Please check the examination details below before entering your candidate information

| Candidate surname | Other names |
|---|---|
| | |

**Pearson Edexcel**
**International Advanced Level**

Centre Number | | | | | |

Candidate Number | | | | |

Sample Assessment Materials for first teaching September 2018

(Time: 1 hour 30 minutes) | Paper Reference **WMA11/01**

# 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 $y = 4x^3 - \frac{5}{x^2}$, $x \neq 0$, find in their simplest form

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

**(3)**

(b) $\int y \, dx$

**(3)**

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**Question 1 continued**

**Q1**

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

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**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)**

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**Question 2 continued**

**Q2**

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

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**3.** Solve the simultaneous equations

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

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

**(6)**

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**Question 3 continued**

**Q3**

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

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**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)**

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**Question 4 continued**

**Q4**

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

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**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)**

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**Question 5 continued**

**Q5**

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

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**6.**

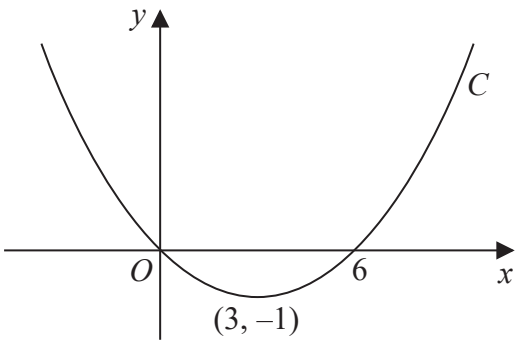


**Figure 1**

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)**

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**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)**

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**Question 7 continued**

**Q7**

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**8.**

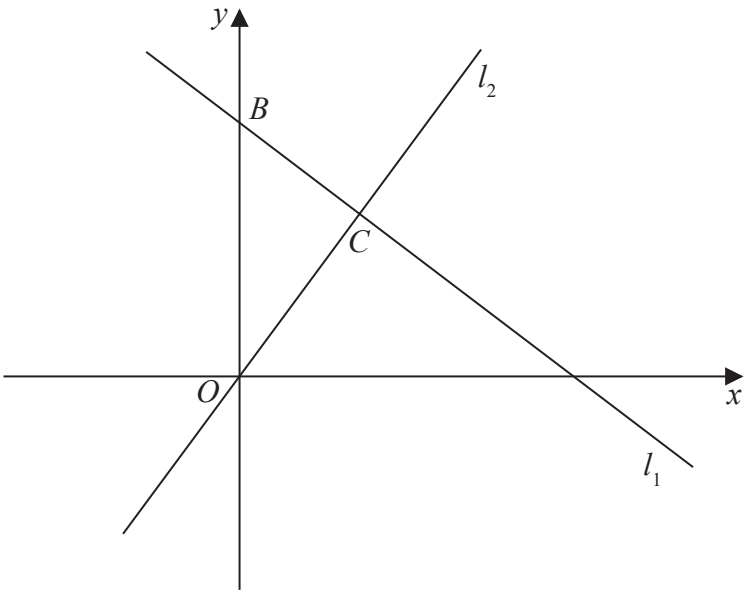


**Figure 2**

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 $\frac{a}{b}$, where $a$ and $b$ are integers to be found.

**(6)**

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**Question 8 continued**

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**Question 8 continued**

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**Question 8 continued**

**Q8**

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**9.**

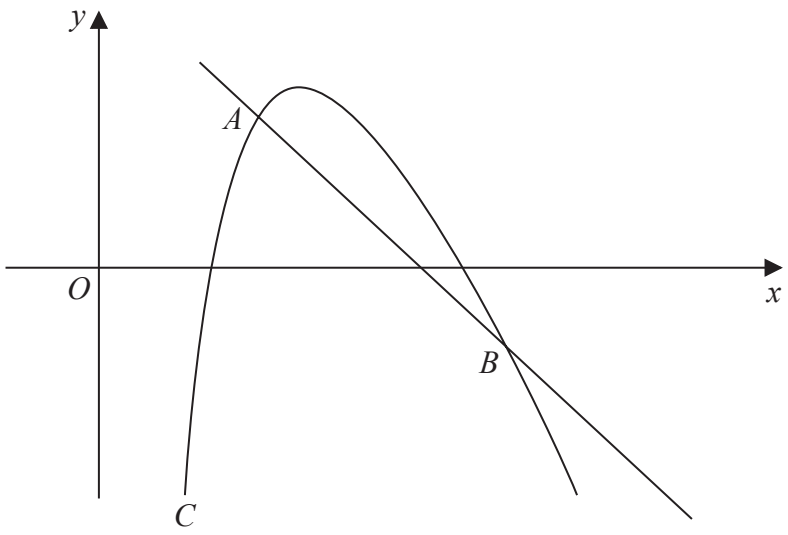


**Figure 3**

A sketch of part of the curve $C$ with equation

$$y = 20 - 4x - \frac{18}{x}, \qquad x > 0$$

is shown in Figure 3.

Point $A$ lies on $C$ and has $x$ coordinate equal to 2

(a) Show that the equation of the normal to $C$ at $A$ is $y = -2x + 7$.

**(6)**

The normal to $C$ at $A$ meets $C$ again at the point $B$, as shown in Figure 3.

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

**(5)**

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**Question 9 continued**

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**Question 9 continued**

**Q9**

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**10.**

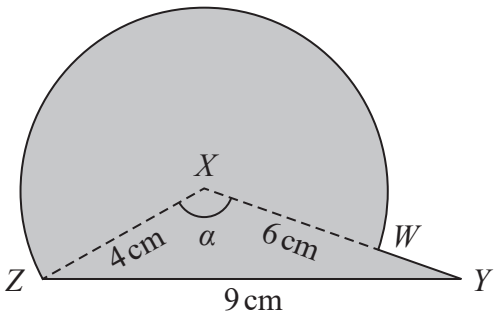


**Figure 4**

The triangle $XYZ$ in Figure 4 has $XY = 6$ cm, $YZ = 9$ cm, $ZX = 4$ cm and angle $ZXY = \alpha$.

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)**

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**Question 10 continued**

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**Question 10 continued**

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**Question 10 continued**

**Q10**

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

**TOTAL FOR PAPER IS 75 MARKS**

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