

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Education
Advanced Subsidiary Examination
June 2011

Mathematics

MFP1

Unit Further Pure 1

Friday 20 May 2011 1.30 pm to 3.00 pm

For this paper you must have:

- the blue AQA booklet of formulae and statistical tables.

You may use a graphics calculator.

Time allowed

- 1 hour 30 minutes

- 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.
 - Write the question part reference (eg (a), (b)(i) etc) in the left-hand margin.
 - You must answer the questions in the spaces provided. Do not write outside the box around each page.
 - Show all necessary working; otherwise marks for method may be lost.
 - Do all rough work in this book. Cross through any work that you do not want to be marked.

- Information**
- The marks for questions are shown in brackets.
 - The maximum mark for this paper is 75.

- Advice**
- Unless stated otherwise, you may quote formulae, without proof, from the booklet.

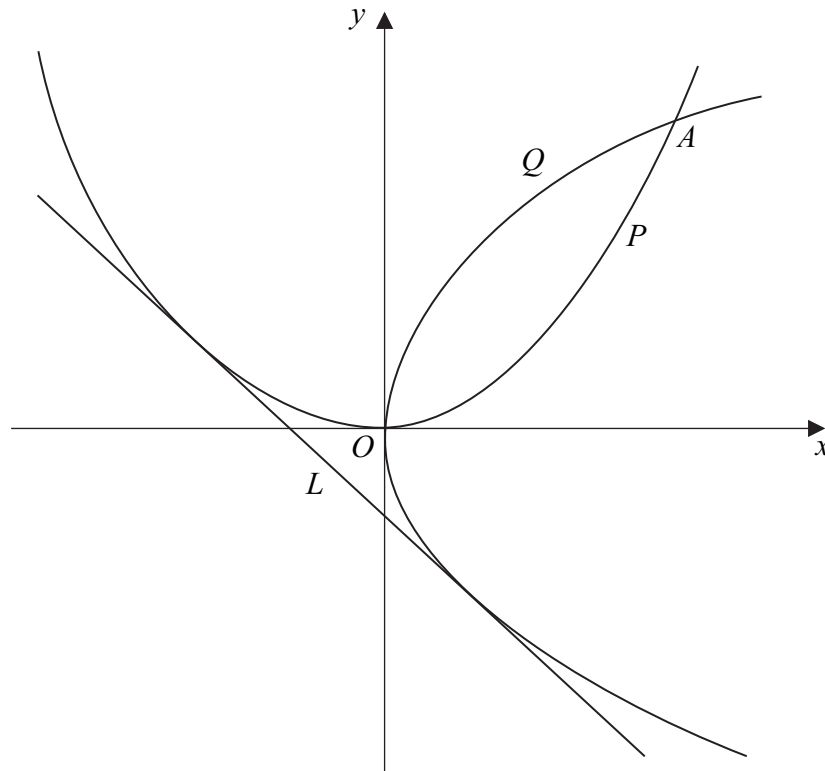
For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	



- 9 The diagram shows a parabola P which has equation $y = \frac{1}{8}x^2$, and another parabola Q which is the image of P under a reflection in the line $y = x$.

The parabolas P and Q intersect at the origin and again at a point A .

The line L is a tangent to both P and Q .



- (a) (i) Find the coordinates of the point A . (2 marks)
- (ii) Write down an equation for Q . (1 mark)
- (iii) Give a reason why the gradient of L must be -1 . (1 mark)
- (b) (i) Given that the line $y = -x + c$ intersects the parabola P at two distinct points, show that
- $$c > -2 \quad \text{(3 marks)}$$
- (ii) Find the coordinates of the points at which the line L touches the parabolas P and Q .
(No credit will be given for solutions based on differentiation.) (4 marks)



QUESTION
PART
REFERENCE

Area with horizontal dotted lines for writing answers.

END OF QUESTIONS

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