

Tuesday 21 June 2022 – Afternoon

A Level Mathematics B (MEI)

H640/03 Pure Mathematics and Comprehension

Printed Answer Booklet

Time allowed: 2 hours



You must have:
Question Paper H640/03 (inside this document)
 the Insert (inside this document)

- inside this document)
- · a scientific or graphical calculator



Please write clearly in black ink. Do not write in the barcodes.								
Centre number					Candidate number			
First name(s)								
Last name						 		

INSTRUCTIONS

- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided in the **Printed Answer** Booklet. If you need extra space use the lined pages at the end of the Printed Answer Booklet. The guestion numbers must be clearly shown.
- Answer all the questions.
- · Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.
- Give your final answers to a degree of accuracy that is appropriate to the context.

INFORMATION

• This document has **20** pages.

ADVICE

· Read each question carefully before you start your answer.

Section A (60 marks)

	T
1	
2(a)	
2(b)(i)	
2(0)(1)	
2(b)(ii)	

3 (a)	
2(1-)	
3(b)	

4	

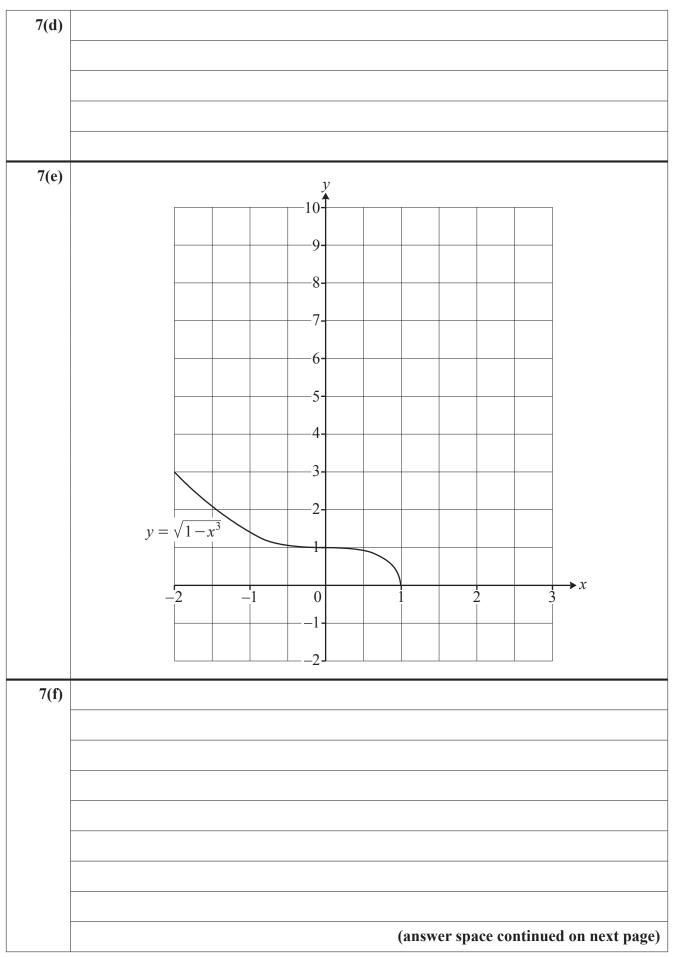
5(a)	

DO NOT WRITE IN THIS SPACE

5(b)	
6(a)	

(α)	
6(b)	

7(a)	
7(b)	
7(c)	



(f)	(continued)

8 (a)	
8(b)	
0(U)	
	Coordinates of A:
	Coordinates of B:
	Coordinates of C:
	Coordinates of D:

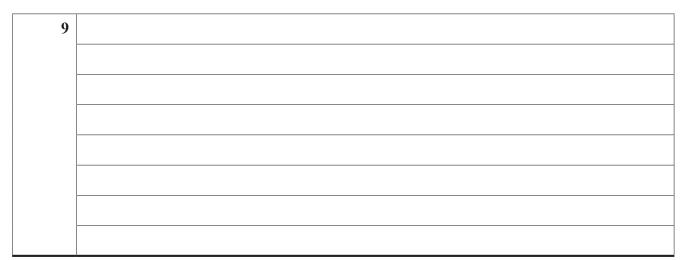
8(c)	
8(d)	
0(u)	
	(answer space continued on next page)

8(d)	(continued)

Section B (15 marks)

The questions in this section refer to the article on the Insert. You should read the article before attempting the questions.

9 Show that y = x has the same gradient as $y = \sin x$ when x = 0, as stated in line 5. [2]



[5]

10 In this question you must show detailed reasoning.

Fig. C2.2 indicates that the curve $y = \frac{4x(\pi - x)}{\pi^2} - \sin x$ has a stationary point near x = 3.

- Verify that the *x*-coordinate of this stationary point is between 2.6 and 2.7.
- Show that this stationary point is a maximum turning point.

10			

11	

Г

- 12 (a) Show that $\cos x = \sin\left(x + \frac{\pi}{2}\right)$. [2]
 - (b) Hence show that $\sin x \approx \frac{16x(\pi x)}{5\pi^2 4x(\pi x)}$ gives the approximation $\cos x \approx \frac{\pi^2 4x^2}{\pi^2 + x^2}$, as stated in line 31. [3]

10()	
12(a)	
12(1-)	
12(b)	
	(answer space continued on next page)
	(answer space continued on next page)

12(b)	(continued)

ADDITIONAL A	NSWER SPACE
--------------	--------------------

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series. If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible

opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of Cambridge University Press & Assessment, which is itself a department of the University of Cambridge.

© OCR 2022