Cambridge Assessment International Education

# Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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*157586951 1*

**MATHEMATICS** **0580/23**

Paper 2 Non-calculator (Extended) **May/June 2025**

**2 hours**

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.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary working clearly.

**INFORMATION**

- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

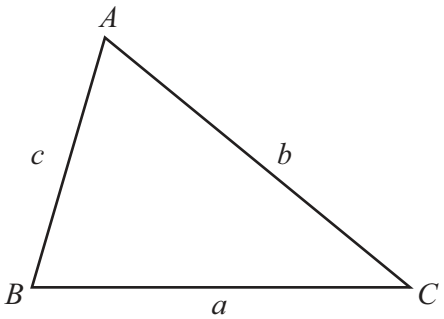



[Turn over

## List of formulas

| | |
|---|---|
| Area, $A$, of triangle, base $b$, height $h$. | $A = \frac{1}{2}bh$ |
| Area, $A$, of circle of radius $r$. | $A = \pi r^2$ |
| Circumference, $C$, of circle of radius $r$. | $C = 2\pi r$ |
| Curved surface area, $A$, of cylinder of radius $r$, height $h$. | $A = 2\pi rh$ |
| Curved surface area, $A$, of cone of radius $r$, sloping edge $l$. | $A = \pi rl$ |
| Surface area, $A$, of sphere of radius $r$. | $A = 4\pi r^2$ |
| Volume, $V$, of prism, cross-sectional area $A$, length $l$. | $V = Al$ |
| Volume, $V$, of pyramid, base area $A$, height $h$. | $V = \frac{1}{3}Ah$ |
| Volume, $V$, of cylinder of radius $r$, height $h$. | $V = \pi r^2 h$ |
| Volume, $V$, of cone of radius $r$, height $h$. | $V = \frac{1}{3}\pi r^2 h$ |
| Volume, $V$, of sphere of radius $r$. | $V = \frac{4}{3}\pi r^3$ |
| For the equation $ax^2 + bx + c = 0$, where $a \neq 0$, | $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ |

For the triangle shown,




$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}ab\sin C$$

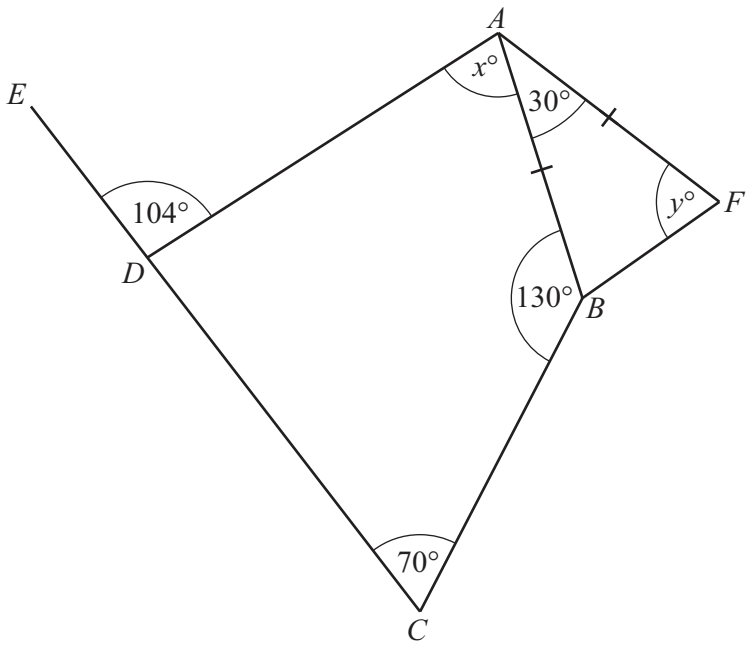
Calculators must **not** be used in this paper.

**1** The probability of picking a green pen from a box is 0.17 .

Find the probability of not picking a green pen from the box.

..... [1]

**2**




NOT TO SCALE

*ABCD* is a quadrilateral.
*CDE* is a straight line.
*AFB* is an isosceles triangle.

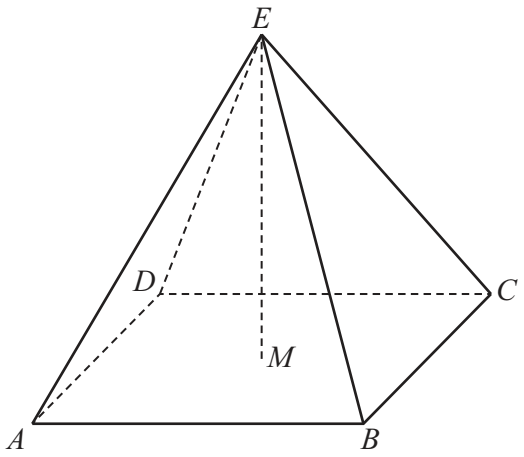
Find the value of $x$ and the value of $y$.

$x =$ .....

$y =$ .....

[4]

**3**




NOT TO SCALE

The diagram shows a pyramid *ABCDE* with a square base.
*M* is the centre of the square base.
*E* is vertically above *M*.

**(a)** Write down the number of planes of symmetry of this pyramid.

..... [1]

**(b)** Using two of the letters from *A*, *B*, *C*, *D*, *E* and *M*, complete the statement about the pyramid.

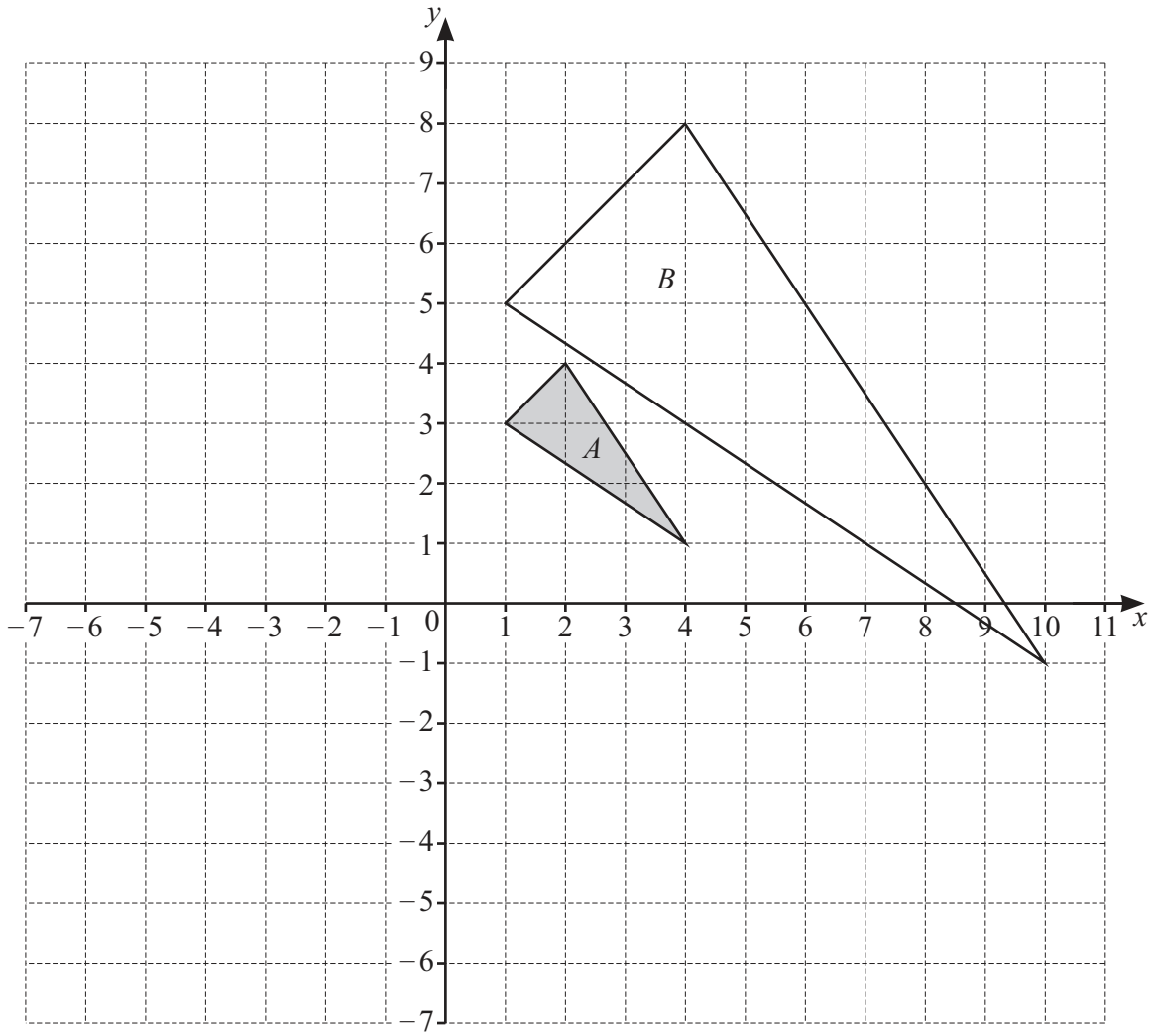
The axis of rotational symmetry passes through the points ..... and ..... [1]

**4** The number of ice creams sold increases as the temperature rises.

What type of correlation does this statement describe?

..... [1]

5




**(a)** Describe fully the **single** transformation that maps triangle $A$ onto triangle $B$.

.....

..... [3]

**(b)** On the grid, draw the image of

**(i)** triangle $A$ after a reflection in the line $x = -1$ [2]

**(ii)** triangle $A$ after a rotation 90° clockwise, centre $(1, -2)$. [2]

**6** There are 15 giraffes in a group.
The table gives information about the heights of the 15 giraffes.

| |
|---|
| One giraffe has a height of 2.6 m |
| No giraffe is shorter than 2.5 m |
| The range of heights for the 15 giraffes is 2.3 m |
| More than 3 giraffes have the same height |
| The modal height for the giraffes is 3.9 m |

The stem-and-leaf diagram shows information about the height of 9 of these giraffes.

| | |
|---|---|
| 2 | 5 |
| 3 | 2 7 7 |
| 4 | 1 1 4 5 7 |

Key: 4|1 represents a giraffe height of 4.1 m

Use the information in the table to complete the stem-and-leaf diagram for the group of 15 giraffes.

[3]

**7** Work out.

**(a)** $\frac{5}{6} - \frac{7}{12}$

Give your answer as a fraction in its simplest form.

..... [2]

**(b)** $1\frac{1}{3} \div \frac{8}{15}$

Give your answer as a mixed number in its simplest form.

..... [3]

**8** **(a)** Write 42 as a product of its prime factors.

..... [2]

**(b)** Find the highest common factor (HCF) of 84 and 70.

..... [2]

**9** **(a)** Solve.

$$5x^2 = 12 - 17x$$

$x =$ ..... or $x =$ ..... [4]

**(b)** $ax^2 + a = b$ where $a$ and $b$ are integers.

One solution of this equation is $x = 6$.

Write down the other solution.

$x =$ ..... [1]

**10** Solve the simultaneous equations.

$$4x - 5y = 13$$
$$3x - 2y = 8$$

$x =$ .....

$y =$ .....

[4]

**11** Angela picks a number at random from the numbers 1, 2 and 3.
She then picks a number at random from the numbers 4, 5 and 6.
She adds the two numbers to find the total.

**(a)** Complete the table to show the possible outcomes.

| | | First number | | |
|---|---|---|---|---|
| | + | 1 | 2 | 3 |
| Second number | 4 | 5 | 6 | 7 |
| | 5 | | | |
| | 6 | | | |

[2]

**(b)** Given that the total is odd, find the probability that one of the numbers Angela picks is 3.

..... [2]

**12** **(a)** $\mathbf{v} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$

Find $5\mathbf{v}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

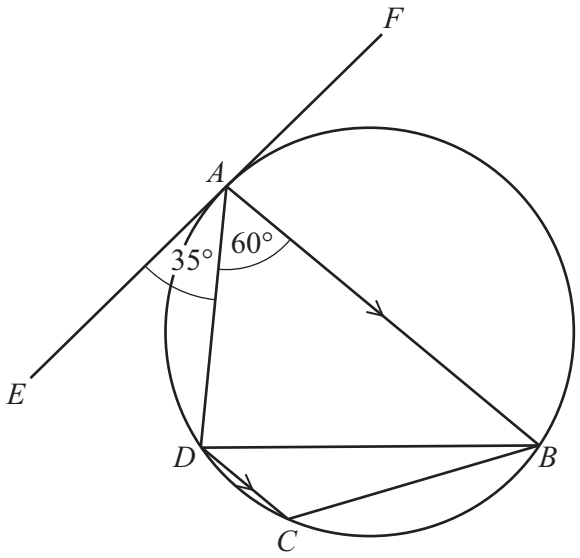
**(b)** $H$ is the point $(-3, 8)$ and $K$ is the point $(-4, 0)$.

$\overrightarrow{HJ} = \begin{pmatrix} 7 \\ -2 \end{pmatrix}$

Find $\left|\overrightarrow{JK}\right|$.

..... [4]

**13**




NOT TO SCALE

$A$, $B$, $C$ and $D$ are points on a circle.
$EF$ is a tangent to the circle at $A$.
$AB$ is parallel to $DC$.

**(a)** Find angle $DCB$, giving a geometrical reason.

Angle $DCB$ = ..... because .....

..... [2]

**(b)** Find angle $DBC$.

Angle $DBC$ = ..... [2]

**14** Find the lowest common multiple (LCM) of $15xy^3$ and $18x^4y$.

..... [2]

**15** **(a)** Simplify.

$$\sqrt{27} + \sqrt{12}$$

..... [2]

**(b)** $\dfrac{40\sqrt{8}}{5\sqrt{2}} = k$, where $k$ is an integer.

Find the value of $k$.

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

**(c)** Rationalise the denominator.

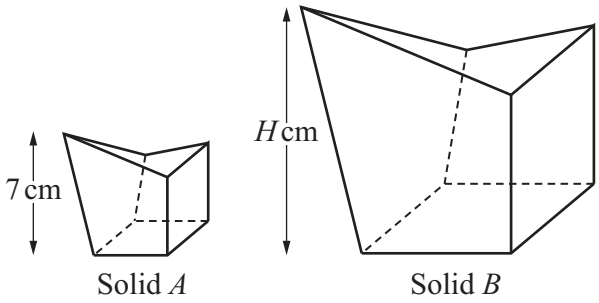
$$\frac{1}{3 - \sqrt{5}}$$

..... [2]

**16** Write $0.3\dot{2}\dot{8}$ as a fraction in its simplest form.

..... [3]

**17** Solid $A$ is mathematically similar to solid $B$.




NOT TO SCALE

The height of solid $A$ is 7 cm and its surface area is 60 $cm^2$.
The surface area of solid $B$ is 540 $cm^2$.

Calculate the height of solid $B$.

..... cm [3]

**18** Make $t$ the subject of the formula.

$$2 = \frac{m(1-t)}{pt}$$

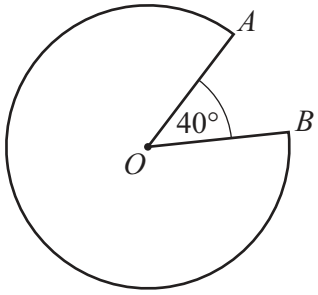
$t =$ ..... [4]

**19** Simplify.

$$\frac{7x-x^2}{49-x^2}$$

..... [3]

**20**




NOT TO SCALE

The diagram shows a sector of a circle, centre $O$.
The radius of the circle is 6 cm.

Calculate the length of the major arc $AB$.
Give your answer in its simplest form in terms of $\pi$.

.....cm [3]

**21** **(a)** Differentiate $x^3 - 3x^2 + 1$.

..... [2]

**(b)** Find the coordinates of the turning points of the graph of $y = x^3 - 3x^2 + 1$.

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

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

[4]

**22** $f(x) = 2x + 5$ $g(x) = x - 4$ $h(x) = 5^x$

**(a)** Find $f(3)$.

..... [1]

**(b)** Find $f^{-1}(x)$.

$f^{-1}(x) =$ ..... [2]

**(c)** Solve $fg(x) = 25$.

$x =$ ..... [3]

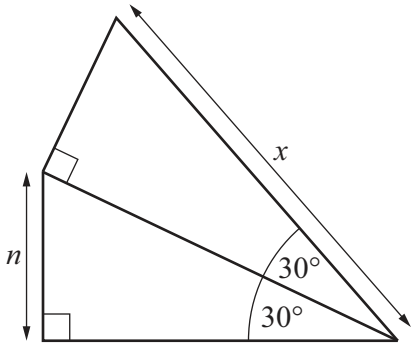
**(d)** Find $x$ when $h^{-1}(x) = 2$.

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

**23** **(a)** Write down the value of cos 90°.

..... [1]

**(b)**




NOT TO SCALE

The diagram shows two different right-angled triangles joined by a common side.

Find $x$ in terms of $n$.

$x =$ ..... [5]

**Question 24 is on the next page.**

**24** **(a)** $A$ is the point $(a, 12)$ and $B$ is the point $(b, 27)$.

**(i)** Find the $y$-coordinate of the midpoint of $AB$.

..... [1]

**(ii)** The line $AB$ has gradient 3.

Find an expression for $a$ in terms of $b$.

$a =$ ..... [3]

**(b)** $D$ is the point $(22, 34)$ and $E$ is the point $(23, 39)$.
$D$ is the point on $CE$ such that $2CE = 5DE$.

Find the coordinates of $C$.

( ..... , ..... ) [3]