**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 | Candidate Number
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Sample Assessment Materials for first teaching September 2018

(Time: 1 hour 30 minutes) | Paper Reference **WMA11/01**
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# Mathematics
**International Advanced Subsidiary/Advanced Level
Pure Mathematics P1**

**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 10 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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**Answer ALL questions. Write your answers in the spaces provided.**

1. Given that $y = 4x^3 - \dfrac{5}{x^2}$, $x \neq 0$, find in their simplest form

    (a) $\dfrac{dy}{dx}$,

    **(3)**

    (b) $\displaystyle\int y \, dx$

    **(3)**

Leave blank

**Question 1 continued**

**(Total for Question 1 is 6 marks)**

Q1

Leave blank

**2.** (a) Given that $3^{-1.5} = a\sqrt{3}$ find the exact value of $a$

(2)

(b) Simplify fully $\dfrac{(2x^{\frac{1}{2}})^3}{4x^2}$

(3)

Leave blank

**Question 2 continued**

**(Total for Question 2 is 5 marks)**

Q2

Leave
blank

**3.** Solve the simultaneous equations

$$y + 4x + 1 = 0$$

$$y^2 + 5x^2 + 2x = 0$$

**(6)**

Leave blank

**Question 3 continued**

**Q3**

**(Total for Question 3 is 6 marks)**

Leave blank

4. The straight line with equation $y = 4x + c$, where $c$ is a constant, is a tangent to the curve with equation $y = 2x^2 + 8x + 3$

Calculate the value of $c$

**(5)**

Leave
blank

**Question 4 continued**

Q4

**(Total for Question 4 is 5 marks)**

Leave blank

**5.** (a) On the same axes, sketch the graphs of $y = x + 2$ and $y = x^2 - x - 6$ showing the coordinates of all points at which each graph crosses the coordinate axes.

**(4)**

(b) On your sketch, show, by shading, the region $R$ defined by the inequalities

$$y < x + 2 \quad \textbf{and} \quad y > x^2 - x - 6$$

**(1)**

(c) Hence, or otherwise, find the set of values of $x$ for which $x^2 - 2x - 8 < 0$

**(3)**

**Question 5 continued**

Q5

**(Total for Question 5 is 8 marks)**
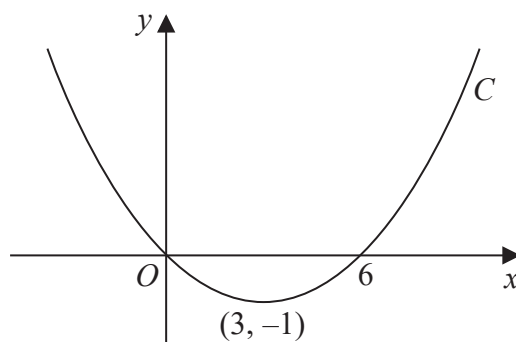
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**6.**



**Figure 1**

Figure 1 shows a sketch of the curve $C$ with equation $y = f(x)$

The curve $C$ passes through the origin and through $(6, 0)$

The curve $C$ has a minimum at the point $(3, -1)$

On separate diagrams, sketch the curve with equation

(a) $y = f(2x)$

**(3)**

(b) $y = f(x + p)$, where $p$ is a constant and $0 < p < 3$

**(4)**

On each diagram show the coordinates of any points where the curve intersects the $x$-axis and of any minimum or maximum points.

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**Question 6 continued**

Q6

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

Leave blank

7. A curve with equation $y = f(x)$ passes through the point $(4, 25)$

Given that

$$f'(x) = \frac{3}{8}x^2 - 10x^{-\frac{1}{2}} + 1, \qquad x > 0$$

find $f(x)$, simplifying each term.

(5)

Leave blank

**Question 7 continued**

Q7

**(Total for Question 7 is 5 marks)**

Leave blank

**8.**



**Figure 2**

The line $l_1$, shown in Figure 2 has equation $2x + 3y = 26$

The line $l_2$ passes through the origin $O$ and is perpendicular to $l_1$

(a)  Find an equation for the line $l_2$

**(4)**

The line $l_2$ intersects the line $l_1$ at the point $C$.  Line $l_1$ crosses the $y$-axis at the point $B$ as shown in Figure 2.

(b)  Find the area of triangle $OBC$.  Give your answer in the form $\dfrac{a}{b}$, where $a$ and $b$ are integers to be found.

**(6)**

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**Question 8 continued**

**Question 8 continued**

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**Question 8 continued**

**(Total for Question 8 is 10 marks)**

Q8

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**Question 9 continued**

**Question 9 continued**

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**Q9**

**(Total for Question 9 is 11 marks)**

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**10.**
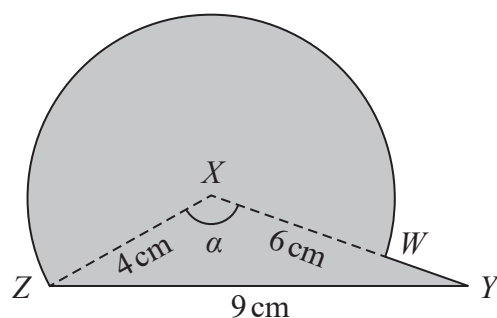


**Figure 4**

The triangle *XYZ* in Figure 4 has *XY* = 6 cm, *YZ* = 9 cm, *ZX* = 4 cm and angle *ZXY* = *α*.

The point *W* lies on the line *XY*.

The circular arc *ZW*, in Figure 4, is a major arc of the circle with centre *X* and radius 4 cm.

(a) Show that, to 3 significant figures, $\alpha = 2.22$ radians.

**(2)**

(b) Find the area, in cm$^2$, of the major sector *XZWX*.

**(3)**

The region, shown shaded in Figure 4, is to be used as a design for a logo.

Calculate

(c) the area of the logo

**(3)**

(d) the perimeter of the logo.

**(4)**

Leave
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**Question 10 continued**

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**Question 10 continued**

**Question 10 continued**

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**Q10**

**(Total for Question 10 is 12 marks)**

**TOTAL FOR PAPER IS 75 MARKS**