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MATHEMATICS **0580/23**

Paper 2 Non-calculator (Extended) **October/November 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 [ ].

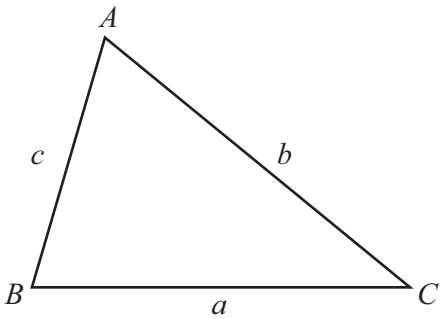
This document has **20** pages. Any blank pages are indicated.

[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,



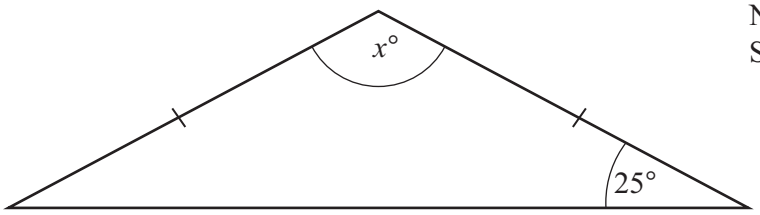
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

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

1



NOT TO SCALE

The diagram shows an isosceles triangle.

Find the value of x.

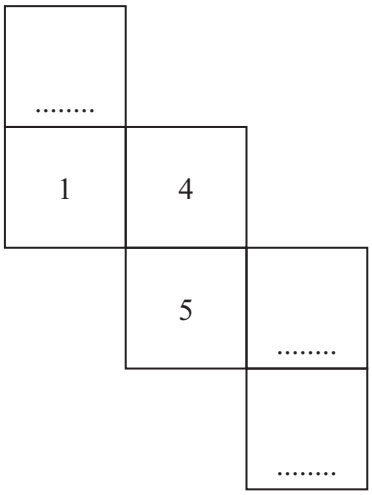
$x =$ ..... [2]

2 Find the largest **odd** number that is a common factor of 90 and 120.

..... [1]

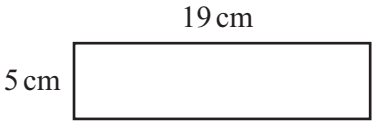
3 The diagram shows a net for a dice.
The dice has six faces numbered 1 to 6.
The sum of each pair of opposite faces on the dice is 7.

Write the missing numbers on the net.



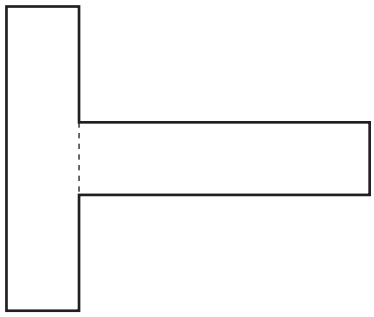
[1]

4 A rectangle measures 5 cm by 19 cm.



NOT TO SCALE

Two of these rectangles are joined to make a shape.

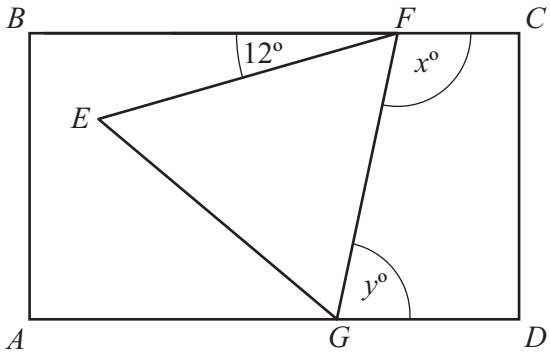


NOT TO SCALE

Work out the perimeter of the shape.

..... cm [2]

5



NOT TO SCALE

The diagram shows a rectangle *ABCD*.
EFG is an equilateral triangle that touches the rectangle at *F* and *G*.

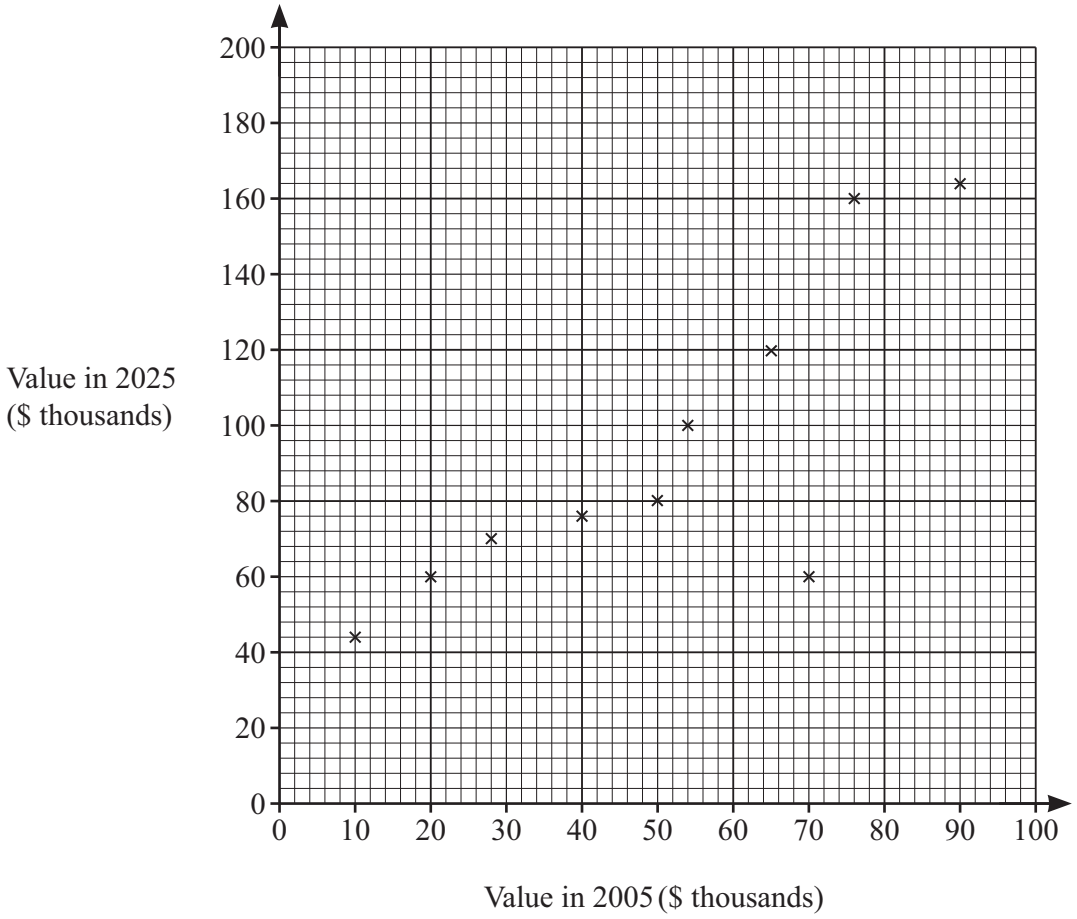
Find the value of x and the value of y.

$x =$ .....

$y =$ .....

[2]

6 The scatter diagram shows the value, in thousands of dollars, of ten paintings in 2005 and the value of the same paintings in 2025.



(a) The value of one of the paintings in 2025 is less than expected.

Draw a circle around the point that represents this painting. [1]

(b) Another painting had a value of $75 000 in 2005 and $140 000 in 2025.

On the scatter diagram, plot this point. [1]

(c) Write down the number of paintings with a value of less than $53 000 in 2005.

..... [1]

(d) What type of correlation is shown on the scatter diagram?

..... [1]

7 **(a)** The sum of all the prime numbers less than 10 is equal to 17.

Find the sum of all the prime numbers less than 16.

..... [2]

(b) x is an integer.
The sum of the prime numbers greater than 6 and less than x is equal to 18.

Find a possible value for x.

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

8 $\overrightarrow{DE} = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$

(a) Find $5\overrightarrow{DE}$.

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

(b) Find $\left|\overrightarrow{DE}\right|$.

..... [2]

(c) D is the point (–2, –3).

Find the coordinates of the point E.

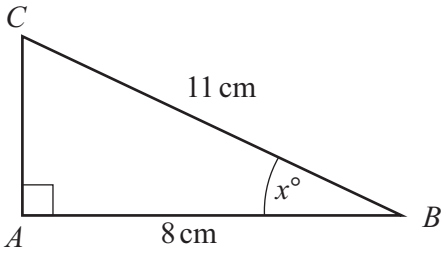
(..... , ...) [2]

9 $n^{15} \div n^x = n^5$

Find the value of x.

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

10



NOT TO SCALE

The diagram shows a right-angled triangle ABC.

(a) Work out the exact length of AC.

..... cm [3]

(b) $\cos x = k$

Write down the value of k.

$k =$ ..... [1]

11 Sarah rolls a fair 6-sided dice twice.

Find the probability she rolls a number greater than 4 both times.

..... [2]

12 **(a)** Write down the value of 73^0.

..... [1]

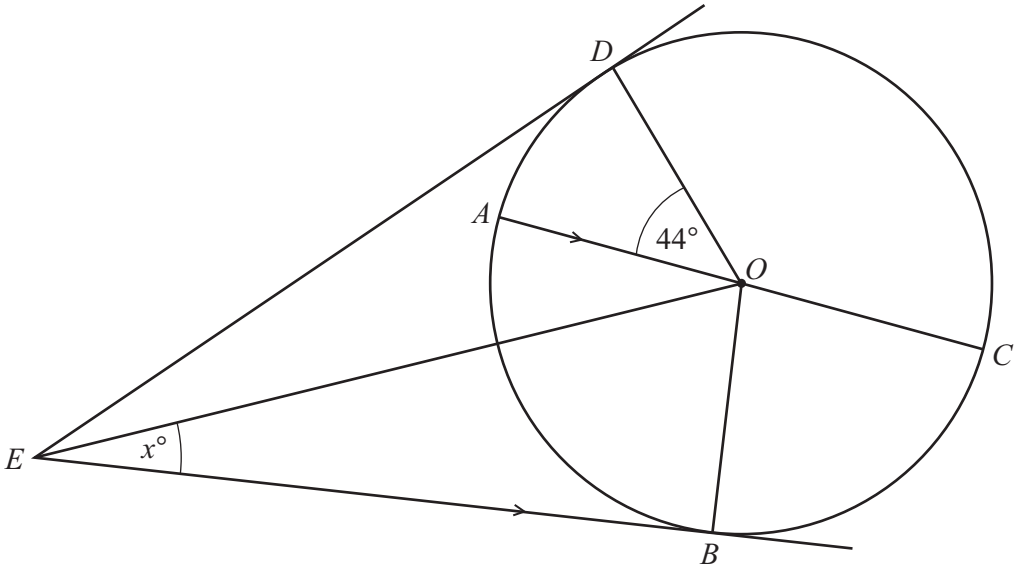
(b) Find the value of $\frac{7}{3^{-2}}$.

..... [2]

(c) Write 27×81^2 in the form 3^n.

..... [2]

13



NOT TO SCALE

A, B, C and D are points on the circumference of a circle with centre O.
ED and EB are tangents to the circle.
AC is parallel to EB.
Angle $AOD = 44°$.

Find the value of x.

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

14 The minimum point on a quadratic curve is (–3, –5).

(a) Find the equation of the line of symmetry of the curve.

..... [1]

(b) Write the equation of the curve in the form $y = (x + a)^2 + b$.

$y =$ ..... [1]

15 Factorise.

(a) $x^2 - 7x + 12$

..... [2]

(b) $5x + 10y + 6ny + 3nx$

..... [2]

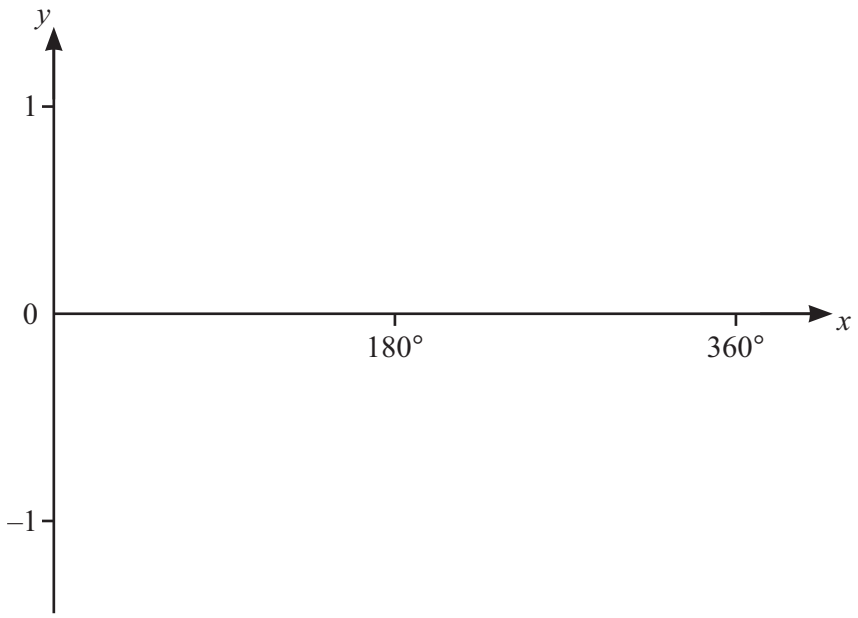
16 The table shows three sequences.

	1st term	2nd term	3rd term	4th term	5th term	nth term
Sequence A	8	13	18	23	28	
Sequence B	$\frac{3}{2}$	$\frac{4}{3}$	$\frac{5}{4}$	$\frac{6}{5}$	$\frac{7}{6}$	
Sequence C	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	

Complete the table to show the nth term of each sequence.

[5]

17 **(a)** Sketch the graph of $y = \cos x$ for $0° \leqslant x \leqslant 360°$.



[2]

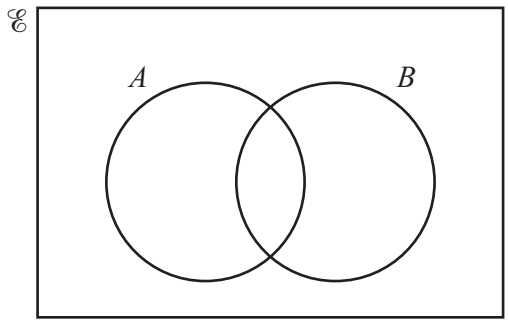
(b) $\cos x° = \frac{1}{\sqrt{2}}$ and x is a **reflex** angle.

Find the value of x.

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

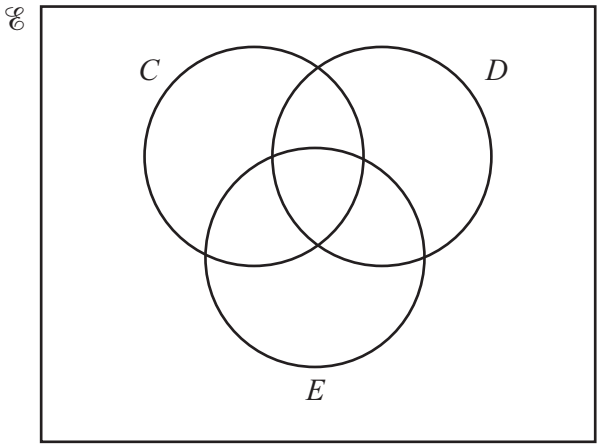
18 Shade the region in each Venn diagram.

(a) $(A \cap B)'$



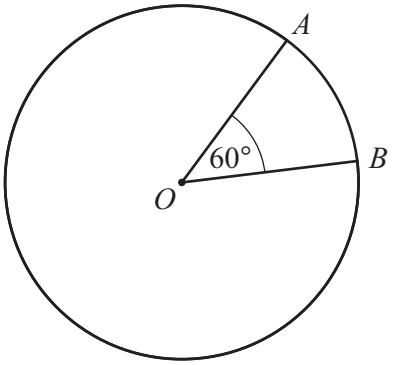
[1]

(b) $(C \cup D) \cap E'$



[1]

19



NOT TO SCALE

The diagram shows a circle, centre O, radius 12 cm.

(a) Work out the area of the **minor** sector AOB.
Give your answer in terms of π in its simplest form.

..... cm^2 [2]

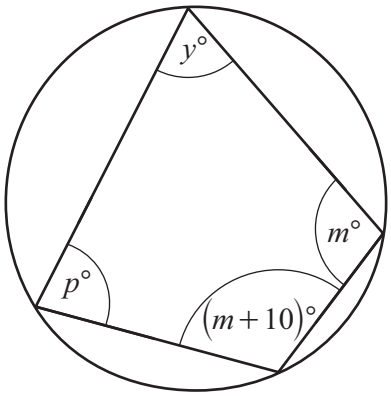
(b) Calculate the length of the **major** arc AB.
Give your answer in terms of π in its simplest form.

..... cm [3]

20 Work out $0.1\dot{1}\dot{4}+0.2$.
Give your answer as a fraction.

..... [3]

21



NOT TO SCALE

The diagram shows a cyclic quadrilateral.
The ratio $p : m = 2 : 3$.

Find the value of y.

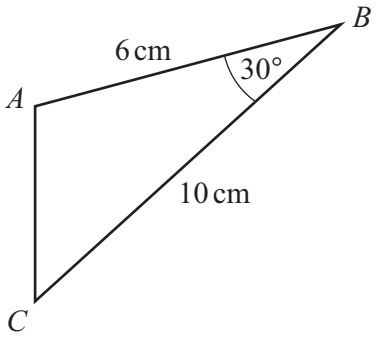
$y =$ ..... [4]

22 The equation of line L is $y = -\frac{1}{2}x + 7$.

Find an equation of the line perpendicular to line L that passes through the point (3, 5).
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

23



NOT TO SCALE

Work out the area of triangle ABC.

..... cm^2 [3]

24 **(a)** Simplify.

$\sqrt{125} - \sqrt{20}$

..... [2]

(b)

NOT TO SCALE

The area of this rectangle is $k\,\text{cm}^2$.

Work out the value of k.

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

(c) Rationalise the denominator.

$$\frac{1}{\sqrt{7}+2}$$

..... [2]

25 Mahir picks one number at random from the numbers 5, 10 and 15.
He then picks one number at random from the numbers 4, 5 and 6.
He adds the two numbers.

The sample space diagram shows some of the possible outcomes.

		First number		
	+	5	10	15
Second number	4		14	19
	5		15	20
	6		16	21

(a) Complete the sample space diagram. [1]

(b) Given that the total of the two numbers is odd, find the probability that one of the numbers added is 15.

..... [2]

26 Write as a single fraction in its simplest form.

(a) $\frac{mp}{25y} \times \frac{15}{m}$

..... [2]

(b) $\frac{3}{2x-5} + \frac{4}{x-3}$

..... [3]

27 Solve the simultaneous equations.

$y = x^2 - 8x + 22$

$y + 2 = 3x$

$x =$ ..... , $y =$ .....

$x =$ ..... , $y =$ .....

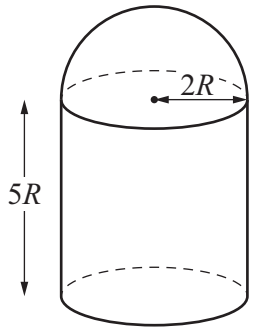
[6]

28 Simplify.

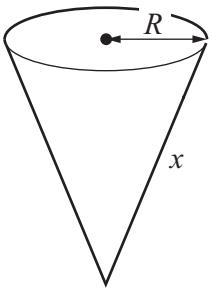
$$\frac{2x^2 - 11x - 21}{x^2 - 49}$$

..... [4]

29 In this question all measurements are in centimetres.



Solid *A*



Solid *B*

NOT TO SCALE

Solid *A* is made from a cylinder and a hemisphere, both of radius $2R$.
The cylinder has height $5R$.
Solid *B* is a cone of radius R and sloping edge x.

The **total** surface area of solid *A* is equal to the **total** surface area of solid *B*.

Find R in terms of x.

$R =$ ..... [5]

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