

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Education
Advanced Subsidiary Examination
June 2009

Mathematics

MPC2

Unit Pure Core 2

Specimen paper for examinations in June 2010 onwards

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 space 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	

QUESTION
PART
REFERENCE

Turn over ►



0 3

- | QUESTION | PART | REFERENCE |
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QUESTION
PART
REFERENCE

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0 5



QUESTION
PART
REFERENCE

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4 (a) Use the trapezium rule with four ordinates (three strips) to find an approximate value for $\int_0^6 \sqrt{x^3 + 1} \, dx$, giving your answer to four significant figures. (4 marks)

(b) The curve with equation $y = \sqrt{x^3 + 1}$ is stretched parallel to the x -axis with scale factor $\frac{1}{2}$ to give the curve with equation $y = f(x)$. Write down an expression for $f(x)$. (2 marks)

QUESTION
PART
REFERENCE

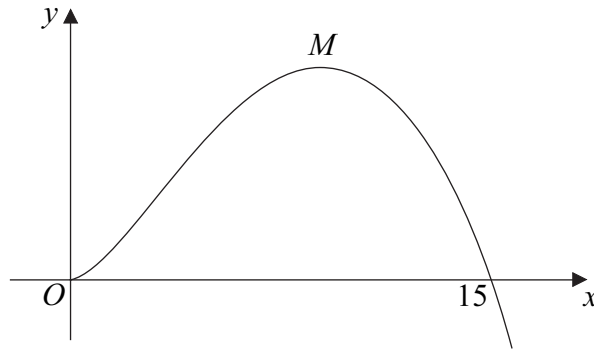


QUESTION
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Turn over ►



- 5** The diagram shows part of a curve with a maximum point M .



The equation of the curve is

$$y = 15x^{\frac{3}{2}} - x^{\frac{5}{2}}$$

- (a) Find $\frac{dy}{dx}$. (3 marks)
- (b) Hence find the coordinates of the maximum point M . (4 marks)
- (c) The point $P(1, 14)$ lies on the curve. Show that the equation of the tangent to the curve at P is $y = 20x - 6$. (3 marks)
- (d) The tangents to the curve at the points P and M intersect at the point R . Find the length of RM . (3 marks)

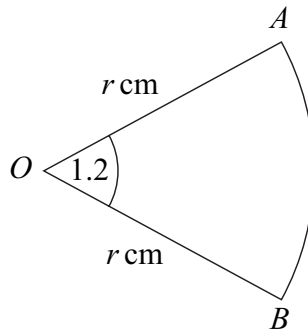
QUESTION
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6

The diagram shows a sector OAB of a circle with centre O and radius r cm.



The angle AOB is 1.2 radians. The area of the sector is 33.75 cm^2 .

Find the perimeter of the sector.

(6 marks)

QUESTION
PART
REFERENCE



[illegible]

7 A geometric series has second term 375 and fifth term 81.

(a) (i) Show that the common ratio of the series is 0.6. (3 marks)

(ii) Find the first term of the series. (2 marks)

(b) Find the sum to infinity of the series. (2 marks)

(c) The n th term of the series is u_n . Find the value of $\sum_{n=6}^{\infty} u_n$. (4 marks)

QUESTION
PART
REFERENCE



[illegible]

(b) (i) Use an appropriate identity to show that the equation

can be written as

(ii) Hence solve the equation

giving all solutions in the interval $0^\circ \leq x \leq 360^\circ$. (5 marks)

QUESTION	PART	REFERENCE
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- Express x in terms of a , giving your answer in a form not involving logarithms.
- (4 marks)*

[illegible]

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There are no questions printed on this page

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

