

Cambridge International AS & A Level

CANDIDATE NAME						
CENTRE NUMBER				CANDIDATE NUMBER		

MATHEMATICS 9709/11

Paper 1 Pure Mathematics 1

October/November 2022

1 hour 50 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

INSTRUCTIONS

- Answer all questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do not use an erasable pen or correction fluid.
- Do not write on any bar codes.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- You should use a calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.

INFORMATION

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [].

This document has 20 pages.

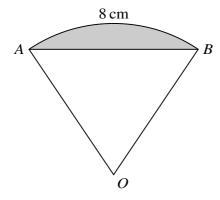
Solve the equation $3x + 2 = \frac{2}{x - 1}$.	[3

	$\operatorname{int} P(6, 4)$.	
(a)	Find the equation of the tangent to the curve at P .	[2
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(b)	Find the equation of the curve	
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F	Find the y -coordinate of P .
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Find the po	ossible values o	f the constan	t <i>p</i> .				
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(a)



The diagram shows a sector OAB of a circle with centre O. The length of the arc AB is 8 cm. It is given that the perimeter of the sector is 20 cm.

Find the perimeter of the shaded segment.	[4]

Find the area of the shaded segment.	[2
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6	(a)	Show	that	the	equation

$\sin \theta + \cos \theta - \sin \theta - \cos \theta$
may be expressed in the form $a \sin^2 \theta + b \sin \theta + c = 0$, where a , b and c are constants to be found.

Hence solve the equation	$\sin \theta + \cos \theta$	$+\frac{1}{\sin\theta-\cos\theta}$	$\frac{1}{\theta} = 1 \text{ for } 0^{\circ} \leqslant \theta \leqslant$	360°.	
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	first three impacts cause the post to sink into the ground by 50 mm, 40 mm and 32 mm respectively
(a)	Verify that the 9th impact is the first in which the post sinks less than 10 mm into the ground.
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Find $f'(x)$ and hence determine whether f is an increasing function, a decreasing function neither.

Express $f^{-1}(x)$ in the form $\frac{p}{a} - \frac{b}{cx - d}$, where a, b, c and d are integers.
Hence state the value of p for which $f^{-1}(x) \equiv f(x)$.

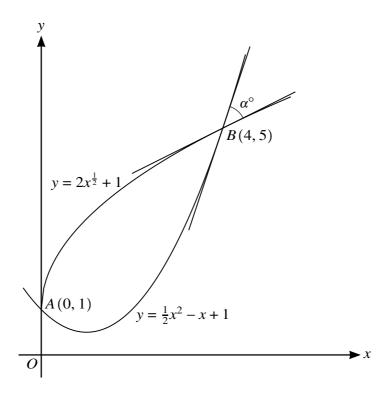
9 Functions f and g are both defined for $x \in \mathbb{R}$ and are given	en by
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$$f(x) = x^{2} - 4x + 9,$$

$$g(x) = 2x^{2} + 4x + 12.$$

	Express $f(x)$ in the form $(x-a)^2 + b$.	[1]
		•••••
(b)	Express $g(x)$ in the form $2[(x+c)^2+d]$.	[2]
		•••••

Express $g(x)$ in the form $kf(x + h)$, where k and h are integers.	
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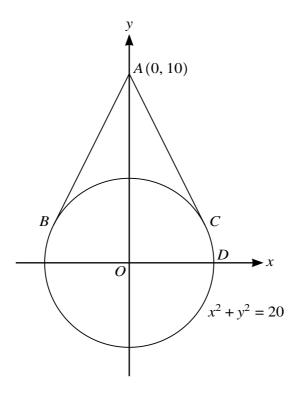


Curves with equations $y = 2x^{\frac{1}{2}} + 1$ and $y = \frac{1}{2}x^2 - x + 1$ intersect at A(0, 1) and B(4, 5), as shown in the diagram.

Find the area of the region between the two curves.	[5]

The acute angle between the two tangents at B is denoted by α° , and the scales on the axes are the same.

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The diagram shows the circle with equation $x^2 + y^2 = 20$. Tangents touching the circle at points B and C pass through the point A (0, 10).

By letting the equation of a tangent be $y = mx + 10$, find the two possible values of m. [4]

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point D is w	here the circle	e crosses the po	ositive <i>x</i> -axis.		•••••
			ositive <i>x</i> -axis.		•••••
	where the circle BDC in degree		ositive <i>x-</i> axis.		•••••
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Additional Page

If you use the following lined page to complete the answer(s) to any question(s), the question number(s) must be clearly shown.					
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