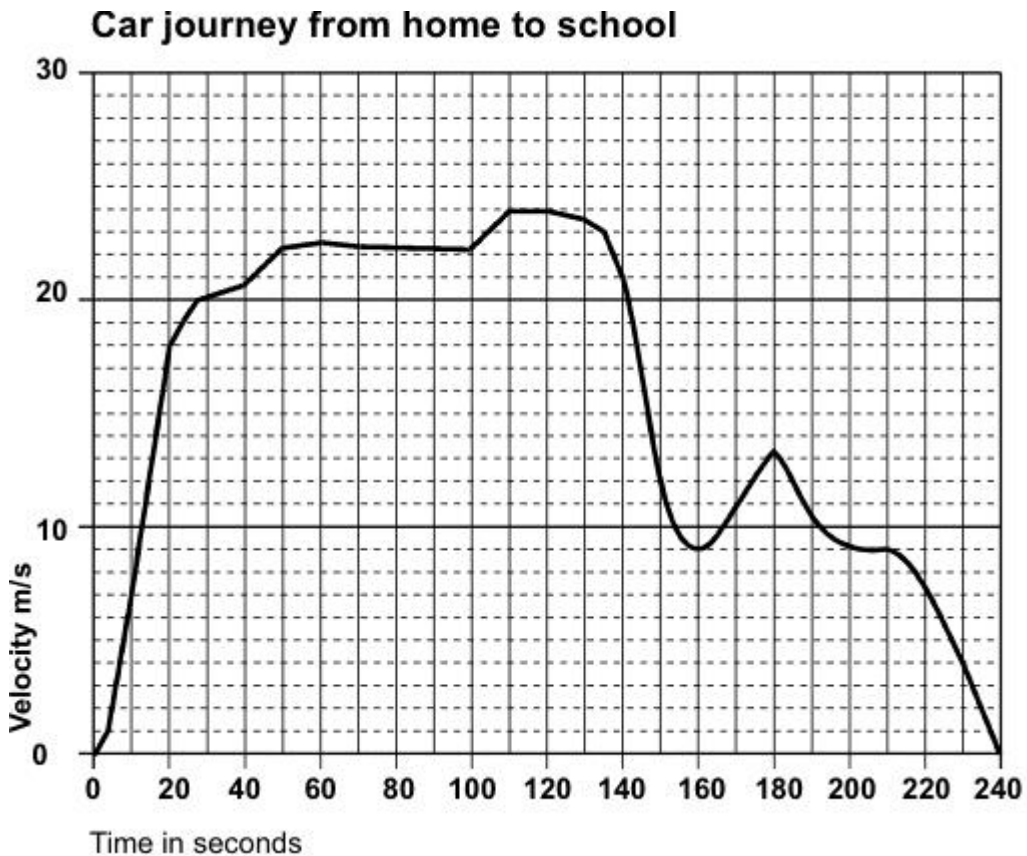


**Q3.**

Ravinder recorded the speed of a car every 10 seconds throughout a short journey from her home to school.

She used the data to draw a velocity/time graph.



- (a) Find a point during the journey when the car's speed was increasing most quickly. Mark this point as P.  
By drawing appropriate lines on the graph, find the acceleration of the car at point P. Make sure that all the lines you draw on the graph are clear.

..... m/s<sup>2</sup>

3 marks

- (b) Find a point during the journey when the car's speed was decreasing most quickly. Mark this point as Q.  
By drawing appropriate lines on the graph, find the acceleration of the car at point Q. Make sure that all the lines on the graph are clear.

..... m/s<sup>2</sup>

3 marks

- (c) The car uses least fuel when it travels at speeds between 20m/s and 25m/s.

Find the area under the graph for the period when the car was travelling at between 20 m/s and 25 m/s.

What does this area represent? Give the correct units.



3 marks

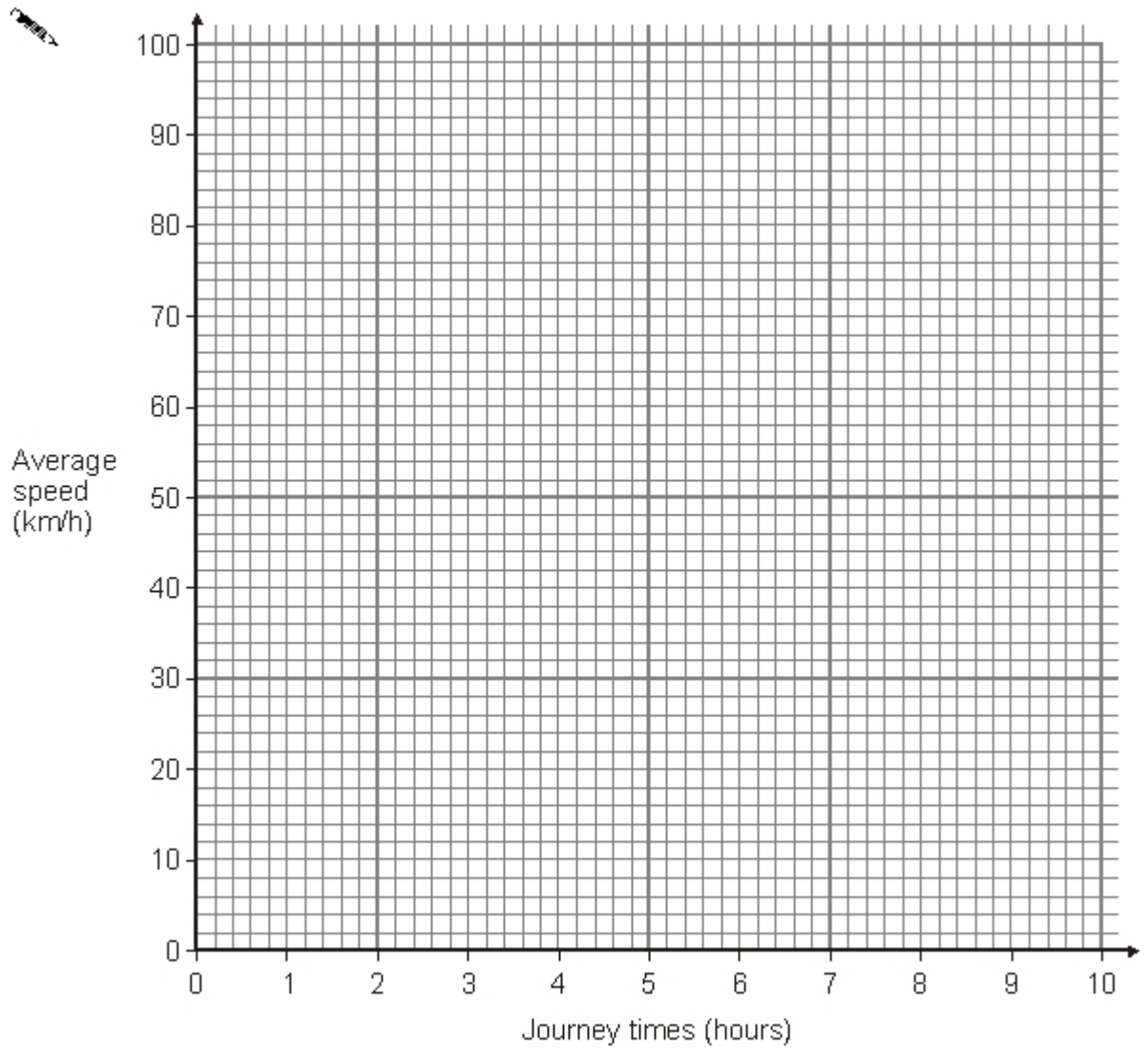
### Q31.

#### Journeys

This question is about a journey between two towns that are **100 km** apart.

When the journey time is 2 hours, the average speed is 50 km/h.  
The journey time is different at different average speeds.

Show the relationship between journey time and average speed by drawing a graph on the grid below.



3 marks

### Q3.

- (a) **For 3m** indicates P as a point between  $t = 10$  and  $t = 20$  inclusive, draws a correct tangent and/or intercepts for this point or shows correct values for time and distance, and states an answer in the range 1.0 to 1.2 inclusive.,  
eg:

- 1.1

**For only 2m** indicates P as a point between  $t = 10$  and  $t = 20$  inclusive, draws a tangent and/or intercepts for this point or shows values for time and distance, but states an answer outside the range 1.0 to 1.2 inclusive.

**For only 1m** indicates P as a point between  $t = 10$  and  $t = 20$  inclusive.

*If a tangent is not drawn in, the other two sides of the required right angled triangle must be shown in some way or their lengths written down.*

3

- (b) **For 3m** indicates Q as a point between  $t = 140$  and  $t = 150$  inclusive, draws a correct tangent and/or intercepts for this point or shows correct values for time and distance and states an answer in the range  $-0.8$  to  $-1.0$  inclusive , eg:

- -0.9

**For only 2m** indicates Q as a point between  $t = 140$  and  $t = 150$  inclusive, draws a tangent and/or intercepts for this point or shows values for time an distance, but states an answer outside the range  $-0.8$  to  $-1.0$  inclusive, eg:

- 0.9

**For only 1m** indicates Q as a point between  $t = 140$  and  $t = 150$  inclusive.

***For 3m** a positive value for the acceleration.*

*If a tangent is not drawn in, the other two sides of the required right angled triangle must be shown in some way or their lengths written down.*

3

- (c) **For 3m** calculates the area under the graph correctly and interprets the answer as the distance travelled in metres, eg:

- The car travelled 2685m.

*Accept values between 2450m and 2700m inclusive.*

**For only 2m** calculates the area under the graph, interprets the answer as distance travelled in metres, but gives an answer outside the range 2450m to 2700m., eg:

- The car travelled 268.5m.

- Distance travelled 2750m.

*For 2m the complete area under the graph must be calculated, not just the area above  $V = 20$ .*

or calculates the area under the graph correctly, gives an answer in the range 2450 to 2700, but fails to specify either distance travelled or metres, eg:

- Distance travelled 2650.
- 2625m

**For only 1m** calculates the area under the graph correctly, gives an answer in the range 2450 to 2700, but specifies neither distance travelled nor metres.,  
eg:

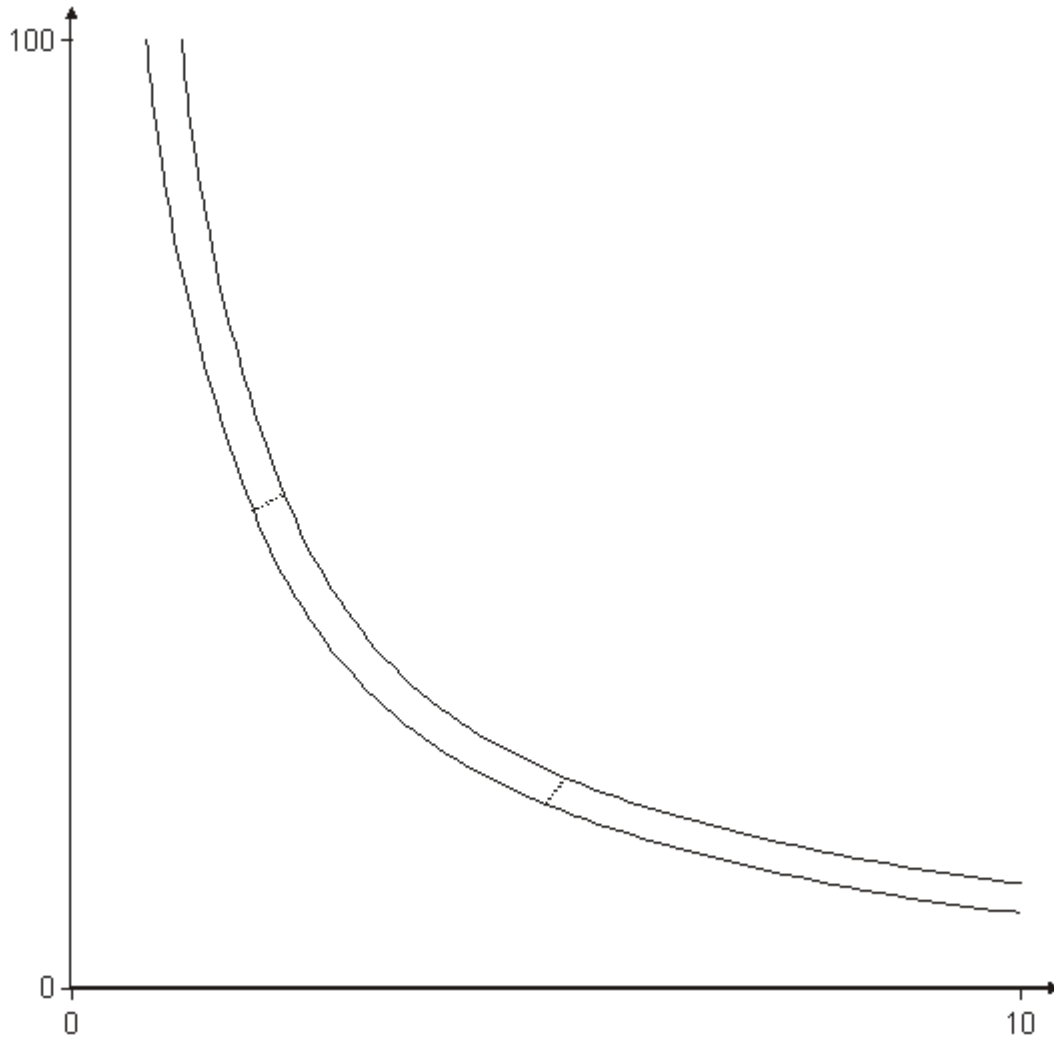
- 2650

*268.5 is obtained by failing to recognise that each rectangle is 10 seconds rather than 1 second.*

3

[9]

**Q31.**



Draws a complete correct curve within the tolerance as shown above

***For 3m, do not accept points joined with straight lines for a curve***

3

**or** Draws a curve within the tolerance as shown above between (2, 50) and (5, 20), even if the curve is incorrect or omitted elsewhere

or

Indicates at least 5 correct points on the graph, even if the points are not joined or joined with straight lines

2

**or** Indicates at least 3 correct points on the graph

or

Gives the coordinates of at least 5 correct points with x values greater than 0 but less than or equal to 10

**! For 2m or 1m, points inaccurately plotted**

*Accept provided the pupil's intention is clear*

**! For 2m or 1m, points not explicitly plotted**

*Accept unambiguous indications of the locations of points on the graph, for example the tops of vertical lines*

*Note to markers:*

*The five points with integer coordinates are (1, 100), (2, 50), (4, 25), (5, 20) and (10, 10)*

**[3]**