

"Full Coverage": Distance-Time & Speed-Time Graphs

This worksheet is designed to cover one question of each type seen in past papers, for each GCSE Higher Tier topic. This worksheet was automatically generated by the DrFrostMaths Homework Platform: students can practice this set of questions interactively by going to www.drfrostmaths.com/homework, logging on, *Practise* → *Past Papers/Worksheets* (or *Library* → *Past/Past Papers* for teachers), and using the 'Revision' tab.

Question 1

Categorisation: Complete a distance-time graph.

[Edexcel IGCSE May2012-4H Q3b]

Bhavik left his home at 12 00 to cycle to Sam's house.

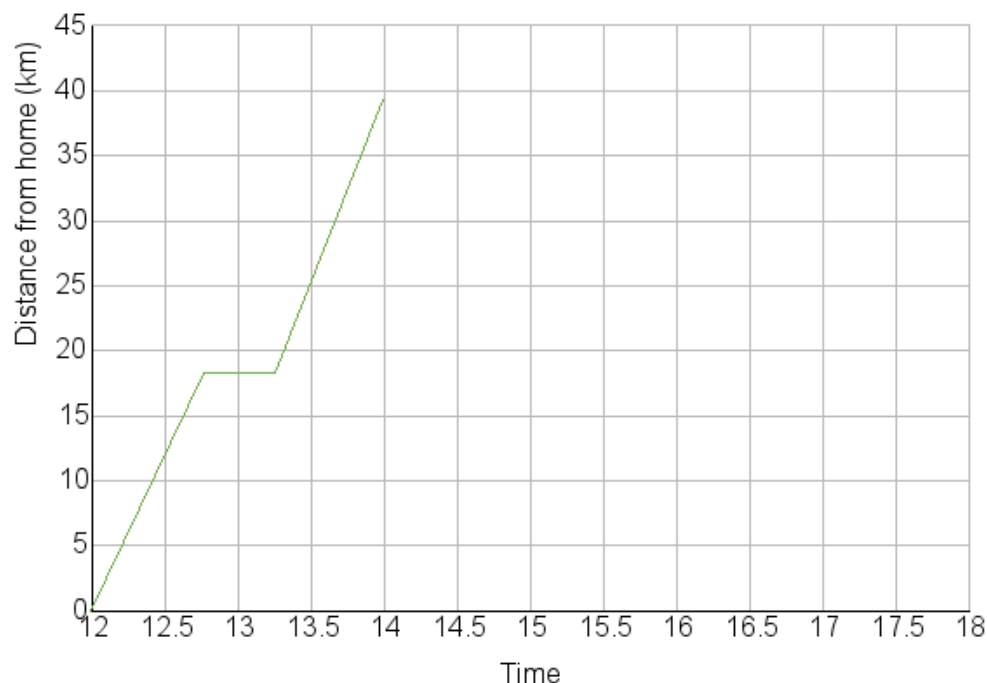
On the way Bhavik stopped for a rest, and then continued his journey.

The distance-time graph shows his journey.

Bhavik stayed at Sam's house for 2 hours. He then cycled back to his home.

He arrived home at 17 15.

Show all this information on the graph.

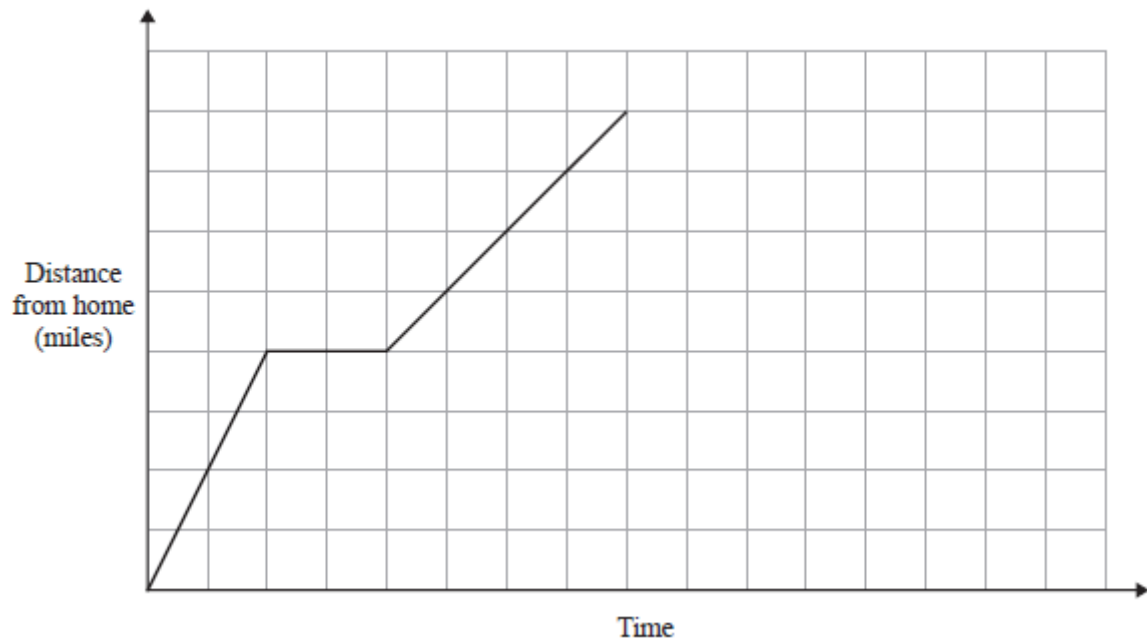


Question 2

Categorisation: Make time calculations based on a (potentially incomplete) distance-time graph.

[Edexcel GCSE(9-1) Mock Set 1 Autumn 2016 1F Q22, 1H Q6 Edited]

On Monday Ria delivered a parcel to a hospital.
The travel graph represents Ria's journey to the hospital.



Ria left home at 13 00
She drove for 30 minutes at a constant speed of 40 mph.
She then stopped for a break.

Ria then drove to the hospital at a constant speed.
She was at the hospital for 30 minutes.
She then drove home at a constant speed of 32 mph.

At what time does she arrive home?

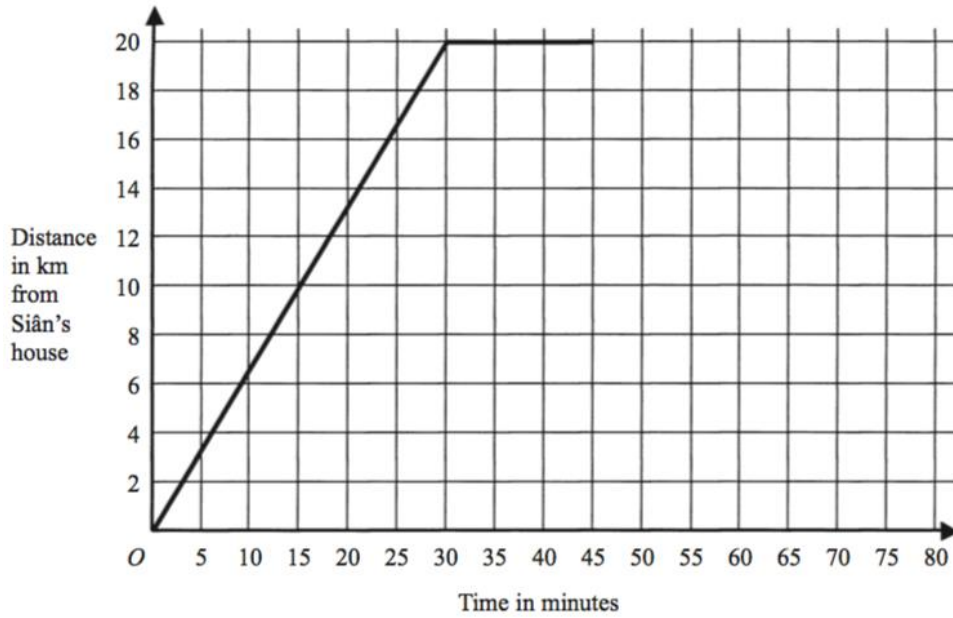
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Question 3

Categorisation: Understand that the gradient of a distance-time graph is the speed/velocity.

[Edexcel GCSE June2003-1F Q26a, June2003-3I Q13a]

Here is part of a travel graph of Siân's journey from her house to the shops and back.



Work out Siân's speed for the first 30 minutes of her journey.
Give your answer in km/h.

..... km/h

Question 4

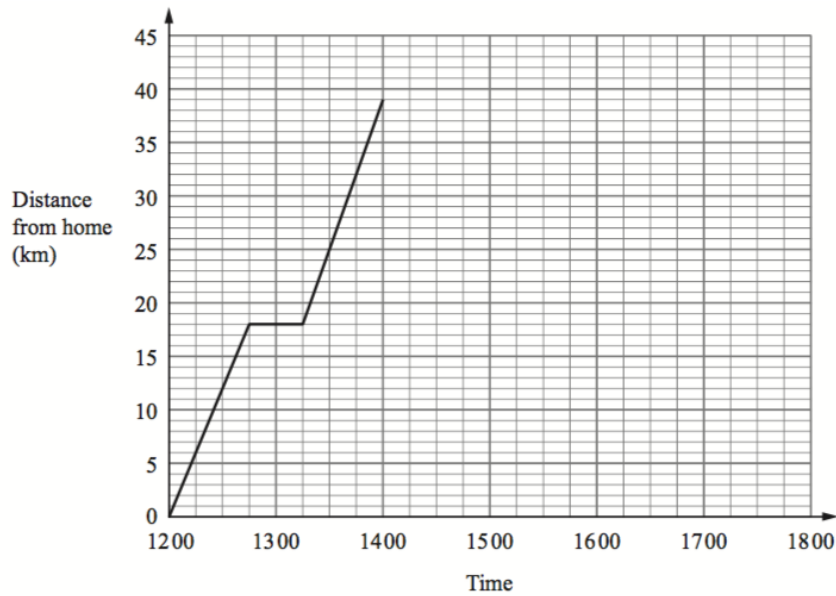
Categorisation: As per Question 2.

[Edexcel IGCSE May2012-4H Q3d]

Bhavik left his home at 12 00 to cycle to Sam's house.

On the way Bhavik stopped for a rest, and then continued his journey.

The distance-time graph shows his journey.



Bhavik stayed at Sam's house for 2 hours.

He then cycled back to his home.

He arrived home at 17 15.

Work out the average speed, in kilometres per hour, of Bhavik's journey from Sam's house back to his home.

Give your answer correct to 1 decimal place.

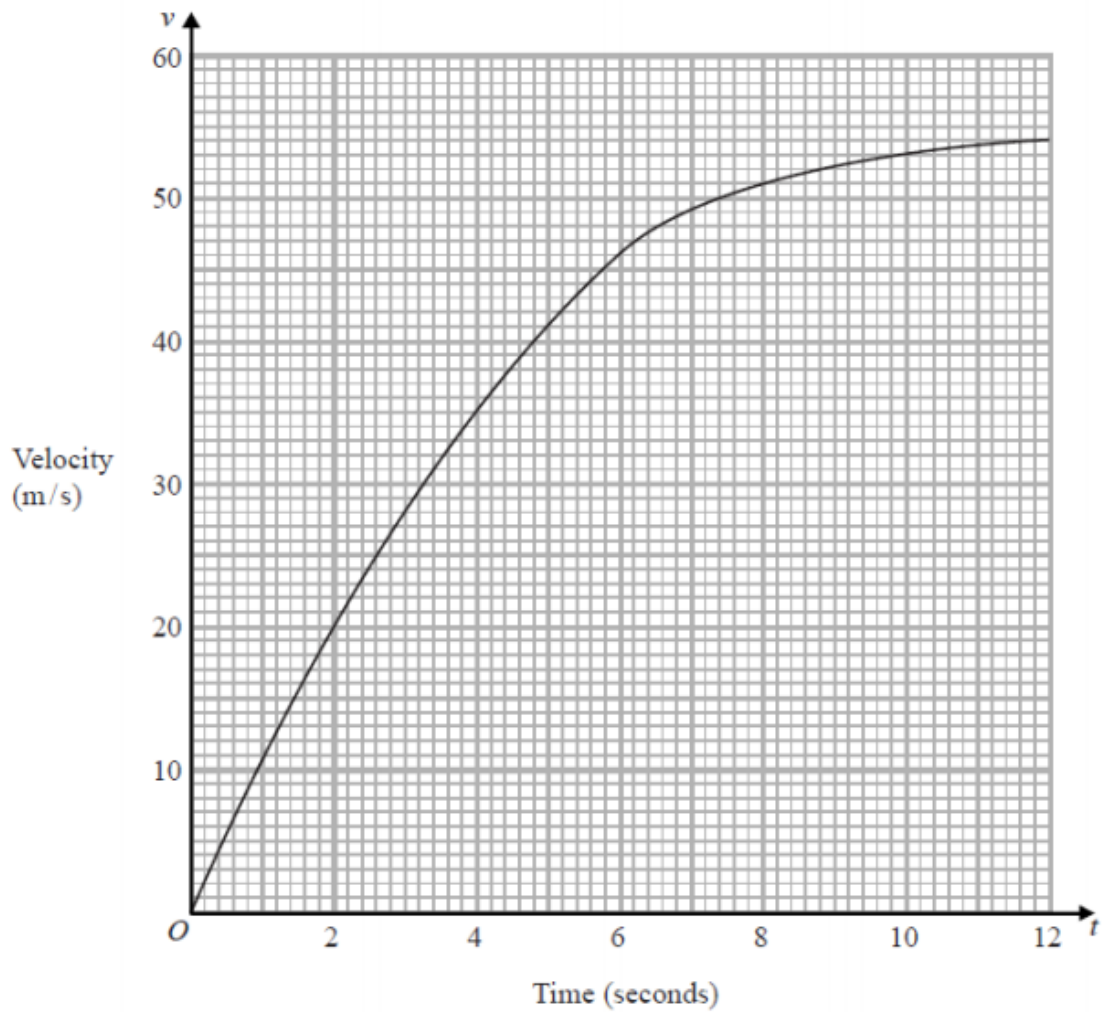
..... km/h

Question 5

Categorisation: Find the gradient of the tangent to a speed/velocity-time curve to find the acceleration.

[Edexcel Specimen Papers Set 1, Paper 2H Q20a]

The graph shows information about the velocity, v m/s, of a parachutist t seconds after leaving a plane.



Work out an estimate for the acceleration of the parachutist at $t = 6$

..... m/s²

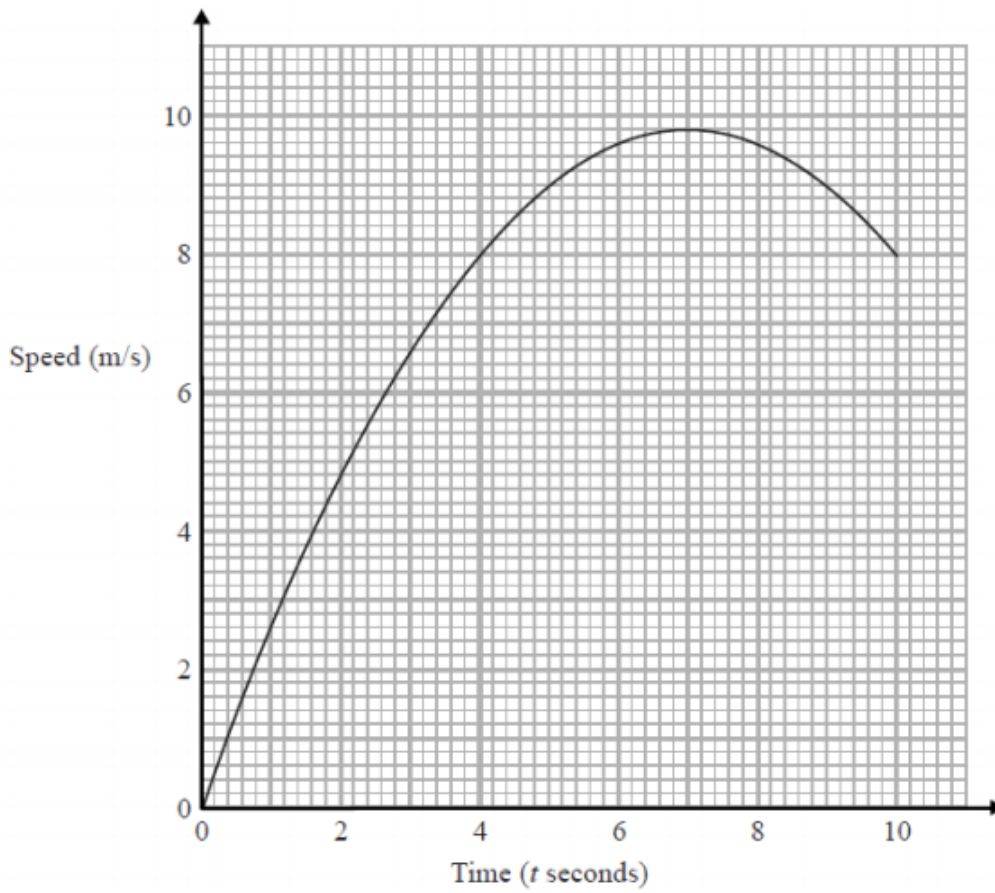
Question 6

Categorisation: As above.

[Edexcel Specimen Papers Set 2, Paper 2H Q15a]

Karol runs in a race.

The graph shows her speed, in metres per second, t seconds after the start of the race.



Calculate an estimate for the gradient of the graph when $t = 4$ You must show how you get your answer.

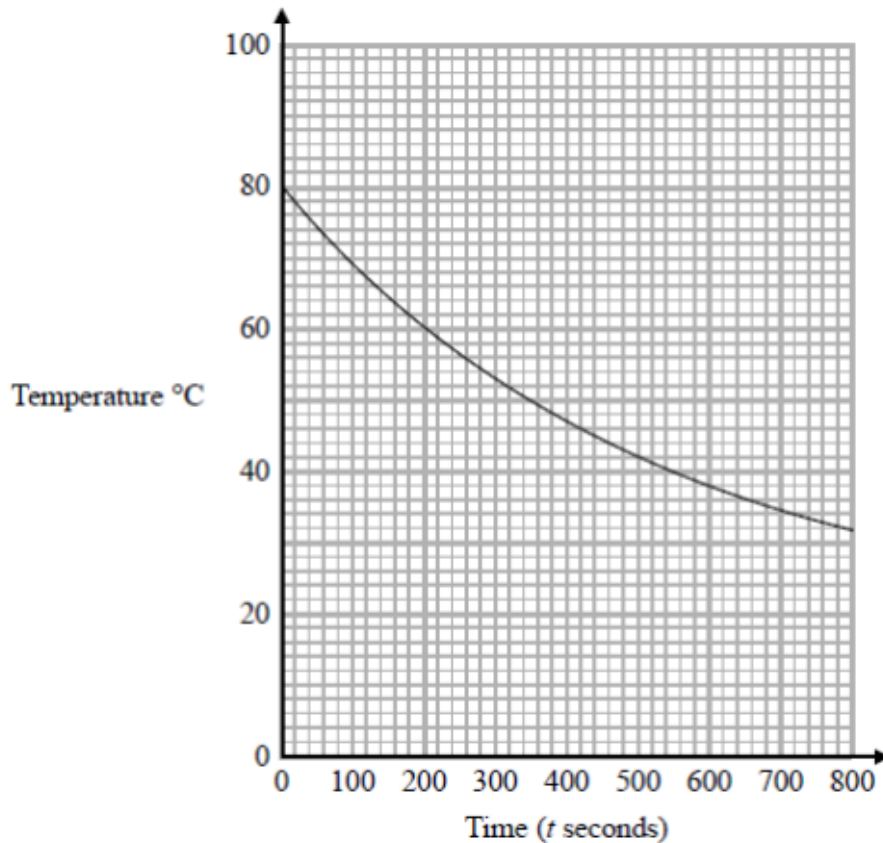
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Question 7

Categorisation: Understand that the average rate of change is the gradient of the line connecting the two endpoints of a curve, and find a tangent parallel this to determine the time at which the speed is this average.

[Edexcel Original SAMs Paper 3H Q14bii]

The graph gives information about the variation in the temperature, in $^{\circ}\text{C}$, of an amount of water that is allowed to cool from 80°C .



The instantaneous rate of decrease of the temperature of the water at time T seconds is equal to the average rate of decrease of the temperature of the water between $t = 0$ and $t = 800$, which is $0.06^{\circ}\text{C}/\text{s}$.

Find an estimate for the value of T .

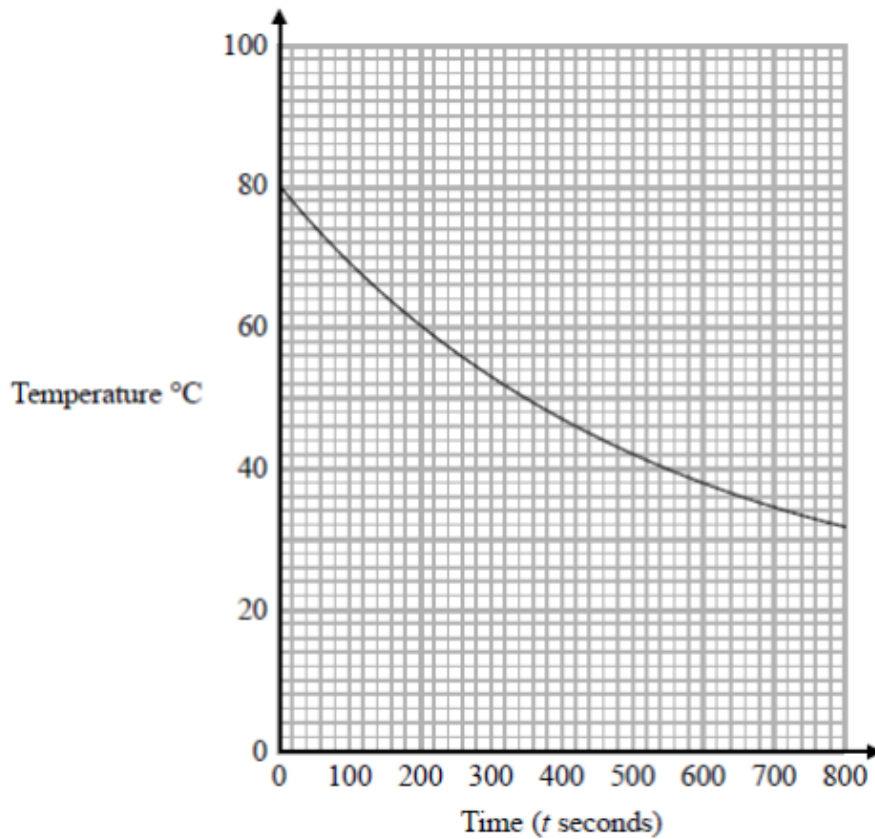
$T = \dots\dots\dots$ seconds

Question 8

Categorisation: As with Question 7, but finding the gradient of this line connecting the endpoints of the curve.

[Edexcel Original SAMs Paper 3H Q14bi]

The graph gives information about the variation in the temperature, in $^{\circ}\text{C}$, of an amount of water that is allowed to cool from 80°C .



Work out the average rate of decrease of the temperature of the water between $t = 0$ and $t = 800$.

..... $^{\circ}\text{C}/\text{s}$

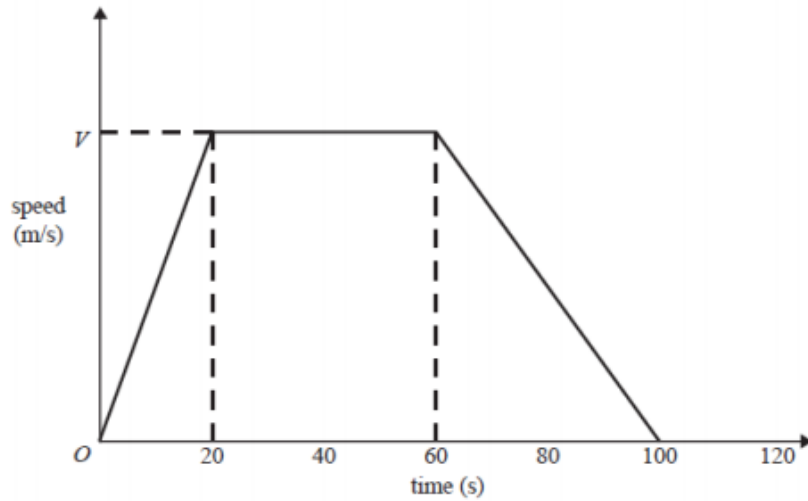
Question 9

Categorisation: Determine the exact distance travelled by finding the area under a distance-time graph consisting of straight lines.

[Edexcel New SAMs Paper 1H Q21a]

Here is a speed-time graph for a car journey.

The journey took 100 seconds.



The car travelled 1.75 km in the 100 seconds.

Work out the value of V .

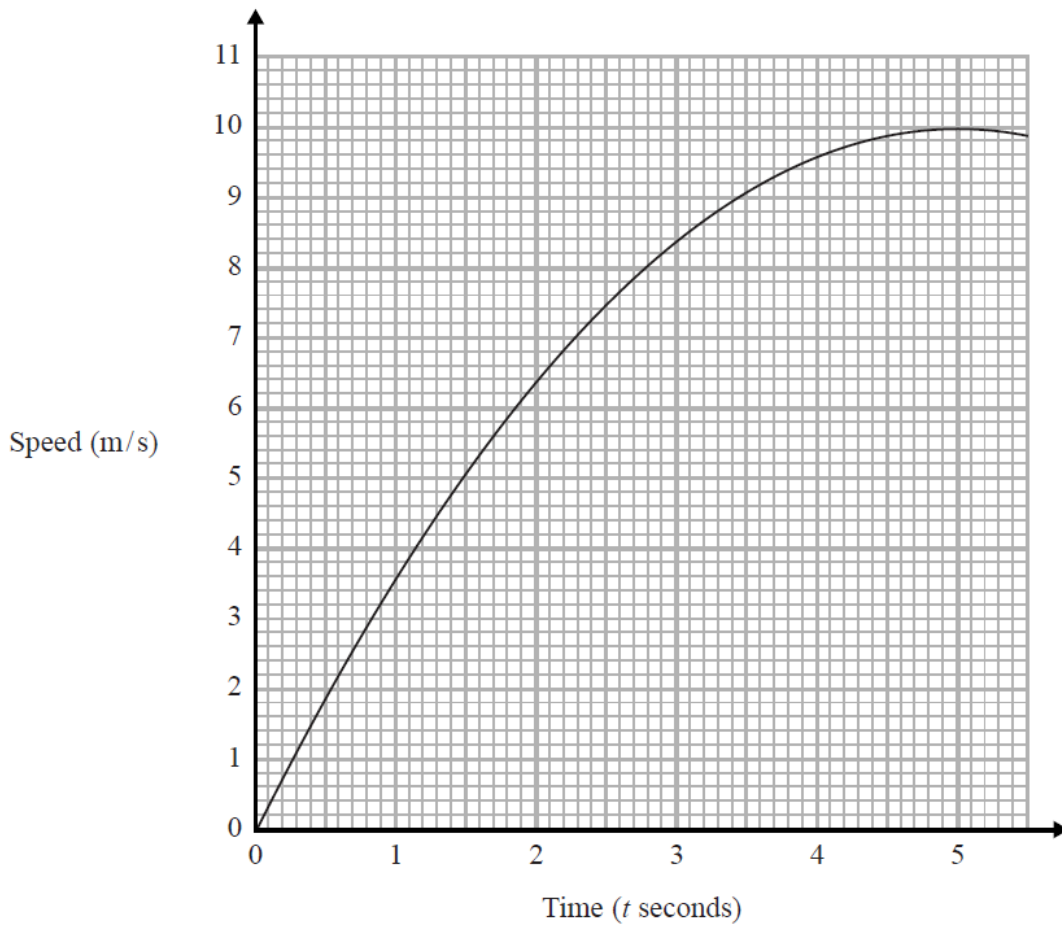
$V = \dots\dots\dots$ m/s

Question 10

Categorisation: Estimate the distance travelled for a curve graph by finding the area of appropriate trapeziums and triangles.

[Edexcel GCSE(9-1) Mock Set 1 Autumn 2016 - 2H Q17a]

Here is a speed-time graph showing the speed, in metres per second, of an object t seconds after it started to move.



(a) Use 3 strips of equal width to find an estimate for the area under the graph between $t = 1$ and $t = 4$

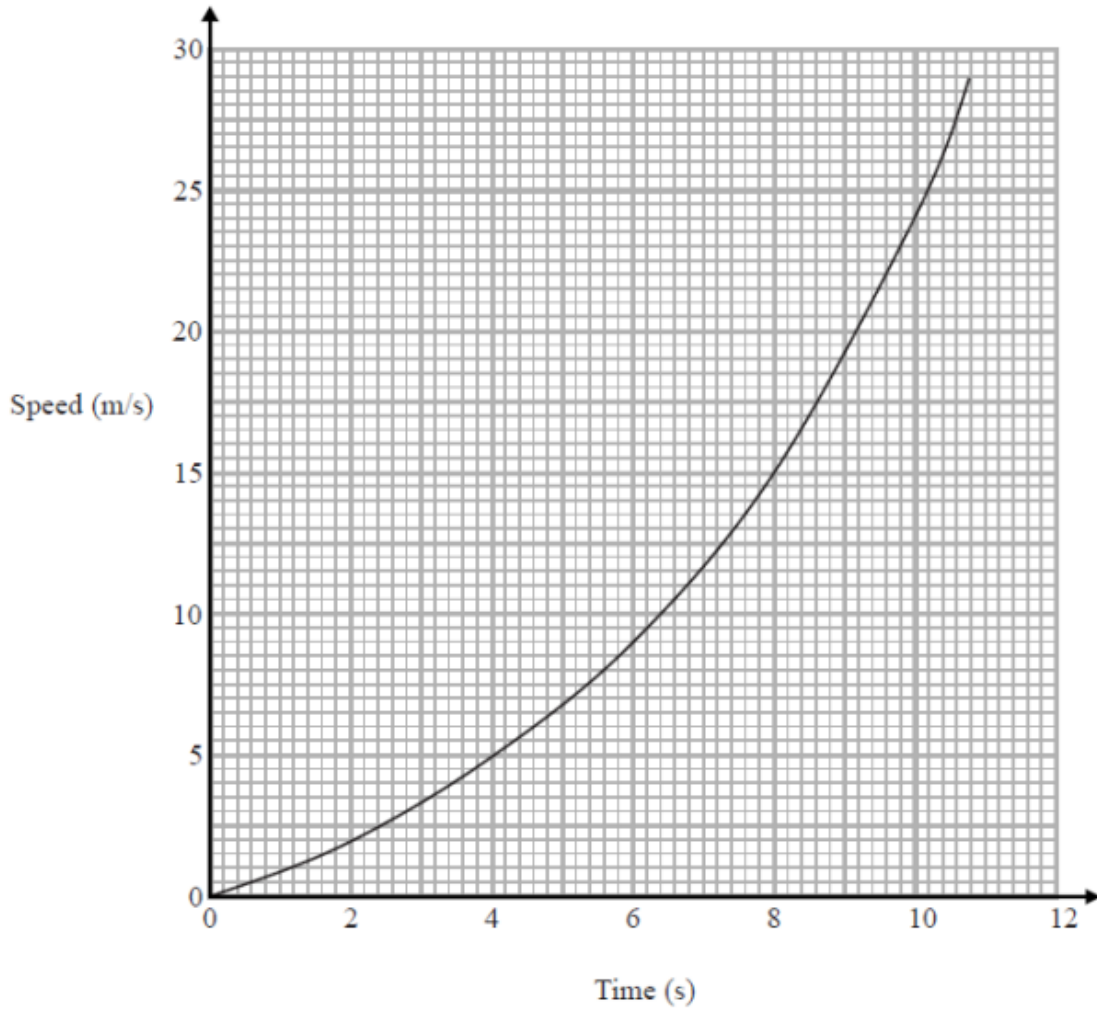
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Question 11

Categorisation: As above.

[Edexcel Specimen Papers Set 2, Paper 3H Q18a]

Here is the speed-time graph for a car.



Work out an estimate for the distance the car travelled in the first 10 seconds.
Use 5 strips of equal width.

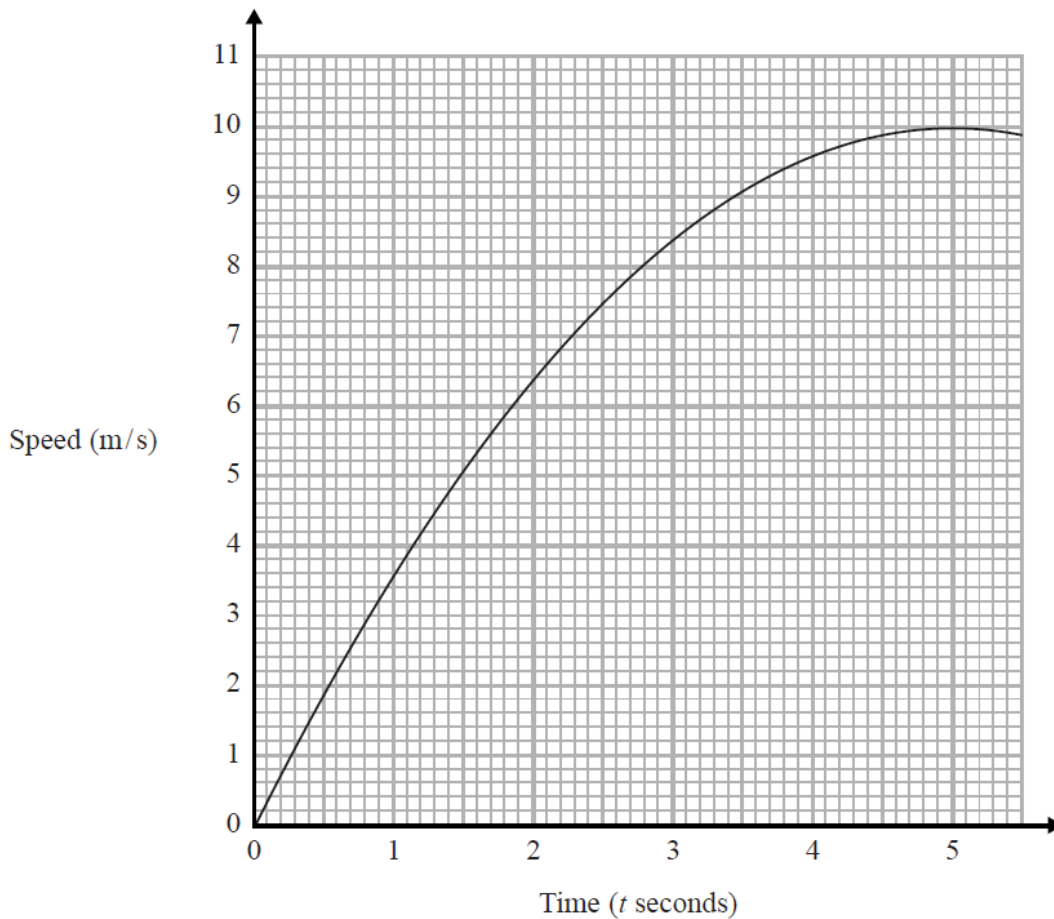
..... m

Question 12

Categorisation: Determine whether an estimated distance is an underestimate or an overestimate.

[Edexcel GCSE(9-1) Mock Set 1 Autumn 2016 - 2H Q17c]

Here is a speed-time graph showing the speed, in metres per second, of an object t seconds after it started to move.



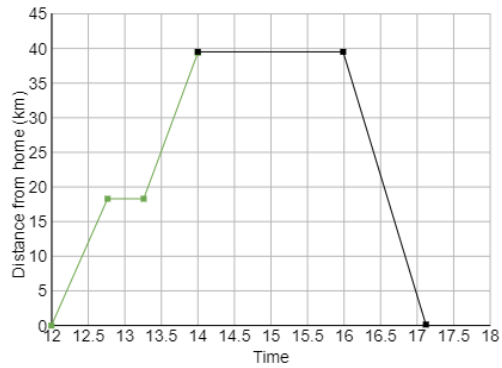
(c) You use 3 strips of equal width to find an estimate for the area under the graph between $t = 1$ and $t = 4$. Explain whether this answer gives an underestimate or an overestimate for the area under the graph.

Underestimate

Overestimate

Answers

Question 1



Question 2

16:45

Question 3

40 km/h

Question 4

31.2 km/h

Question 5

any value in the range 3 m/s^2 to 4 m/s^2

Question 6

any value in the range 1 to 1.3

Question 7

any value in the range $T = 340$ seconds to $T = 360$ seconds

Question 8

$0.06 \text{ } ^\circ\text{C/s}$

Question 9

$V = 25 \text{ m/s}$

Question 10

21.4

Question 11

86 m

Question 12

Underestimate