

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--	--

Wednesday 10 October 2018

Morning (Time: 2 hours 30 minutes)

Paper Reference **WMA01/01**

Core Mathematics C12

Advanced Subsidiary

You must have:

Mathematical Formulae and Statistical Tables (Blue)

Total Marks

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. 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). Coloured pencils and highlighter pens must not be used.
- **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.
- When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information

- The total mark for this paper is 125.
- 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.

Turn over ►

P54941A

©2018 Pearson Education Ltd.

1/1/1



Pearson

Leave
blank

Question 5 continued

DO NOT WRITE IN THIS AREA

Q5

(Total 6 marks)



Leave
blank

6. (a) Sketch the graph of $y = \left(\frac{1}{2}\right)^x$, $x \in \mathbb{R}$, showing the coordinates of the point at which the graph crosses the y-axis.

(2)

The table below gives corresponding values of x and y , for $y = \left(\frac{1}{2}\right)^x$

The values of y are rounded to 3 decimal places.

x	-0.9	-0.8	-0.7	-0.6	-0.5
y	1.866	1.741	1.625	1.516	1.414

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

$$\int_{-0.9}^{-0.5} \left(\frac{1}{2}\right)^x dx$$

(3)



Leave blank

8.

$$f(x) = 2x^3 - 3x^2 + px + q$$

where p and q are constants.

When $f(x)$ is divided by $(x - 1)$, the remainder is -6

(a) Use the remainder theorem to show that $p + q = -5$

(2)

Given also that $(x + 2)$ is a factor of $f(x)$,

(b) find the value of p and the value of q .

(3)

(c) Factorise $f(x)$ completely.

(4)



DO NOT WRITE IN THIS AREA

Leave blank

10.

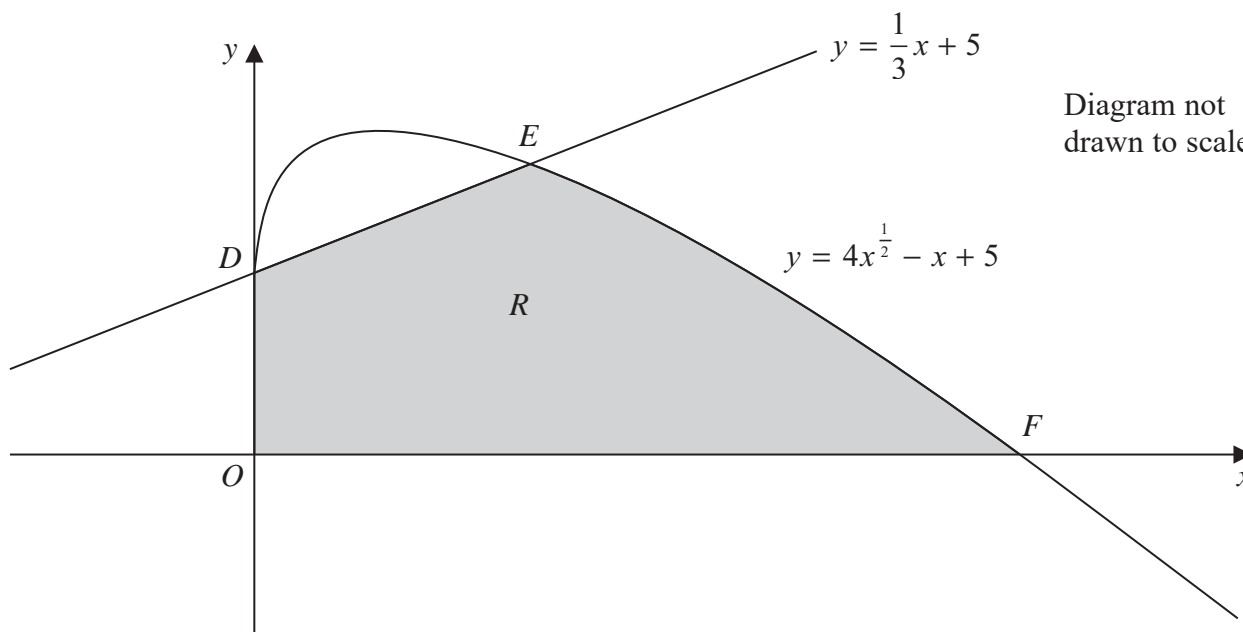


Figure 1

The finite region R , which is shown shaded in Figure 1, is bounded by the coordinate axes, the straight line l with equation $y = \frac{1}{3}x + 5$ and the curve C with equation $y = 4x^{\frac{1}{2}} - x + 5, x \geq 0$

The line l meets the curve C at the point D on the y -axis and at the point E , as shown in Figure 1.

- (a) Use algebra to find the coordinates of the points D and E . (4)

The curve C crosses the x -axis at the point F .

- (b) Verify that the x coordinate of F is 25 (1)

- (c) Use algebraic integration to find the exact area of the shaded region R . (6)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Leave blank

11. The equation $7x^2 + 2kx + k^2 = k + 7$, where k is a constant, has two distinct real roots.

(a) Show that k satisfies the inequality

$$6k^2 - 7k - 49 < 0$$
 (4)

(b) Find the range of possible values for k . (4)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA



Leave blank

12. (a) Show that the equation

$$6 \cos x - 5 \tan x = 0$$

may be expressed in the form

$$6 \sin^2 x + 5 \sin x - 6 = 0$$

(3)

(b) Hence solve for $0 \leq \theta < 360^\circ$

$$6 \cos(2\theta - 10^\circ) - 5 \tan(2\theta - 10^\circ) = 0$$

giving your answers to one decimal place.

(Solutions based entirely on graphical or numerical methods are not acceptable.)

(5)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA



Leave blank

13. (i) Find the value of x for which

$$4^{3x+2} = 3^{600}$$

giving your answer to 4 significant figures.

(3)

(ii) Given that

$$\log_a (3b - 2) - 2\log_a 5 = 4, \quad a > 0, a \neq 1, b > \frac{2}{3}$$

find an expression for b in terms of a .

(4)



DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Leave blank

14. The circle C has equation

$$x^2 + y^2 + 16y + k = 0$$

where k is a constant.

(a) Find the coordinates of the centre of C .

(2)

Given that the radius of C is 10

(b) find the value of k .

(2)

The point $A(a, -16)$, where $a > 0$, lies on the circle C . The tangent to C at the point A crosses the x -axis at the point D and crosses the y -axis at the point E .

(c) Find the exact area of triangle ODE .

(7)

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

Leave blank

Question 14 continued

Lined writing area for the answer.



DO NOT WRITE IN THIS AREA

Question 14 continued

Leave
blank

Q14

(Total 11 marks)



15.

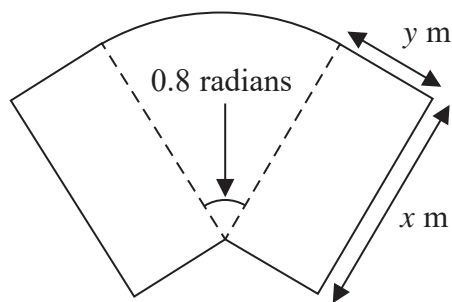


Figure 2

Figure 2 shows a plan for a garden.

The garden consists of two identical rectangles of width y m and length x m, joined to a sector of a circle with radius x m and angle 0.8 radians, as shown in Figure 2.

The area of the garden is 60 m^2 .

(a) Show that the perimeter, P m, of the garden is given by

$$P = 2x + \frac{120}{x} \tag{5}$$

(b) Use calculus to find the exact minimum value for P , giving your answer in the form $a\sqrt{b}$, where a and b are integers. (4)

(c) Justify that the value of P found in part (b) is the minimum. (2)



DO NOT WRITE IN THIS AREA

