

Thursday 13 June 2013 – Morning

A2 GCE MATHEMATICS (MEI)

4754/01B Applications of Advanced Mathematics (C4) Paper B: Comprehension
QUESTION PAPER

Barcode with numbers:
* 4 7 1 5 7 0 0 6 3 1 *

Candidates answer on the Question Paper.

OCR supplied materials:

- Insert (inserted)
- MEI Examination Formulae and Tables (MF2)

Other materials required:

- Scientific or graphical calculator
- Rough paper

Duration: Up to 1 hour



Candidate forename		Candidate surname	
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Centre number						Candidate number			
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INSTRUCTIONS TO CANDIDATES

- The Insert will be found in the centre of this document.
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.
- The Insert contains the text for use with the questions.
- You are permitted to use a scientific or graphical calculator in this paper.
- Final answers should be given to a degree of accuracy appropriate to the context.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- You may find it helpful to make notes and to do some calculations as you read the passage.
- You are **not** required to hand in these notes with your Question Paper.
- You are advised that an answer may receive **no marks** unless you show sufficient detail of the working to indicate that a correct method is being used.
- The total number of marks for this paper is **18**.
- This document consists of **8** pages. Any blank pages are indicated.

1 The diagram is a copy of Fig. 4.

R is a place with latitude 45° north and longitude 60° west. Show the position of R on the diagram.

M is the sub-solar point. It is on the Greenwich meridian and the declination of the sun is $+20^\circ$. Show the position of M on the diagram. [2]

1

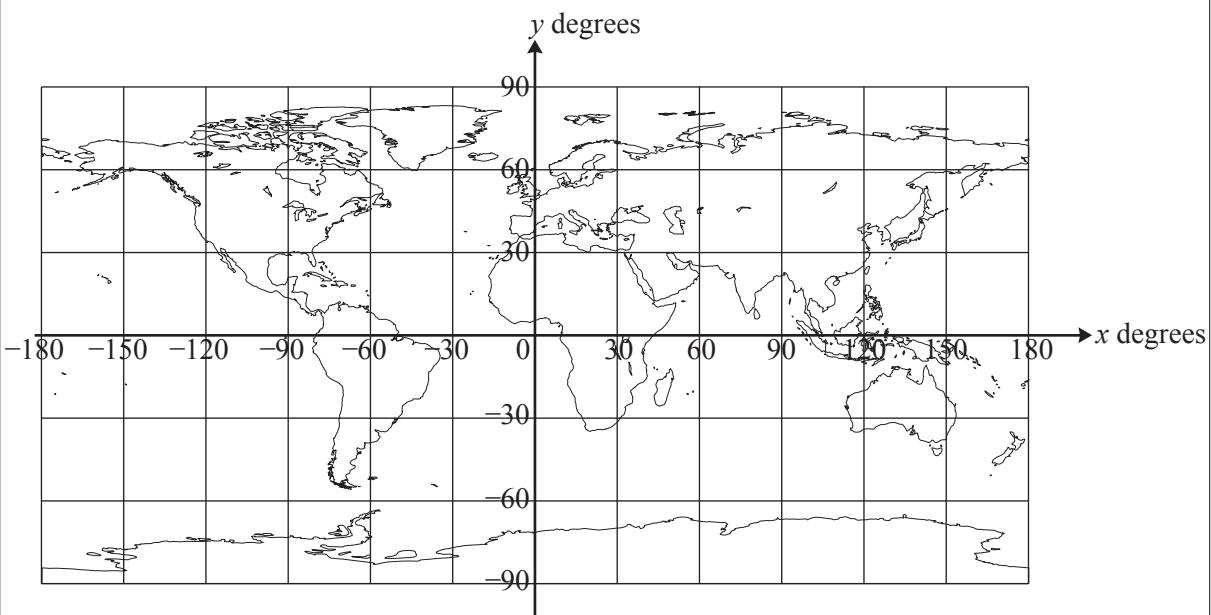


Fig. 4

2 Use Fig. 8 to estimate the difference in the length of daylight between places with latitudes of 30° south and 60° south on the day for which the graph applies. [3]

2

3 The graph is a copy of Fig. 6.

The article says that it shows the terminator in the cases where the sun has declination 10° north, 1° north, 5° south and 15° south.

Identify which curve (A, B, C or D) relates to which declination.

[2]

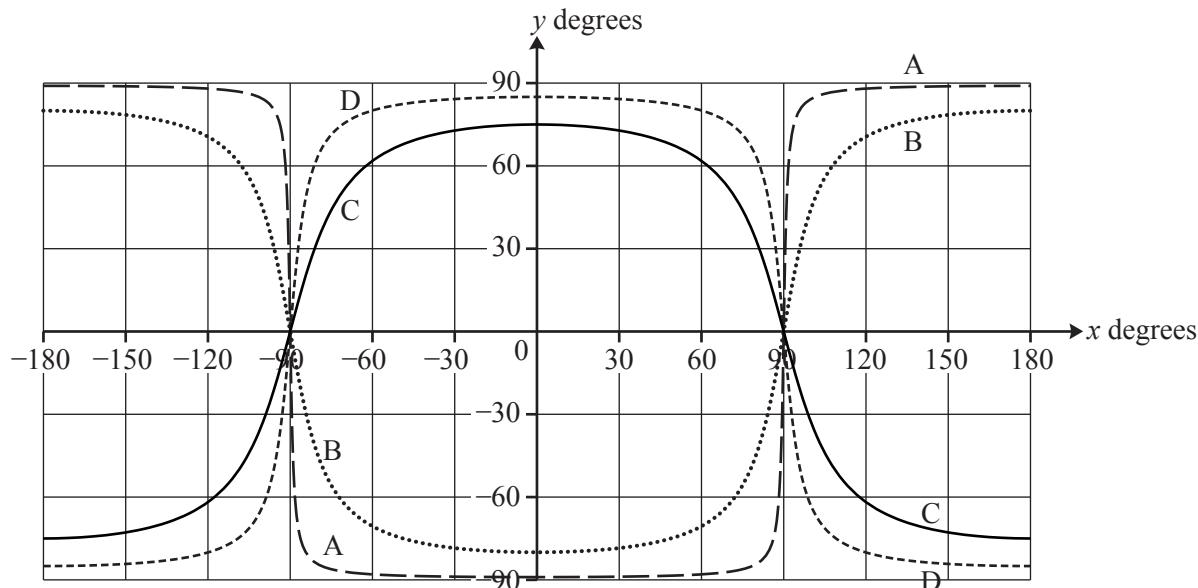


Fig. 6

3	10° north:
	1° north:
	5° south:
	15° south:

4 In lines 94 and 95 the article says

“Fig. 8 shows you that at latitude 60° north the terminator passes approximately through time +9 hours and -9 hours so that there are about 18 hours of daylight.”

Use Equation (4) to check the accuracy of the figure of 18 hours.

[4]

5 (i) Use Equation (3) to calculate the declination of the sun on February 2nd. [3]

(ii) The town of Boston, in Lincolnshire, has latitude 53° north and longitude 0° .
Calculate the time of sunset in Boston on February 2nd.
Give your answer in hours and minutes using the 24-hour clock. [4]

5 (i)	
5 (ii)	

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