Speed, Distance,Time & Rates of Change (H & F)

JustMaths

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Total Marks:	

1. Axel and Lethna are driving along a motorway.

   They see a road sign.

   The road sign shows the distance to Junction 8

   It also shows the average time drivers take to get to Junction 8

   > To Junction 8
   > 30 miles
   > 26 minutes

   The speed limit on the motorway is 70 mph.

   70 miles in 60 mins

   Lethna says:

   "We will have to drive faster than the speed limit to drive 30 miles in 26 minutes."

   Is Lethna right?

   You must show how you get your answer.

   average.

   distance = 30 miles
   time = 26 minutes
   = 26/60 hours.

   $\frac{30}{26} = \frac{15}{13}$

   Speed $= \frac{30}{26/60} = 30 \div \frac{26}{60}$ [3]
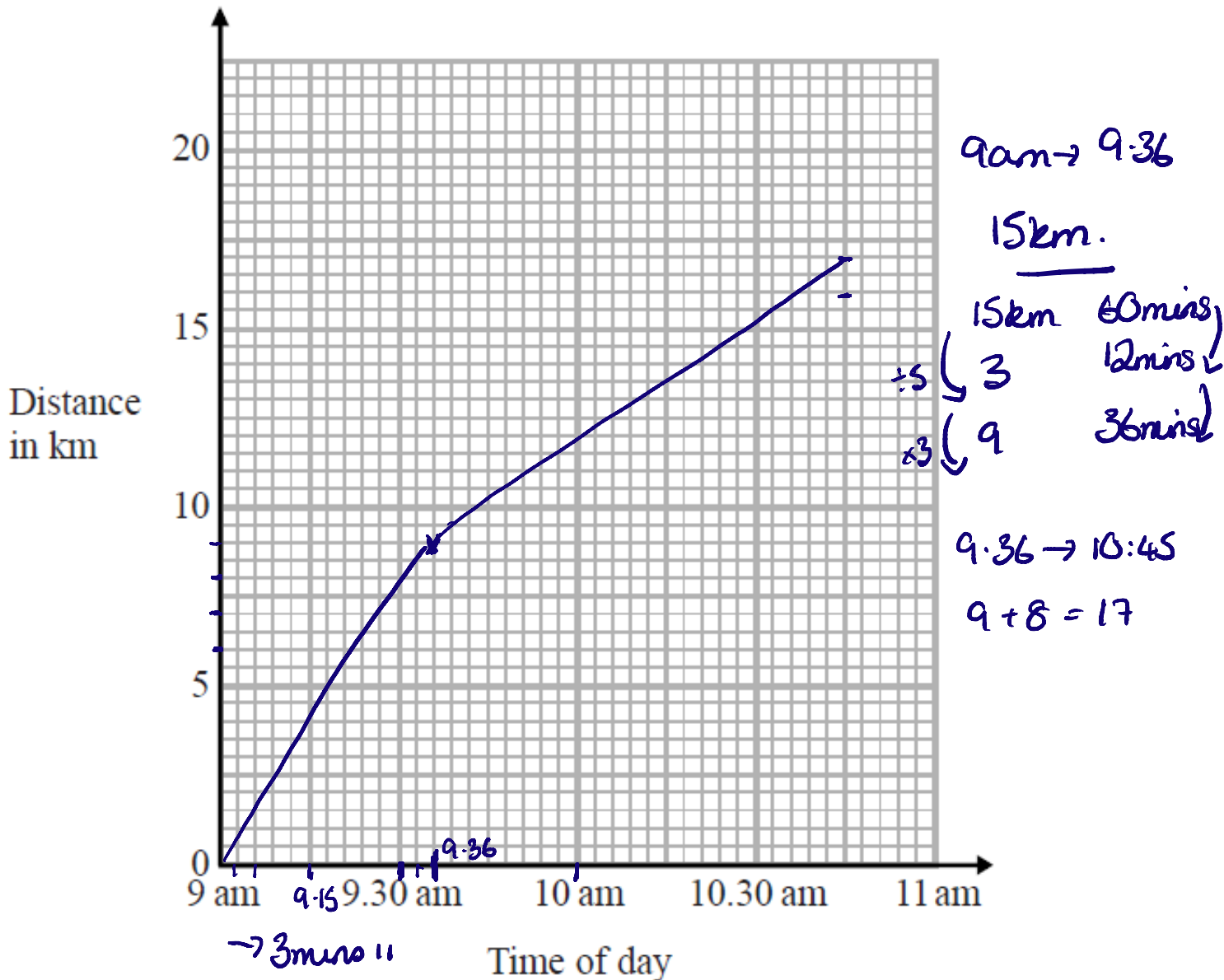
   $= 30 \times \frac{60}{26}$

   $= 69.2307692$ *miles per hour.*

   Lethna is incorrect...

2. 12. 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.

9am→ 9·36
15km.
___
15km 60mins)
3   12mins) ÷5
9   36mins) ×3

9·36 → 10:45
9 + 8 = 17

(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.

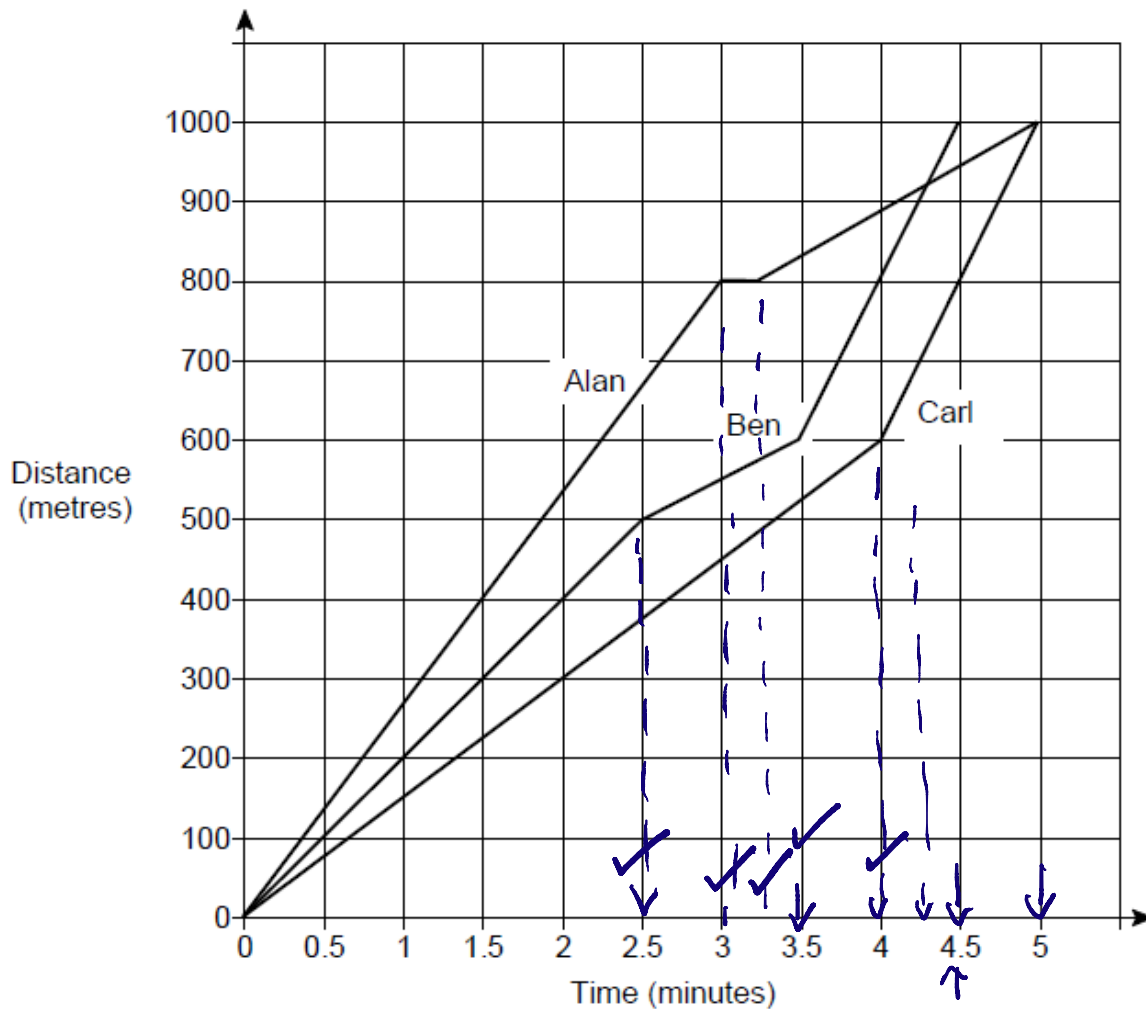(b) Work out the distance Bradley cycled from 10.45 am to 11 am.

18km = 60mins)
4·5   15mins) ÷4

.... 4·5 .... km [2]

3. Alan, Ben and Carl ran a 1000 metre race.

The distance-time graph shows the race.

(a) Who won the race?

Give a reason for your answer.

Ben because he reached 1000m in the quickest time [1]

(b) Describe the race.

All 3 runners started the race at different constant speeds
with Alan running fastest, then Ben, then Carl.
At 2.5 mins Ben changed his speed and ran slower.
At 3.0 mins Alan stopped for 15 seconds and restarted
at a slower pace than before
At 3:30s Ben started running faster and then at [4]
4 mins Carl also sped up
At 4 mins 15 s Ben overtook Alan and won the race at 4.5 mins
✱ both Alan and Carl finished together

4. Water is poured into a glass for 4 seconds.

The graph shows the depth of the water in the glass.
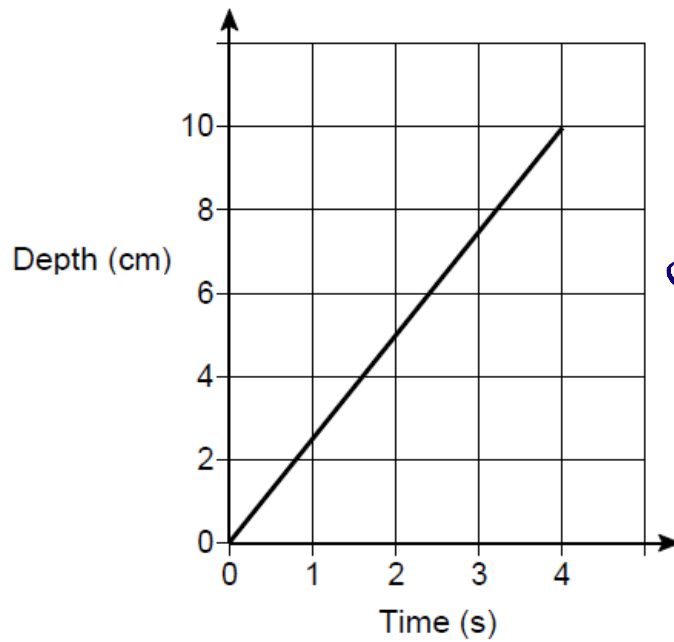
gradient
= rate of change

$\frac{10}{4} = \frac{5}{2} = 2.5$

What is the rate of change of the depth of the water?

Circle your answer.

0.4 cm/s   1.25 cm/s   2.5 cm/s   10 cm/s

[1]

CREDITS AND NOTES

Question	Awarding Body
1	Pearson Edexcel
2	Pearson Edexcel
3	AQA
4	AQA

Notes:

These questions have been retyped from the original sample/specimen assessment materials and whilst every effort has been made to ensure there are no errors, any that do appear are mine and not the exam board s (similarly any errors I have corrected from the originals are also my corrections and not theirs!).

Please also note that the layout in terms of fonts, answer lines and space given to each question does not reflect the actual papers to save space.

These questions have been collated by me as the basis for a GCSE working party set up by the GLOW maths hub - if you want to get involved please get in touch. The objective is to provide support to fellow teachers and to give you a flavour of how different topics "could" be examined. They should not be used to form a decision as to which board to use. There is no guarantee that a topic will or won't appear in the "live" papers from a specific exam board or that examination of a topic will be as shown in these questions.

Links:

AQA http://www.aqa.org.uk/subjects/mathematics/gcse/mathematics-8300

OCR http://ocr.org.uk/gcsemaths

Pearson Edexcel http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015.html

WJEC Eduqas http://www.eduqas.co.uk/qualifications/mathematics/gcse/

Contents:

This version contains questions from:

AQA – Sample Assessment Material, Practice set 1 and Practice set 2

OCR – Sample Assessment Material and Practice set 1

Pearson Edexcel – Sample Assessment Material, Specimen set 1 and Specimen set 2

WJEC Eduqas – Sample Assessment Material