

Please write clearly in block capitals.

Centre number

Candidate number

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

INTERNATIONAL AS FURTHER MATHEMATICS

(9665/FM01) Unit FP1 Pure Mathematics

Monday 13 January 2020 07:00 GMT Time allowed: 1 hour 30 minutes

Materials

- For this paper you must have the Oxford International AQA booklet of formulae and statistical tables (enclosed).
- You may use a graphics calculator.

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.

Advice

- Unless stated otherwise, you may quote formulae, without proof, from the booklet.
- Show all necessary working; otherwise marks may be lost.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	



There are no questions printed on this page

*Do not write
outside the
box*

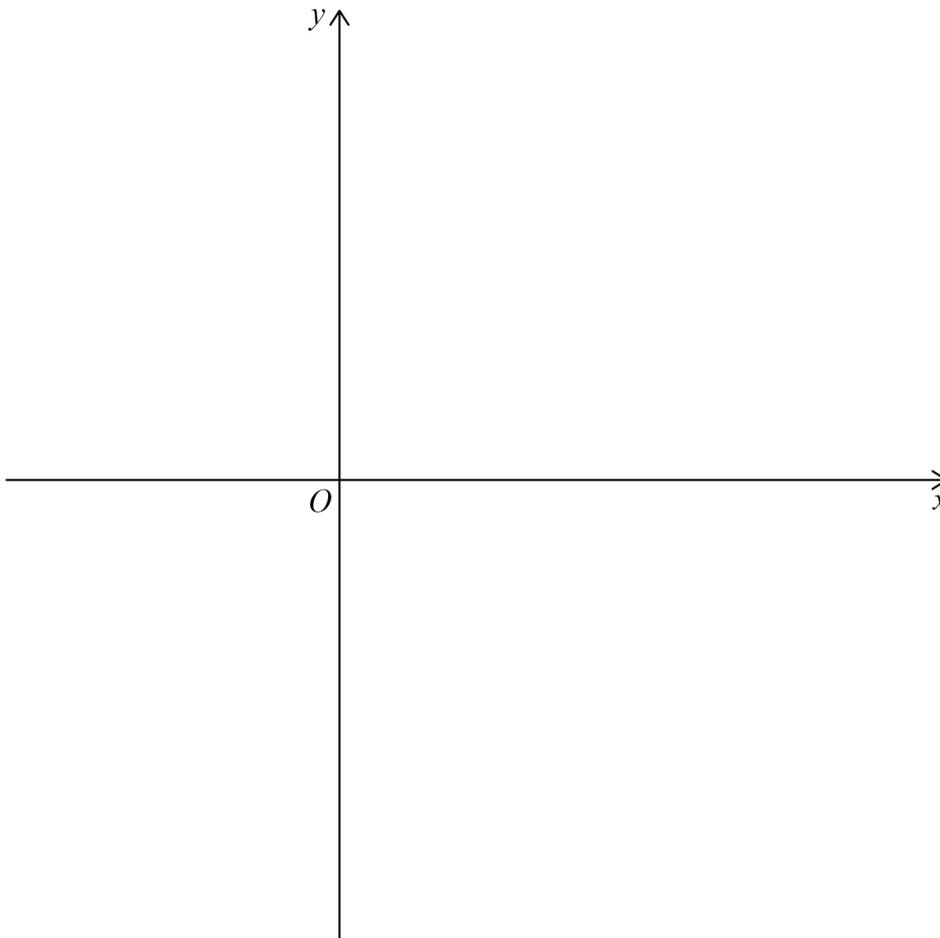
**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



- 6 (c) Sketch the graph of $y = f(x)$ on the axes below, showing the y -coordinates of any stationary points.

[You do **not** need to find the x -coordinates of any stationary points.]

[4 marks]



12

Turn over for the next question

Turn over ►



7 (c) Hence prove that if n is a positive integer, $n^4 + (n+1)^4 - 1$ is a multiple of 16

[2 marks]

9

Turn over for the next question

Turn over ►



- 8 The circle C is the locus of points on an Argand diagram such that

$$|z + 3 + 4i| = 5$$

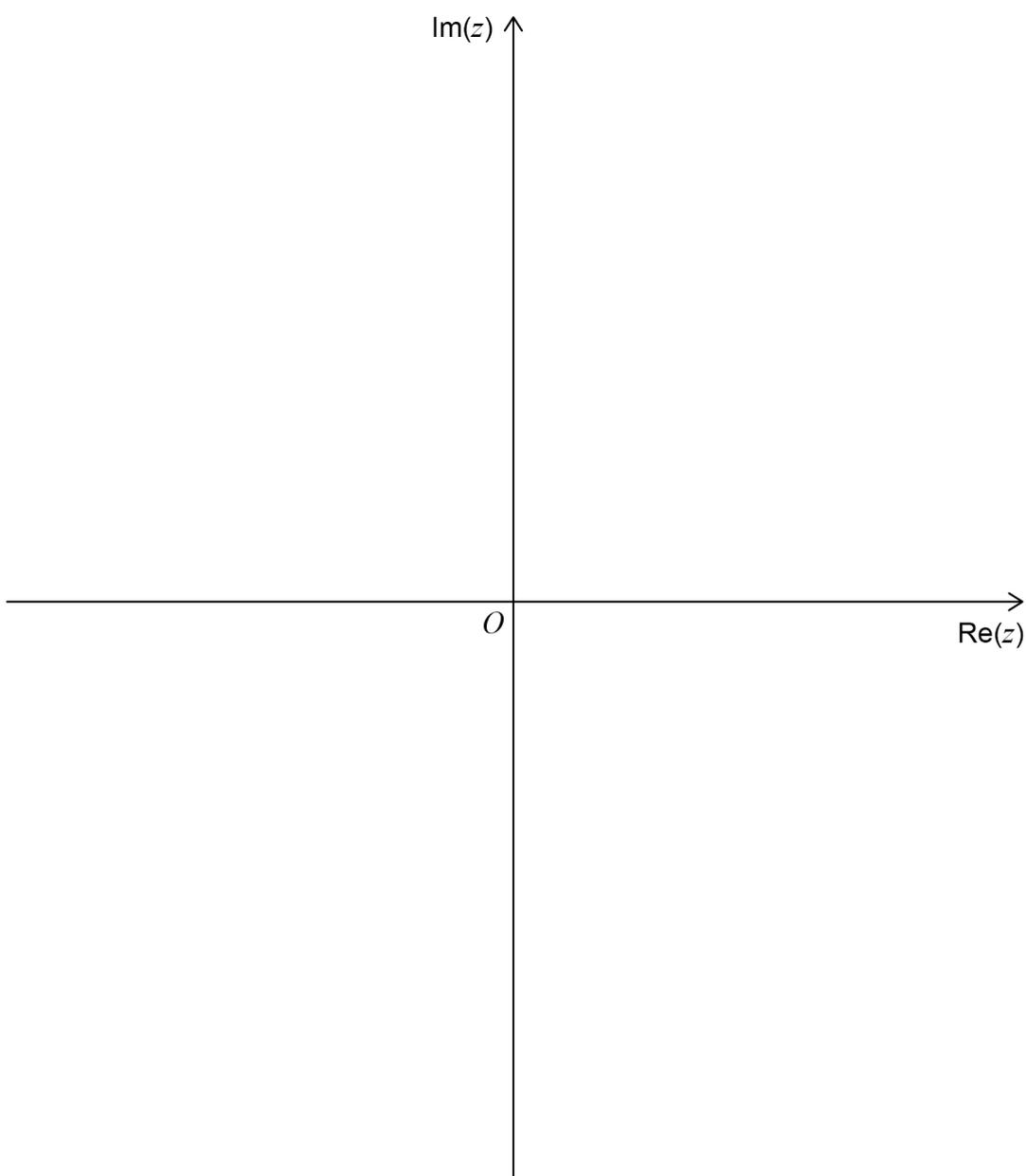
The half-line L is the locus of points on an Argand diagram such that

$$\arg(z + 10i) = \alpha, \quad \text{where } 0 < \alpha < \frac{\pi}{2}$$

L is a tangent to C .

- 8 (a) Draw L and C on the Argand diagram.

[4 marks]



9 The rectangular hyperbola H has equation $xy = 8$

The parabola P has equation $y^2 = 8x$

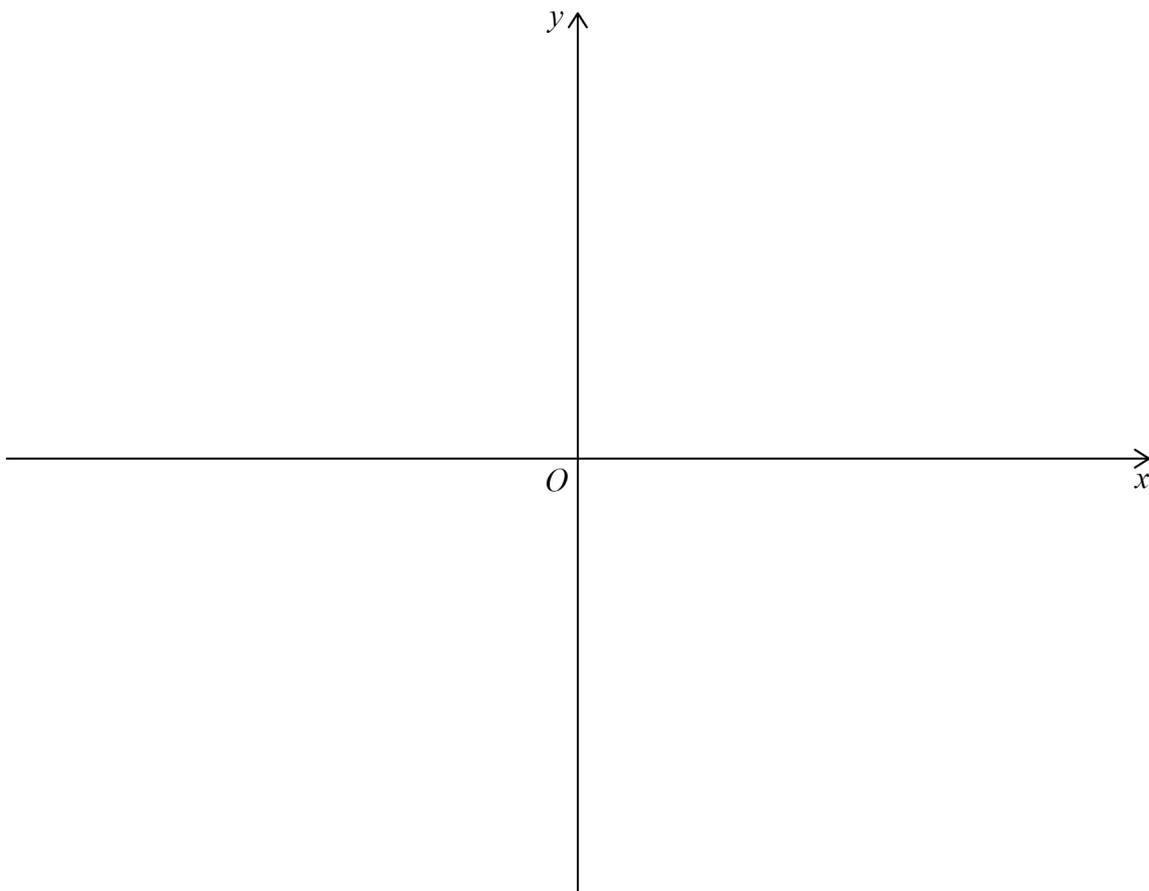
9 (a) Find the coordinates of the point of intersection of H and P .

[2 marks]

Answer _____

9 (b) Sketch the graphs of H and P on the axes below.

[2 marks]



There are no questions printed on this page

*Do not write
outside the
box*

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



There are no questions printed on this page

*Do not write
outside the
box*

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

Copyright information

For confidentiality purposes, all acknowledgements of third-party copyright material are published in a separate booklet. This booklet is published after each live examination series and is available for free download from www.oxfordaqaxams.org.uk

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders may have been unsuccessful and Oxford International AQA Examinations will be happy to rectify any omissions of acknowledgements. If you have any queries please contact the Copyright Team.

Copyright © 2020 Oxford International AQA Examinations and its licensors. All rights reserved.



2 4



2 0 1 X F M 0 1

IB/G/Jan20/FM01