Cambridge Assessment International Education

# Cambridge IGCSE™

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**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 $\pi$, 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.

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**1** Write 24.07839

**(a)** correct to 2 decimal places

View solution

..... [1]

**(b)** correct to the nearest 10.

View solution

..... [1]

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

View solution

..... [1]

**3** $v = u + at$

View solution

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

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

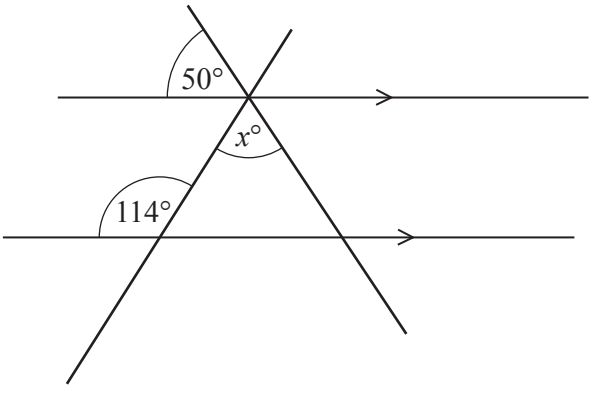
**4** Change 62 000 millimetres into kilometres.

View solution

..... km [1]

**5**

View solution




NOT TO SCALE

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

Find the value of $x$.

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

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

View solution

..... [1]

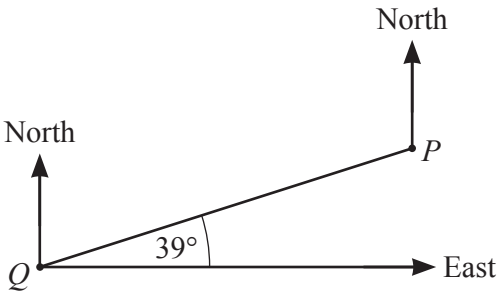
**(b)** Find a prime number between 110 and 120.

View solution

..... [1]

**7**

View solution




NOT TO SCALE

Find the bearing of $Q$ from $P$.

..... [2]

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

View solution

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.

View solution

..... [2]

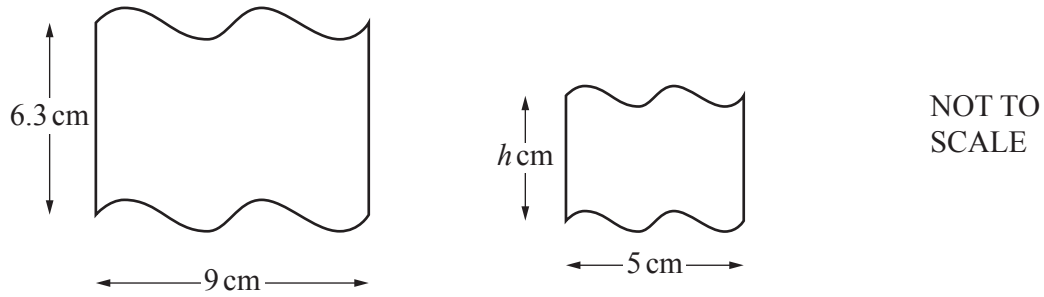
**10** Expand and simplify.

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

View solution

..... [2]

**11**




The two shapes are mathematically similar.

**(a)** Find the value of $h$.

View solution

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

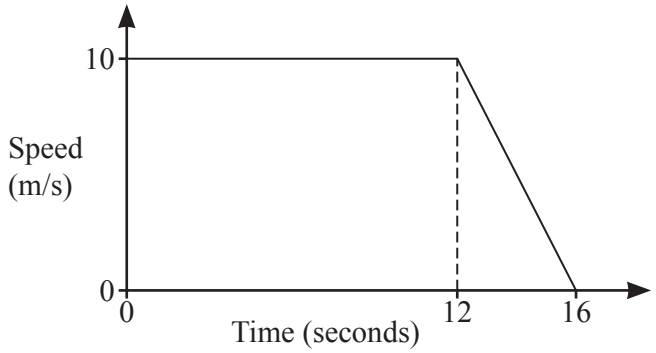
**(b)** The area of the smaller shape is $16\,\text{cm}^2$.

Calculate the area of the larger shape.

View solution

..... $\text{cm}^2$ [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.

View solution

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

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

View solution

..... m [2]

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

View solution

Find the value of $p$.

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

**(b)** Simplify.

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

View solution

..... [2]

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

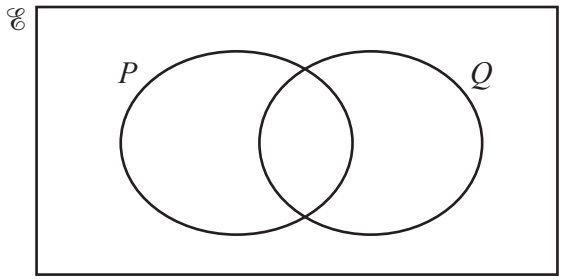
Rearrange the formula to make $w$ the subject.

View solution

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

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

View solution

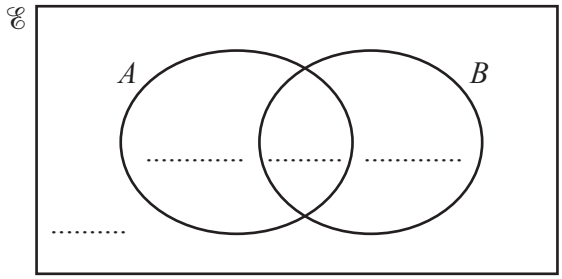



[1]

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

View solution

Complete the Venn diagram.




[2]

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

View solution

..... [2]

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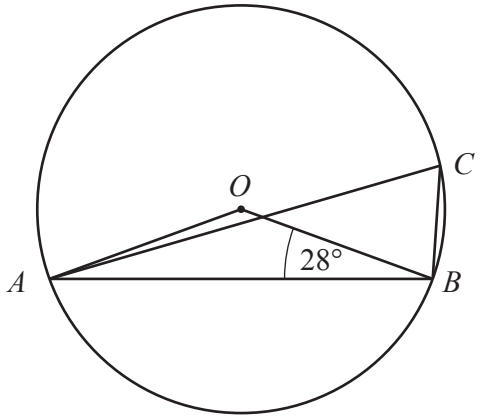
**17 (a)**

View solution




NOT TO SCALE

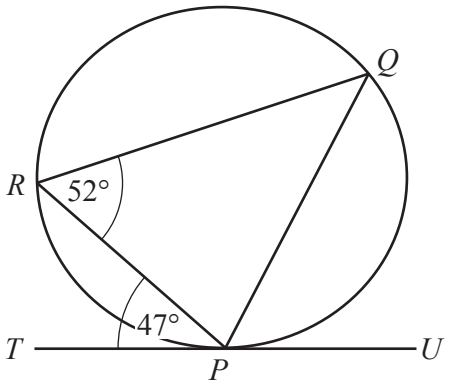
$A$, $B$ and $C$ are points on a circle, centre $O$.
Angle $OBA = 28°$.

Find angle $ACB$.

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

**(b)**

View solution




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]

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

Calculate the total surface area of the cylinder.

View solution

..... $cm^2$ [4]

**19** Find the $n$th term of each sequence.

**(a)** 11, 8, 5, 2, −1, …

View solution

..... [2]

**(b)** 1, 5, 25, 125, 625, …

View solution

..... [2]

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**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.

View solution

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.

View solution

Find the coordinates of the two points.

( ..... , ..... )

( ..... , ..... ) [4]

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

View solution

Find $x$ in terms of $w$.

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

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

View solution

| 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]

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**24** Simplify.

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

View solution

..... [4]

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

View solution

Find the value of $a$ and the value of $k$.

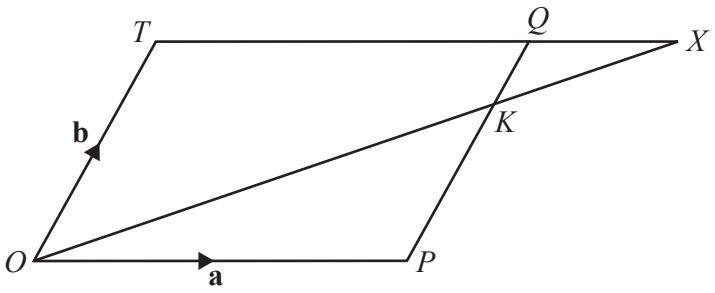
$a =$ .....

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

**Question 26 is printed on the next page.**

**26**

View solution




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]

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