

Cambridge IGCSE[™]

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		



MATHEMATICS 0580/22

Paper 2 (Extended)

October/November 2023

1 hour 30 minutes

You must answer on the question paper.

You will need: Geometrical instruments

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.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- 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.
- For π , use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in brackets [].

This document has 12 pages.

(a) correct to 2 decimal places

г	1	٦	
 L	1	J	

(b) correct to the nearest 10.

2 Write down the number that is 9 greater than -23.

$$v = u + at$$

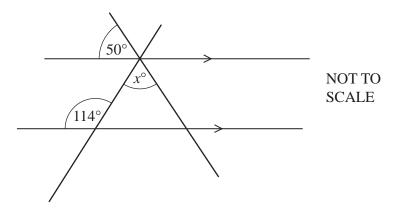
Find the value of v when u = 30, a = -2 and t = 7.

$$v =$$
 [2]

4 Change 62 000 millimetres into kilometres.

km [1												L		1]																	_			L																		Ĺ	1]		ĺ	ľ	1	1	r	ľ	1			Ś	K	ŀ]		•	•		•	•			•		•			•		•		•	•		•	•			•				•		•	•		•	•				•			•		•			•		•		•	•	•				•	•	•					•	•	•	•	•		•			•			
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5



The diagram shows two intersecting straight lines crossing two parallel lines.

Find the value of x.

$$x = \dots [2]$$

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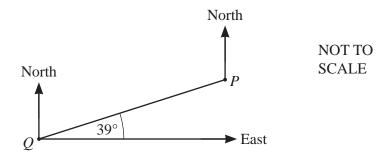
6 (a) Explain why 111 is not a prime number.

[1]

(b) Find a prime number between 110 and 120.

	Γ1
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7



Find the bearing of Q from P.

8 Without using a calculator, work out $3\frac{1}{8} - 1\frac{3}{4}$.

You must show all your working and give your answer as a mixed number in its simplest form.

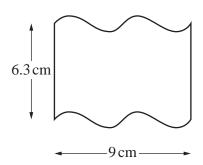
9	Write 90	as a	product	of its	prime	factors
	***************************************	us u	product	OI IUS	princ	ractors

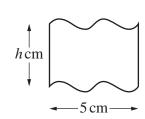
	[2]
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10 Expand and simplify.

$$2(t+w) + 3(w-t)$$

11





NOT TO SCALE

The two shapes are mathematically similar.

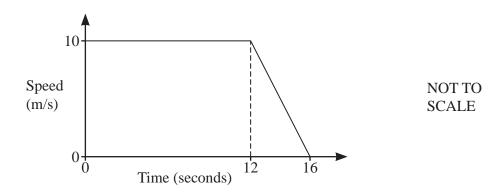
(a) Find the value of h.

$$h = \dots$$
 [2]

(b) The area of the smaller shape is $16 \, \text{cm}^2$.

Calculate the area of the larger shape.

12



The diagram shows a speed-time graph for 16 seconds of a car journey.

(a) Find the deceleration of the car in the final 4 seconds.

, 2	F 4 7
 m/s ²	[1]

(b) Find the total distance travelled during the 16 seconds.

13 (a)
$$3^{3p} \times 3^{2p} = 729$$

Find the value of p.

$$p = \dots$$
 [2]

(b) Simplify.

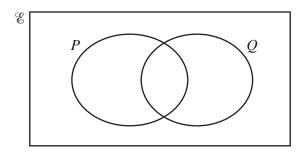
$$(32x^{10})^{\frac{1}{5}}$$

14
$$y = 2w^2 - x$$

Rearrange the formula to make w the subject.



15 (a) On the Venn diagram, shade the region $P \cup Q'$.



[1]

PMT

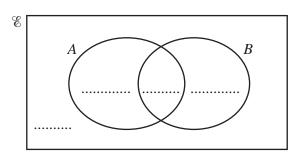
(b)
$$n(\mathscr{E}) = 20$$

$$n(A \cup B)' = 1$$

$$n(A) = 12$$

$$n(B) = 10$$

Complete the Venn diagram.



[2]

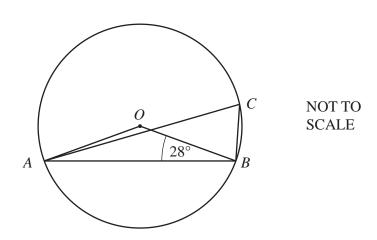
16 Find the lowest common multiple (LCM) of $12x^8$ and $8x^{12}$.

.....[2]

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7

17 (a)

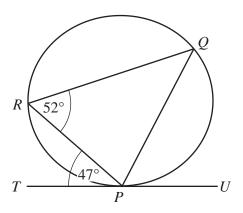


A, B and C are points on a circle, centre O. Angle $OBA = 28^{\circ}$.

Find angle *ACB*.



(b)



NOT TO SCALE

P, Q and R are points on a circle. TU is a tangent to the circle at P. Angle $TPR = 47^{\circ}$ and angle $PRQ = 52^{\circ}$.

Find angle RPQ.

Angle
$$RPQ = \dots$$
 [2]

18	A solid cylinde	r has radius	5 cm and	height 8 cm.
----	-----------------	--------------	----------	--------------

Calculate the total surface area of the cylinder.

								cm ²	[4]
19	Find the	nth ter	m of ea	ach sequ	ence.				
	(a)	11,	8,	5,	2,	-1,			
									[2]
	(b)	1,	5,	25,	125,	625,	•••		

.....[2]

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20	The area of a rectangle is 55.2 cm ² , correct to 1 decimal place. The length of the rectangle is 9 cm, correct to the nearest cm.
	Calculate the upper bound of the width of the rectangle.
	cm [3]
	2
21	The line $y = x + 1$ intersects the curve $y = x^2 + x - 3$ at two points.
	Find the coordinates of the two points.
	()
	() [4]

22	x is inversely proportional to the square root of w
	When $w = 16$, $x = 3$.

Find *x* in terms of *w*.

$$x = \dots$$
 [2]

23 Some students record their reaction times. The table shows the results.

Reaction time (t seconds)	0 < <i>t</i> ≤ 6	6 < <i>t</i> ≤ 10
Frequency	18	16

On a histogram, the height of the block for the $0 < t \le 6$ interval is 7.5 cm.

Calculate the height of the block for the $6 < t \le 10$ interval.

.....cm [2]

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24 Simplify. $\frac{ax-2a-x+2}{a^2-1}$

 [4]

25 The derivative of $2ax^7 + 3x^k$ is $42x^6 + 15x^{k-1}$.

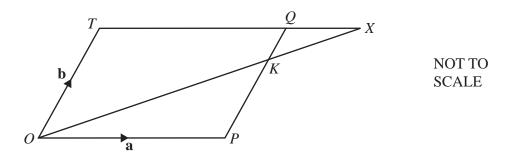
Find the value of a and the value of k.

$$a = \dots$$

$$k = \dots$$
 [2]

Question 26 is printed on the next page.

26



The diagram shows a parallelogram OPQT. The position vector of P is **a** and the position vector of T is **b**.

K is on *PQ* so that PK : KQ = 3 : 1. The lines *OK* and *TQ* are extended to meet at *X*.

Find the position vector of *X* in terms of **a** and **b**. Give your answer in its simplest form.

.....[3]

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