

Please check the examination details below before entering your candidate information

Candidate surname	Other names
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**Pearson Edexcel**  
International  
Advanced Level

Centre Number

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Candidate Number

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Sample Assessment Materials for first teaching September 2018

(Time: 1 hour 30 minutes)

Paper Reference **WMA12/01**

**Mathematics**

**International Advanced Subsidiary/Advanced Level**  
**Pure Mathematics P2**

**You must have:**

Mathematical Formulae and Statistical Tables, calculator

Total Marks

**Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.**

### Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Inexact answers should be given to three significant figures unless otherwise stated.

### Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 9 questions in this question paper. The total mark for this paper is 75.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over ►

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$$f(x) = x^4 + x^3 + 2x^2 + ax + b,$$

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(2)

(5)

(b) Find the value of  $a$  and the value of  $b$

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**(Total for Question 1 is 7 marks)****Q1**

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- (c) Find the smallest value of  $N$ , for which  $S_\infty - S_N < 0.5$

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**3.**

$$y = \sqrt{(3^x + x)}$$

- (a) Complete the table below, giving the values of  $y$  to 3 decimal places.

$x$	0	0.25	0.5	0.75	1
$y$	1	1.251			2

(2)

- (b) Use the trapezium rule with all the values of  $y$  from your table to find an approximation for the value of

$$\int_0^1 \sqrt{(3^x + x)} \, dx$$

You must show clearly how you obtained your answer.

(4)

- (c) Explain how the trapezium rule could be used to obtain a more accurate estimate for the value of

$$\int_0^1 \sqrt{(3^x + x)} \, dx$$

(1)

[illegible]



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4. Given  $n \in \mathbb{N}$ , prove, by exhaustion, that  $n^2 + 2$  is not divisible by 4.

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Q5

**(Total for Question 5 is 11 marks)**





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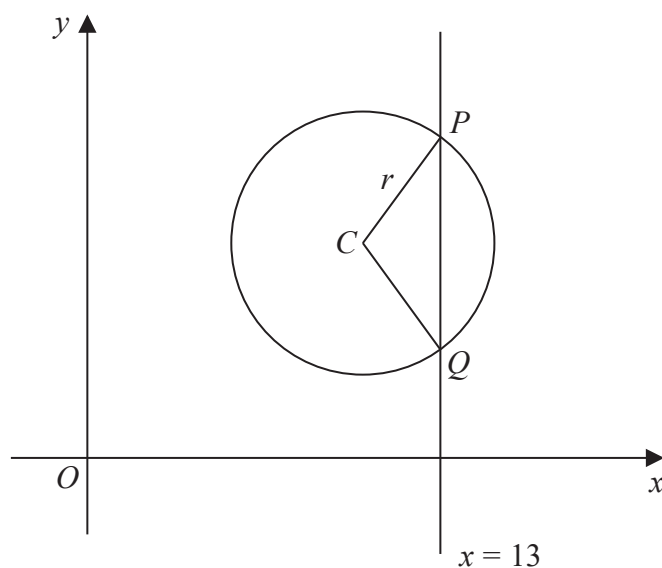
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Q6

**(Total for Question 6 is 7 marks)**

7.

**Figure 1**

The circle with equation

$$x^2 + y^2 - 20x - 16y + 139 = 0$$

had centre  $C$  and radius  $r$ .

(a) Find the coordinates of  $C$ .

**(2)**

(b) Show that  $r = 5$

**(2)**

The line with equation  $x = 13$  crosses the circle at the points  $P$  and  $Q$  as shown in Figure 1.

(c) Find the  $y$  coordinate of  $P$  and the  $y$  coordinate of  $Q$ .

**(3)**

A tangent to the circle from  $O$  touches the circle at point  $X$ .

(d) Find, in surd form, the length  $OX$ .

**(3)**


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8.

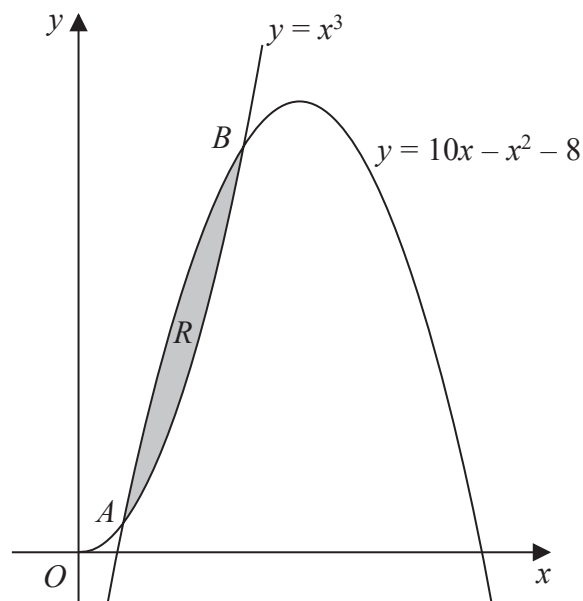
**Figure 2**

Figure 2 shows a sketch of part of the curves  $C_1$  and  $C_2$  with equations

$$C_1: y = 10x - x^2 - 8 \quad x > 0$$

$$C_2: y = x^3 \quad x > 0$$

The curves  $C_1$  and  $C_2$  intersect at the points  $A$  and  $B$ .

(a) Verify that the point  $A$  has coordinates  $(1, 1)$  (1)

(b) Use algebra to find the coordinates of the point  $B$  (6)

The finite region  $R$  is bounded by  $C_1$  and  $C_2$

(c) Use calculus to find the exact area of  $R$  (5)

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Q8

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9. (i) Solve, for  $0 \leq \theta < \pi$ , the equation

$$\sin 3\theta - \sqrt{3}\cos 3\theta = 0$$

giving your answers in terms of  $\pi$

(3)

- (ii) Given that

$$4\sin^2 x + \cos x = 4 - k, \quad 0 \leq k \leq 3$$

- (a) find  $\cos x$  in terms of  $k$

(3)

- (b) When  $k = 3$ , find the values of  $x$  in the range  $0 \leq x < 360^\circ$

(3)

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