## Cambridge IGCSE ${ }^{\text {TM }}$



CENTRE NUMBER


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 [ ].

1 Write 24.07839
(a) correct to 2 decimal places
(b) correct to the nearest 10 .

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

4 Change 62000 millimetres into kilometres.
$\qquad$

5


The diagram shows two intersecting straight lines crossing two parallel lines.
Find the value of $x$.

$$
x=
$$

6 (a) Explain why 111 is not a prime number.
$\qquad$
(b) Find a prime number between 110 and 120 .

7


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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.

10 Expand and simplify.

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

11


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The two shapes are mathematically similar.
(a) Find the value of $h$.

$$
h=
$$

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

Calculate the area of the larger shape.
$\qquad$ $\mathrm{cm}^{2}$

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.
$\mathrm{m} / \mathrm{s}^{2}$
(b) Find the total distance travelled during the 16 seconds.
m [2]

13 (a) $3^{3 p} \times 3^{2 p}=729$
Find the value of $p$.

$$
p=
$$

(b) Simplify.

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

$14 y=2 w^{2}-x$
Rearrange the formula to make $w$ the subject.

$$
w=
$$

15 (a) On the Venn diagram, shade the region $P \cup Q^{\prime}$.

(b) $\mathrm{n}(\mathscr{C})=20$
$\mathrm{n}(A \cup B)^{\prime}=1$
$\mathrm{n}(A)=12$
$\mathrm{n}(B)=10$

Complete the Venn diagram.


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

17 (a)


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

Angle $A C B=$
(b)


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

18 A solid cylinder has radius 5 cm and height 8 cm .
Calculate the total surface area of the cylinder.

19 Find the $n$th term of each sequence.
(a) $\quad 11, \quad 8, \quad 5, \quad 2, \quad-1$,
(b) $1, \quad 5, \quad 25,125, \quad 625, \quad \ldots$

20 The area of a rectangle is $55.2 \mathrm{~cm}^{2}$, 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.

21 The line $y=x+1$ intersects the curve $y=x^{2}+x-3$ at two points.
Find the coordinates of the two points.

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

Find $x$ in terms of $w$.

$$
x=
$$

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

| Reaction time <br> $(t$ 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.

24 Simplify.

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

25 The derivative of $2 a x^{7}+3 x^{k}$ is $42 x^{6}+15 x^{k-1}$.
Find the value of $a$ and the value of $k$.

$$
\begin{align*}
& a= \\
& k= \tag{2}
\end{align*}
$$

Question 26 is printed on the next page.


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The diagram shows a parallelogram $O P Q T$.
The position vector of $P$ is a and the position vector of $T$ is $\mathbf{b}$.
$K$ is on $P Q$ so that $P K: K Q=3: 1$.
The lines $O K$ and $T Q$ are extended to meet at $X$.
Find the position vector of $X$ in terms of $\mathbf{a}$ and $\mathbf{b}$.
Give your answer in its simplest form.

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