

# 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)
<ul> <li>the Insert (inside this document)</li> </ul>

nside this document) · a scientific or graphical calculator



Please write clearly in black ink. <b>Do not write in the barcodes.</b>						
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)

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

<b>3(a)</b>	
2(h)	
<b>3(b)</b>	

4	

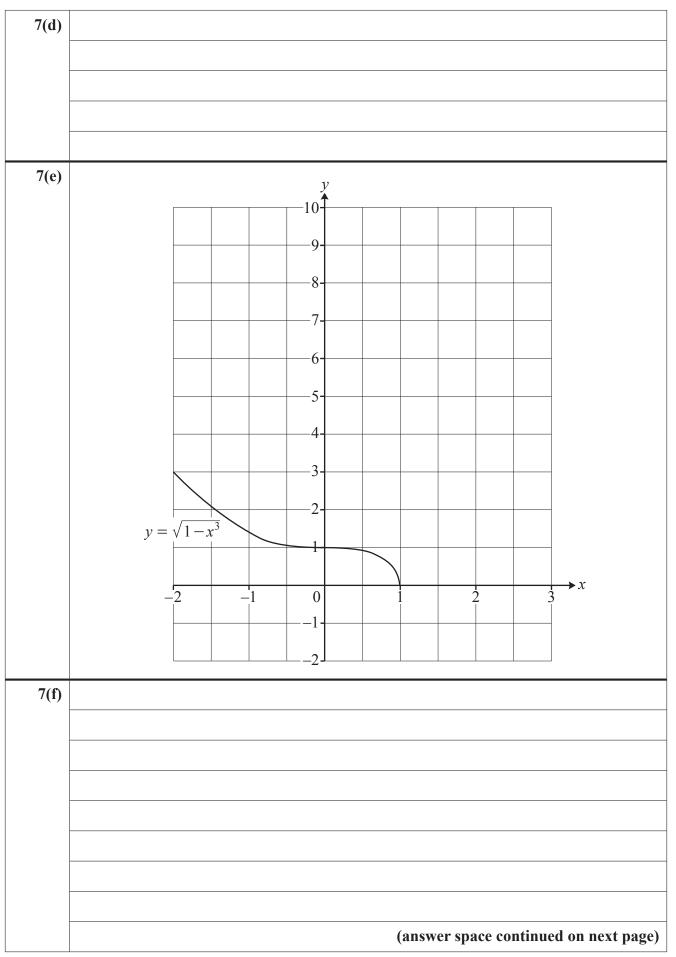
5(a)	

## DO NOT WRITE IN THIS SPACE

5(b)	
6(a)	
$\mathbf{U}(\mathbf{a})$	

$(\mathbf{a})$	
6(b)	

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



7(f)	(continued)

<b>8</b> (a)	
<b>9</b> ( <b>b</b> )	
<b>8(b)</b>	
	Coordinates of A:
	Coordinates of B:
	Coordinates of C:
	Coordinates of D:

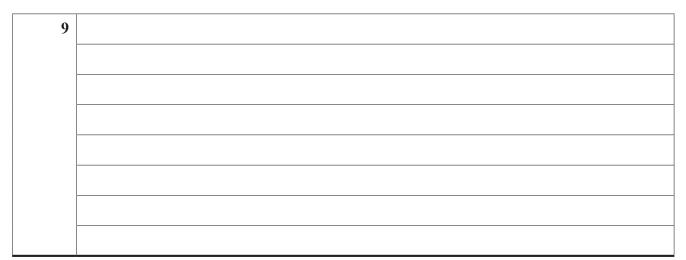
8(c)	
8(d)	
0(u)	
	(answer space continued on next page)

<b>8(d)</b>	(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]

12(a)	
12(b)	
12(0)	
	(answer space continued on next page)

12(b)	(continued)

ADDITIONAL A	<b>NSWER SPACE</b>
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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).

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