Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

9209948326

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.

1 Write 24.07839

(a) correct to 2 decimal places

..... [1]

(b) correct to the nearest 10.

..... [1]

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

..... [1]

3 $v = u + at$

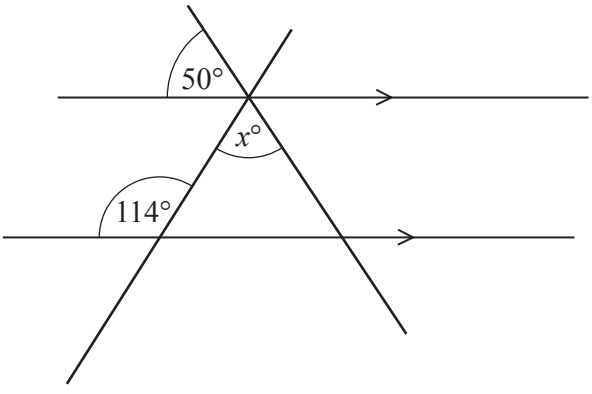
Find the value of v when $u = 30$, $a = -2$ and $t = 7$.

$v =$ ..... [2]

4 Change 62 000 millimetres into kilometres.

..... km [1]

5



NOT TO SCALE

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

Find the value of x.

$x =$ ..... [2]

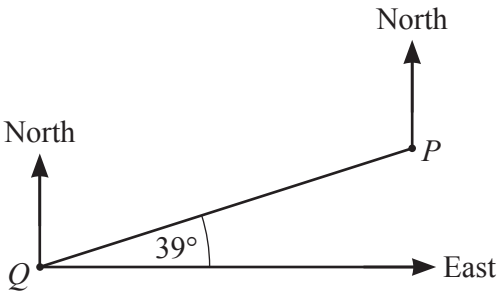
6 **(a)** Explain why 111 is not a prime number.

..... [1]

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

..... [1]

7



NOT TO SCALE

Find the bearing of Q from P.

..... [2]

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.

..... [3]

9 Write 90 as a product of its prime factors.

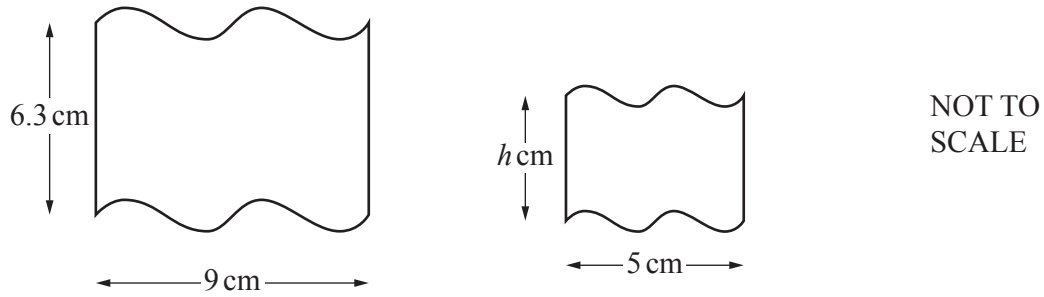
..... [2]

10 Expand and simplify.

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

..... [2]

11



The two shapes are mathematically similar.

(a) Find the value of h.

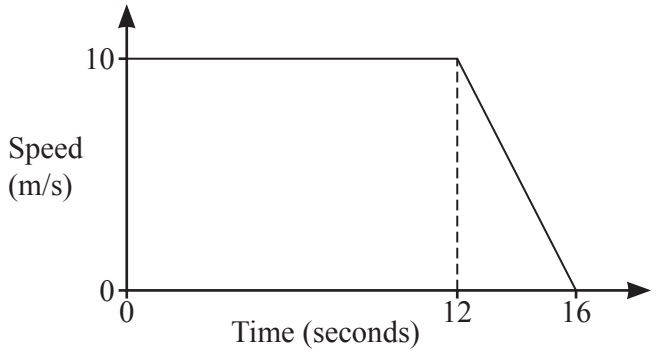
$h =$ ..... [2]

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

Calculate the area of the larger shape.

..... cm^2 [2]

12



NOT TO SCALE

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.

..... m/s^2 [1]

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

..... m [2]

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

Find the value of p.

$p =$ ..... [2]

(b) Simplify.

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

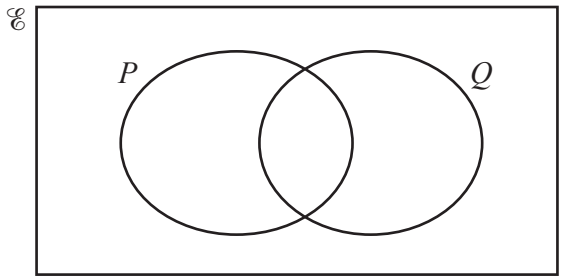
..... [2]

14 $y = 2w^2 - x$

Rearrange the formula to make w the subject.

$w =$ ..... [3]

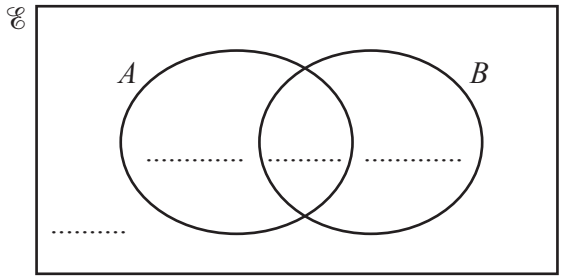
15 **(a)** On the Venn diagram, shade the region $P \cup Q'$.



[1]

(b) $n(\mathscr{E}) = 20$ $n(A \cup B)' = 1$ $n(A) = 12$ $n(B) = 10$

Complete the Venn diagram.

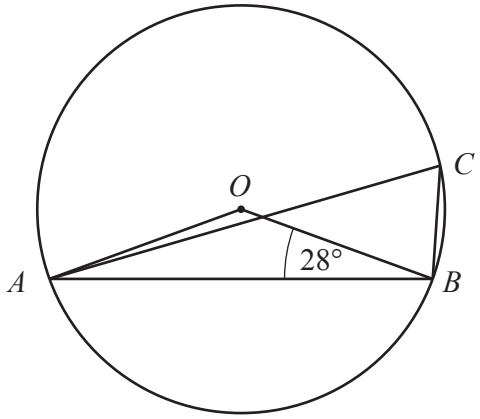


[2]

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

..... [2]

17 (a)



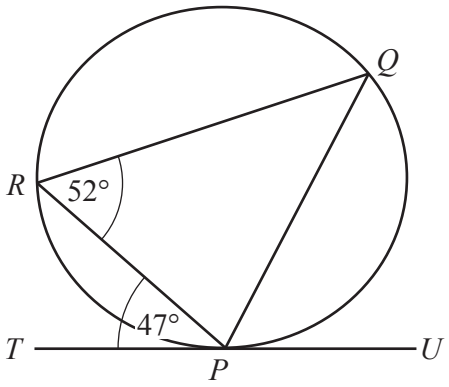
NOT TO SCALE

A, B and C are points on a circle, centre O.
Angle $OBA = 28°$.

Find angle ACB.

Angle $ACB =$ ..... [2]

(b)



NOT TO SCALE

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

Find angle RPQ.

Angle $RPQ =$ ..... [2]

18 A solid cylinder has radius 5 cm and height 8 cm.

Calculate the total surface area of the cylinder.

..... cm^2 [4]

19 Find the nth term of each sequence.

(a) 11, 8, 5, 2, −1, …

..... [2]

(b) 1, 5, 25, 125, 625, …

..... [2]

20 The area of a rectangle is $55.2\,\text{cm}^2$, 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]

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.

$x =$ ..... [2]

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

Reaction time (t seconds)	$0 < t \leqslant 6$	$6 < t \leqslant 10$
Frequency	18	16

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

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

..... cm [2]

24 Simplify.

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

..... [4]

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

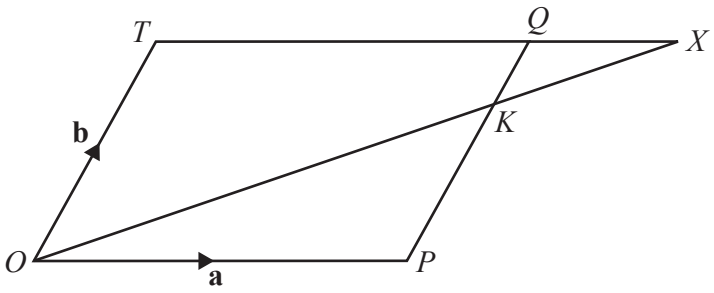
Find the value of a and the value of k.

$a =$ .....

$k =$ ..... [2]

Question 26 is printed on the next page.

26



NOT TO SCALE

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]