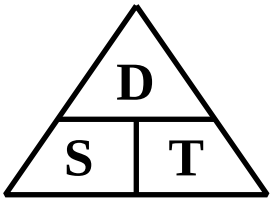
Lesson 10

GCSE Mathematics
Kinematics

10.1 Later Date Revision

You May Use A Calculator

Question 1



By using the constant speed formula triangle, or otherwise, write down a formula for *distance* in terms of *time* and *speed*

$distance =$

[2 marks]

Question 2

(i) How many metres are in a kilometre ?

(ii) How many seconds are in a day ?

[2 marks]

Question 3

Tickles, my pet spider, moves at a constant speed of 0.6 ms^{-1} for 12 minutes.

(i) How many seconds are in 12 minutes ?

(ii) How far does Tickles travel in this time ?

(iii) Is this more or less than $\frac{1}{2}$ km ?

[4 marks]

Question 4

A cyclist leaves her house at 6.48 am.
She peddles at a steady speed of 7 m/s returning home at 7.33 am.

(i) For how long did the cyclist peddle ?
Give your answer in seconds.

[2 marks]

(ii) How far did the cyclist travel ?
Give your answer in metres.

[2 marks]

(iii) Change your part **(ii)** answer into km.

[1 mark]

Question 5

A train accelerates uniformly from a speed of 4 ms^{-1} to
a speed of 28 ms^{-1} over 32 seconds.

(i) What is the average speed of the train over the 32 seconds ?

[1 mark]

(ii) Use the formula;

$$Distance = Average\ Speed \times Time.$$

to calculate the distance the train covers whilst accelerating.

[1 mark]

Question 6

In mathematics the Greek letter delta, Δ, is used for the word *change.*

A child's mass, *M*, increases from 15.8 kg to 18.1 kg
What is ΔM ?

[1 mark]

Question 7

On a speed-time graph;

(i) What does the “gradient of a line” represent ?

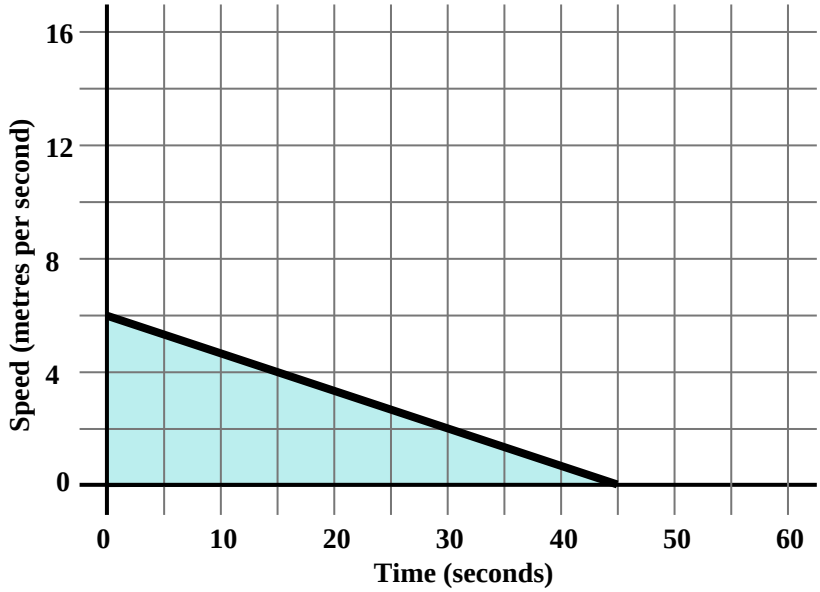
[1 mark]

(ii) What does the “area under the graph” represent ?

[1 mark]

Question 8

The Speed-Time graph is of a mobility scooter approaching a STOP sign.
At $t = 0$ the scooter's driver first applies the brakes.



(i) What speed was the driver doing when he first applies the brakes ?

[1 mark]

(ii) How long did it take for the mobility scooter to stop ?

[1 mark]

(iii) What distance does the mobility scooter travel whilst stopping ?

[2 marks]

(iv) The driver first applied the brakes when the STOP sign was 0.25 km away.
Does it stop before or after reaching the STOP sign ?

[1 mark]

(v) What was the mobility scooter's rate of deceleration ?

[2 marks]

Question 9

GCSE Examination Question from May 2022, Paper 2H, Q3 (Edexcel)

An aeroplane travelled from New York City to Los Angeles.
The aeroplane travelled a distance of 3980 kilometres 5 hours 24 minutes.
Work out the average speed of the aeroplane.
Give your answer in kilometres per hour correct to the nearest whole number.

[3 marks]

Question 10

(i) I move from a point with x coordinate 5 to a point with x coordinate 9.
What is Δx ?

[1 mark]

(ii) I move from a point with y coordinate 11 to a point with y coordinate 23.
What is Δy ?

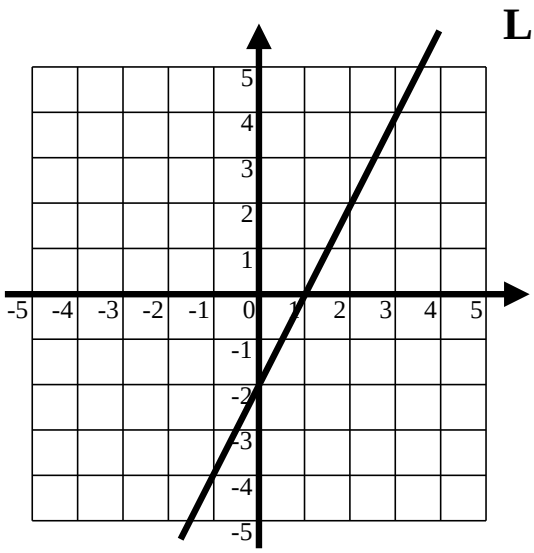
[1 mark]

(iii) Use your part **(i)** and part **(ii)** answers to help calculate the gradient between the points with coordinates (5, 11) and (9, 23).

[2 marks]

Question 11

A line, **L**, passes through the points (0, – 2) and (3, 4)



Find the gradient of the line **L**

[2 marks]

Question 12

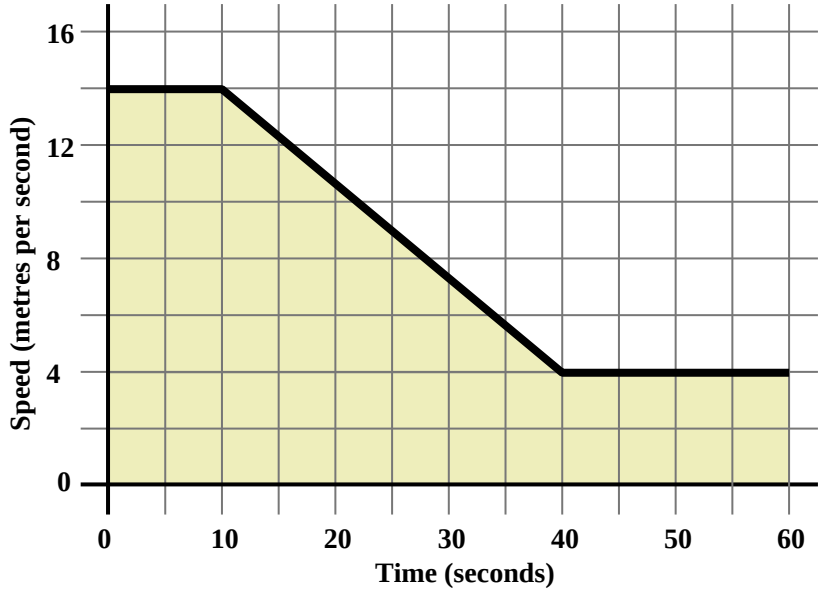
GCSE Examination Question from January 2021, Paper 1H, Q4 (Edexcel)

A train journey from Paris to Amsterdam took 3 hours 24 minutes.
The total distance the train travelled was 433.5 km.

Work out the average speed of the train.
Give your answer in kilometres per hour.

[3 marks]

Question 13



A car's speed over a sixty second period is given by the Speed-Time graph.

(i) Between which two times was the car decelerating ?

[1 mark]

(ii) Calculate the rate of deceleration.

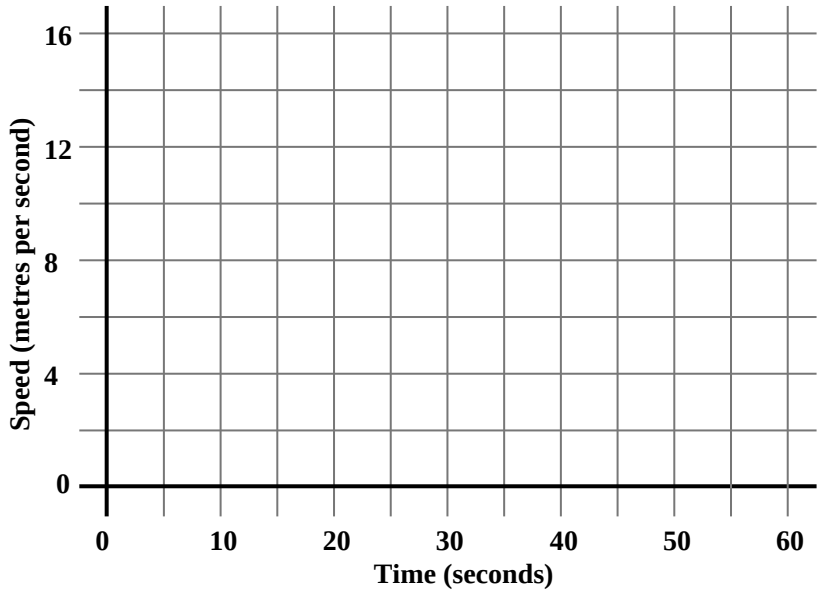
[2 marks]

(iii) Calculate the total distance travelled by the car over the sixty seconds.
Clearly show your working.

[4 marks]

Question 14

A car is moving at a constant speed of 6 ms^{-1} between $t = 0$ and $t = 10$ seconds.
Then, over 30 seconds, it accelerates uniformly to a speed of 12 ms^{-1}
It then moves at a constant speed of 12 ms^{-1} for 20 seconds.



Draw the Speed - Time graph for the car movements described.

[3 marks]

Question 15

GCSE Examination Question from January 2020, Paper 2H, Q10 (Edexcel)

Change a speed of 50 metres per second to a speed in kilometres per hour.

[3 marks]