Name ANSWERS	Class

MATHS TEACHER HUB

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Distance time graphs

(9 – 1) Topic booklet

Higher

These questions have been collated from previous years GCSE Mathematics papers.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.	Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- If the question is a **1H** question you are not allowed to use a calculator.
- If the question is a **2H** or a **3H** question, you may use a calculator to help you answer.

Information

- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

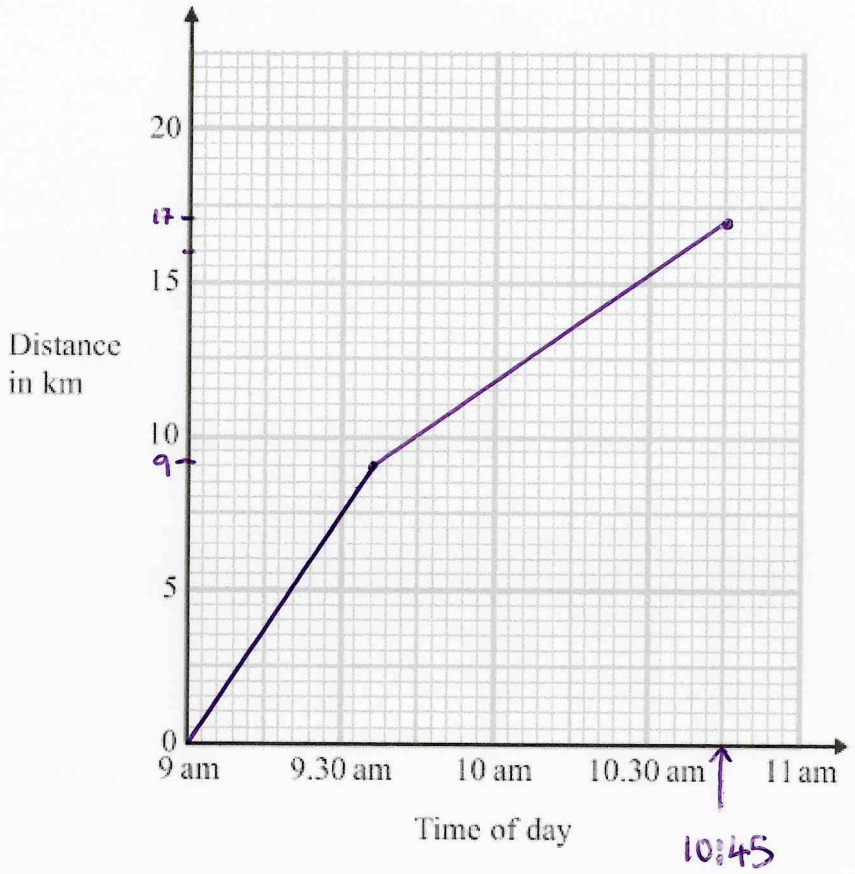
Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.

5 At 9 am, Bradley began a journey on his bicycle.

From 9 am to 9.36 am, he cycled at an average speed of 15 km/h.
From 9.36 am to 10.45 am, he cycled a further 8 km.

$15 \times \frac{36}{60} = 9\text{km}$

(a) Draw a travel graph to show Bradley's journey.



(3)

From 10.45 am to 11 am, Bradley cycled at an average speed of 18 km/h.

(b) Work out the distance Bradley cycled from 10.45 am to 11 am.

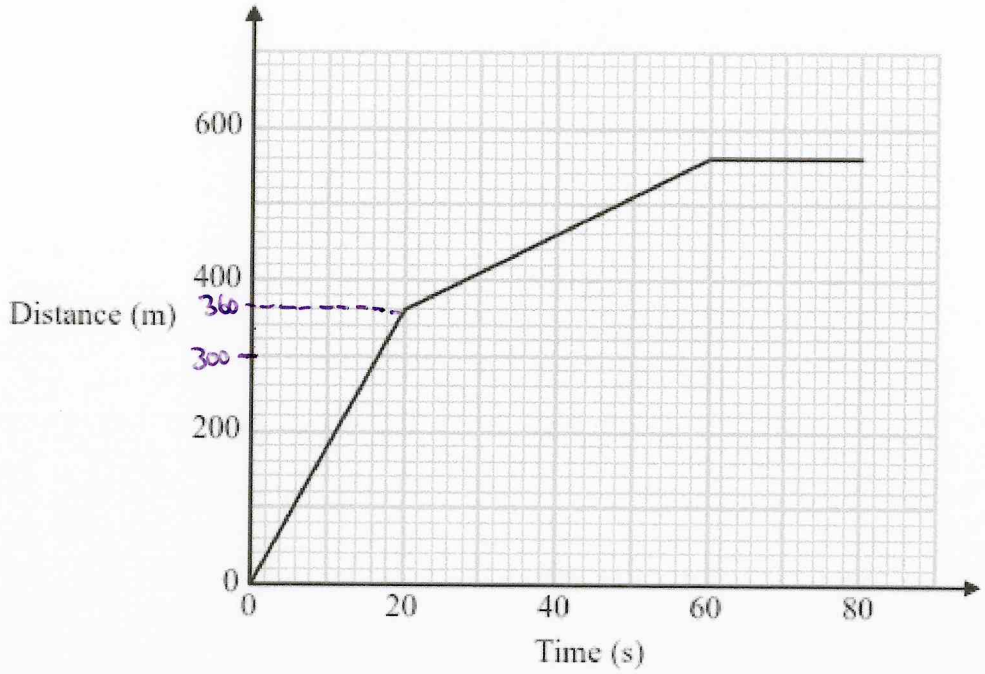
$18\text{kmph} \times \frac{15}{60} = 4.5$

4.5 km

(2)

(Total for Question 5 is 5 marks)

10 Here is part of a distance-time graph for a car's journey.



(a) Between which two times does the car travel at its greatest speed?
Give a reason for your answer.

The steepest part is between 0-20 seconds.

(2)

(b) Work out this greatest speed.

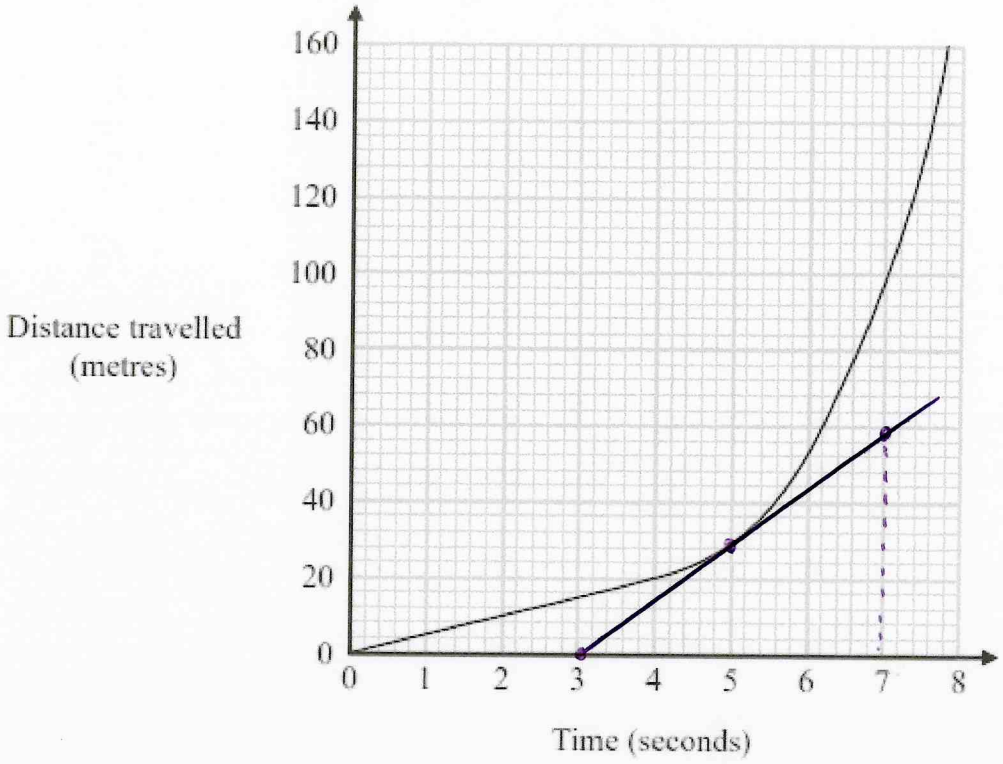
$\frac{360m}{20seconds} = 18m/s$

18 m/s

(1)

(Total for Question 10 is 3 marks)

14 The distance-time graph shows information about part of a car journey.



Use the graph to estimate the speed of the car at time 5 seconds.

Speed = gradient = $\frac{\Delta y}{\Delta x} = \frac{60}{4} = 15$

15

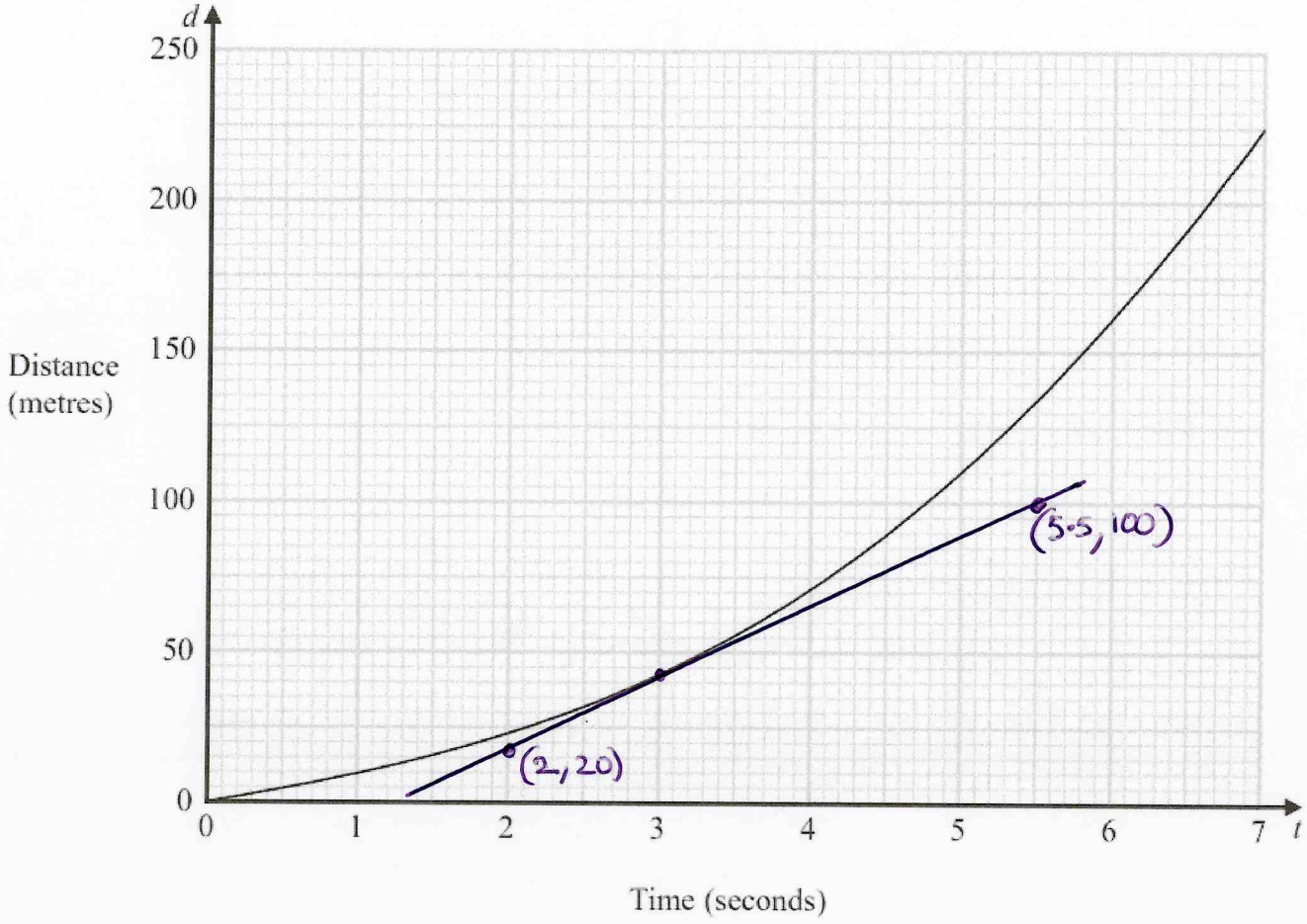
..... m/s

(10 ↔ 19)

(Total for Question 14 is 3 marks)

15 An object falls from rest.

Here is the distance-time graph for the distance (d metres) fallen by the object t seconds after it starts to fall.



Work out an estimate for the gradient of the graph at $t = 3$
You must show how you get your answer.

$$\text{gradient} = \frac{\Delta y}{\Delta x} = \frac{100 - 20}{5.5 - 2} = \frac{80}{3.5}$$

$$= \frac{160}{7}$$

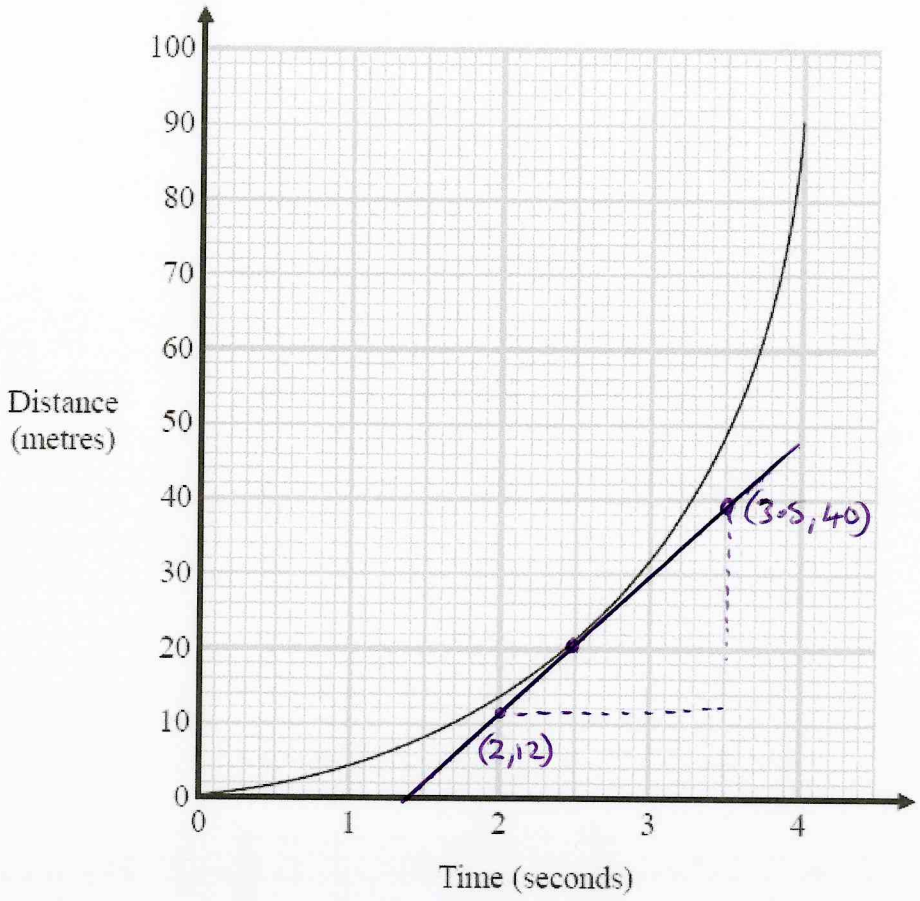
$$7 \overline{)160.^{6}0^{4}0} \quad 22.85$$

22.9

(21 ↔ 28)

(Total for Question 15 is 3 marks)

17 Here is a distance-time graph.



(a) Find an estimate of the gradient of the graph at time 2.5 seconds.
You must show how you get your answer.

gradient $= \frac{\Delta y}{\Delta x} = \frac{40-12}{3.5-2} = \frac{28}{1.5}$

18.6

(16.5 ⟷ 19.5)

(b) What does the gradient of the graph represent?

The speed.

(1)

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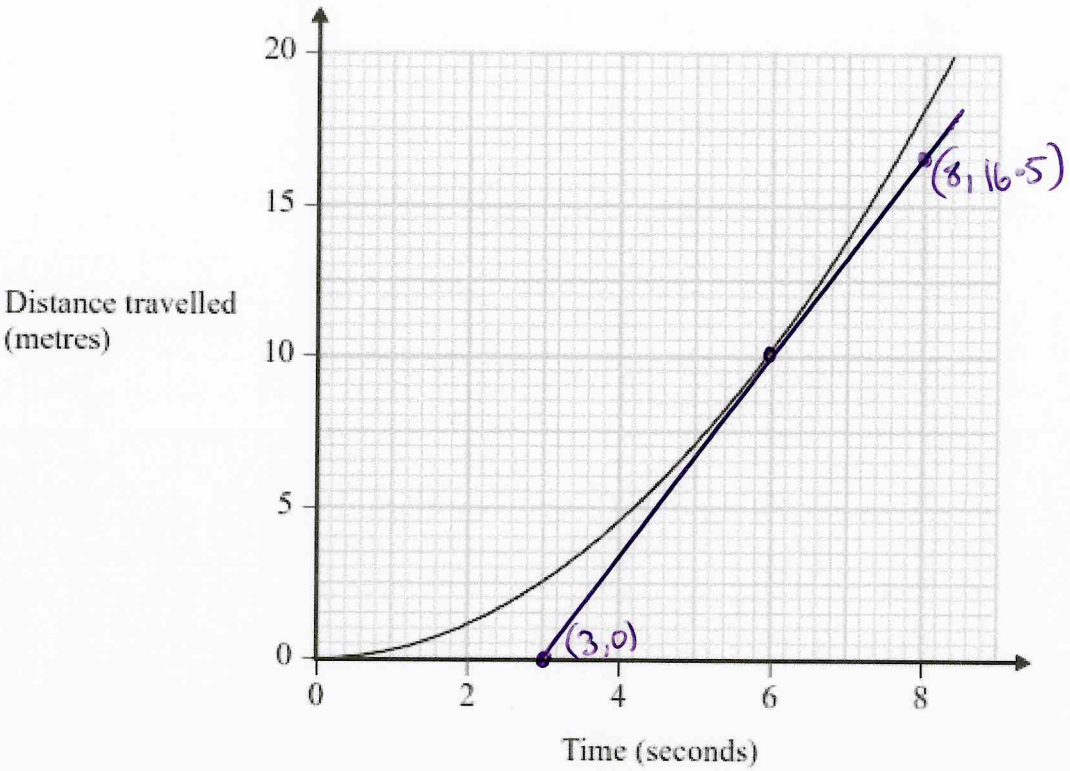
(Total for Question 17 is 4 marks)

19 The graph shows information about part of a cyclist's journey.



Work out an estimate of the speed, in m/s, of the cyclist at time 6 seconds.

Speed = gradient = $\frac{\Delta y}{\Delta x} = \frac{16{\cdot}5 - 0}{8-3} = \frac{16{\cdot}5}{5} = 3{\cdot}3$

3·3 m/s

(3 ⟷ 4)

(Total for Question 19 is 3 marks)