end of the road works it accelerates back to a speed of 18 m/s in 10 seconds.
Find the **total** distance travelled by the truck in the 100 seconds.

Answer(b) m [3]

- 5 (a) A train completed a journey of 850 kilometres with an average speed of 80 kilometres per hour. Calculate, giving **exact** answers, the time taken for this journey in

(i) hours, [2]

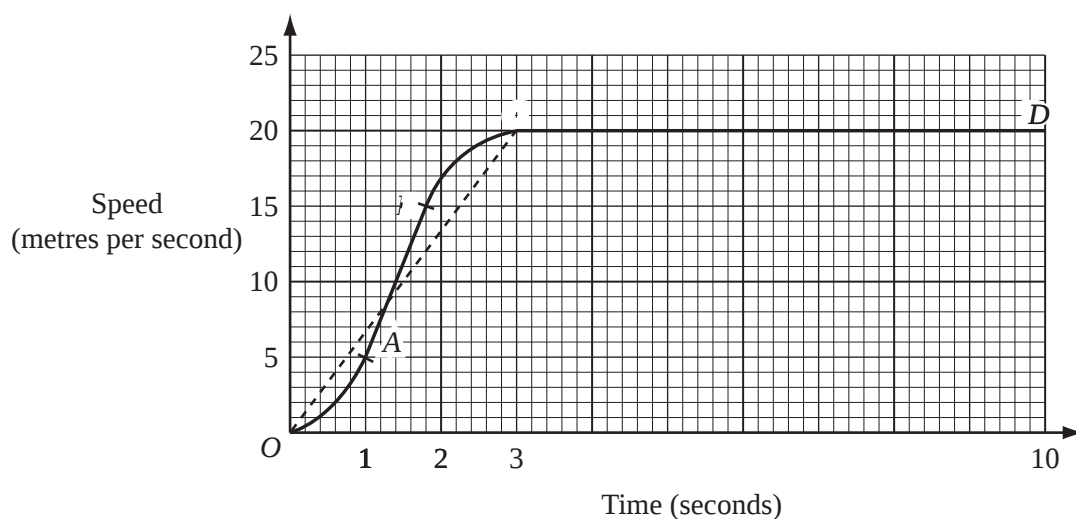
(ii) hours, minutes and seconds. [1]

- (b) Another train took 10 hours 48 minutes to complete the same 850 km journey.

(i) It departed at 19 20.
At what time, on the next day, did this train complete the journey? [1]

(ii) Calculate the average speed, in kilometres per hour, for the journey. [2]

(c)



The **solid** line $OABCD$ on the grid shows the first 10 seconds of a car journey.

(i) Describe briefly what happens to the **speed** of the car between B and C . [1]

(ii) Describe briefly what happens to the **acceleration** of the car between B and C . [1]

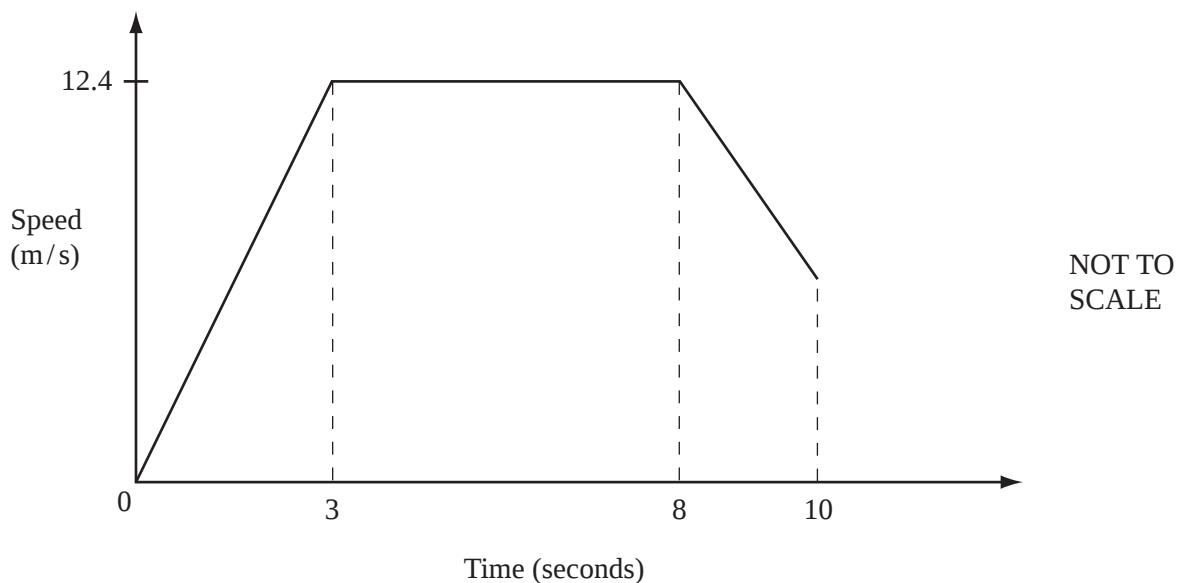
(iii) Calculate the acceleration between A and B . [2]

(iv) Using the **broken** straight line OC , estimate the total distance travelled by the car in the whole 10 seconds. [3]

(v) Explain briefly why, in this case, using the broken line makes the answer to **part (iv)** a good estimate of the distance travelled. [1]

(vi) Calculate the average speed of the car during the 10 seconds.
Give your answer in kilometres per hour. [2]

6



An athlete, in a race, accelerates to a speed of 12.4 metres per second in 3 seconds. He runs at this speed for the next 5 seconds and slows down over the last 2 seconds as shown in the speed-time graph above. He crosses the finish line after 10 seconds. The total distance covered is 100 m.

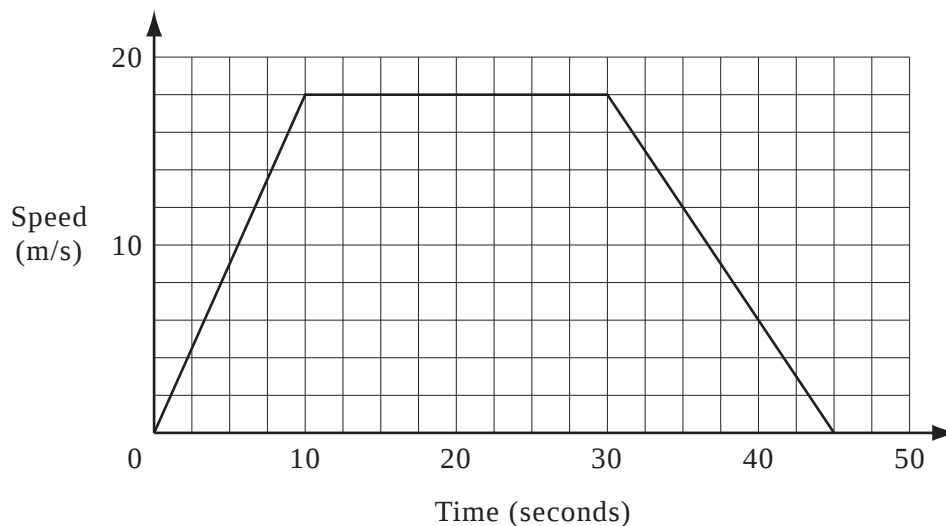
(a) Calculate the distance he runs in the first 8 seconds.

Answer(a) m [2]

(b) Calculate his speed when he crosses the finish line.

Answer(b)m/s [2]

- 7 A cyclist is training for a competition and the graph shows one part of the training.



- (a) Calculate the acceleration during the first 10 seconds.

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

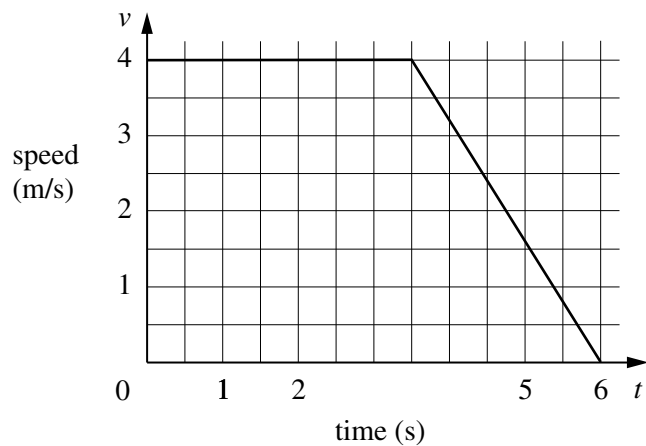
- (b) Calculate the distance travelled in the first 30 seconds.

Answer(b) m [2]

- (c) Calculate the average speed for the entire 45 seconds.

Answer(c) m/s [3]

8



Ameni is cycling at 4 metres per second.

After 3.5 seconds she starts to decelerate and after a further 2.5 seconds she stops.

The diagram shows the speed-time graph for Amen.

Calculate

(a) the constant deceleration,

Answer (a)m/s² [1]

(b) the total distance travelled during the 6 seconds.

Answer (b)m [2]