Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0123456789

MATHEMATICS (SYLLABUS D) **4024/01**

Paper 1 Non-calculator **For examination from 2025**

SPECIMEN PAPER B **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 [ ].

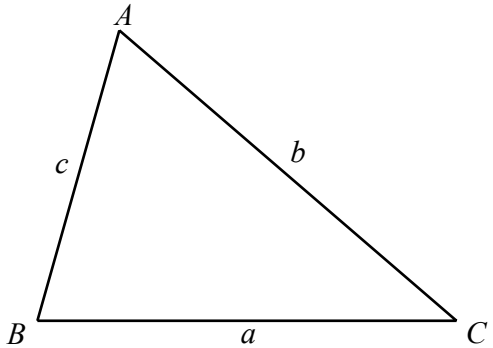
This document has **18** pages.

[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 **(a)** Write down the number of lines of symmetry of a kite.

..... [1]

(b) Write down the order of rotational symmetry of a parallelogram.

..... [1]

2 Work out.

(a) $-8 \times 2 + 3$

..... [1]

(b) 0.03×0.05

..... [1]

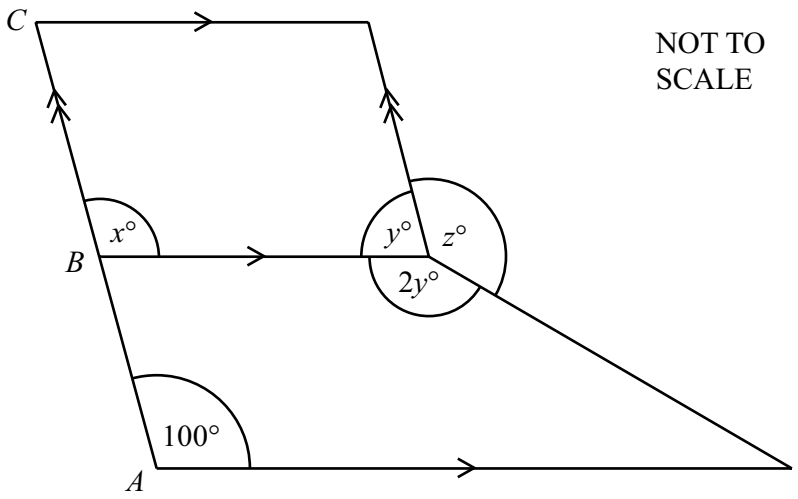
3 Here is some information about five positive integers.

- The median is 7.
- The mode is 13.
- The range is 10.
- They add up to 40.

Find the five integers.

..... , ... , ... , ... , ... [3]

4



The diagram shows a parallelogram and a trapezium.
The parallelogram and the trapezium are joined along a common side.
ABC is a straight line.

(a) Find the value of x.
Give a geometrical reason for your answer.

x = ... because .....

..... [2]

(b) Find the value of y.
Give a geometrical reason for your answer.

y = ... because .....

..... [2]

(c) Find the value of z.

z = ... [2]

5 **(a)** Convert 600 g into kg.

..... kg [1]

(b) Convert 5.7 litres into cm^3.

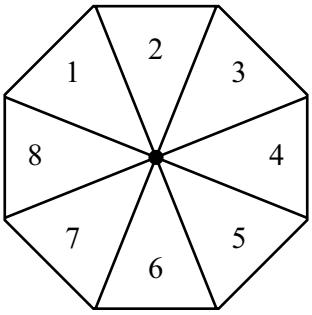
..... cm^3 [1]

6 Write these numbers in order, starting with the smallest.

$\frac{3}{20}$ 0.143 $\frac{1}{6}$ 16%

..... , ... , ... , ... [2]
smallest

7 Jude has a fair 8-sided spinner numbered 1 to 8.



Jude spins the spinner once.

Find the probability that the spinner lands on

(a) a number greater than 6

..... [1]

(b) an odd number or a multiple of 3.

..... [1]

8 Write the ratio 80 : 200 : 360 in its simplest form.

..... : ..... : ..... [2]

9 The time that Rafiq works is divided into meetings, planning and working on a computer.

One day, Rafiq is

- in meetings for $\frac{3}{4}$ of the time
- planning for $\frac{1}{5}$ of the time
- working on a computer for the remaining 25 minutes of the time.

Work out the total time that Rafiq works this day.
Give your answer in hours and minutes.

..... hours ..... minutes [5]

10 These are the first five terms of a sequence.

9 13 17 21 25

(a) Find an expression for the nth term of this sequence.

..... [2]

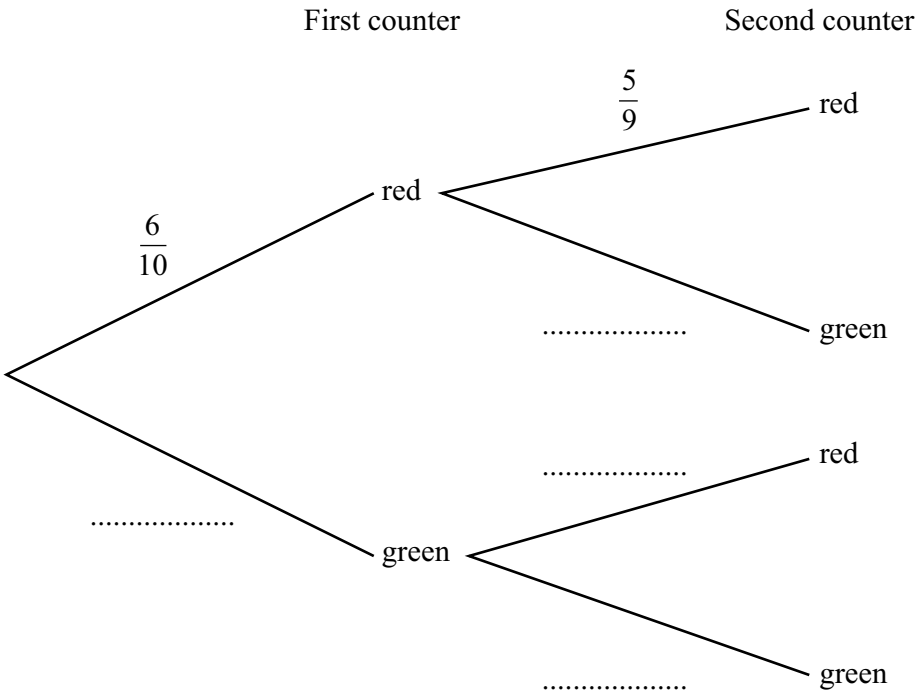
(b) The kth term of this sequence is 89.

Find the value of k.

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

11 Asha has a bag containing 6 red counters and 4 green counters.
She takes two counters from the bag at random without replacement.

(a) Complete the tree diagram.



[2]

(b) Work out the probability that Asha takes two green counters.

..... [2]

12 **(a)** Expand.

$$2x(3x^2 - 8x)$$

..... [2]

(b) **(i)** Factorise.

$$x^2 - 19^2$$

..... [1]

(ii) Work out.

$$81^2 - 19^2$$

..... [2]

13 A force of 196 newtons is applied to a square surface of side 4.9 cm.

By writing each number correct to 1 significant figure, work out an estimate of the pressure applied to the square surface.

[Pressure = force ÷ area]
[Pressure is measured in newtons / cm^2]

..... newtons / cm^2 [3]

14 Freya records how many minutes she takes to complete a crossword each day.

On Tuesday, she takes 10% less time than on Monday.
On Wednesday, she takes 50% less time than on Tuesday.
On Wednesday, she takes 9 minutes to complete the crossword.

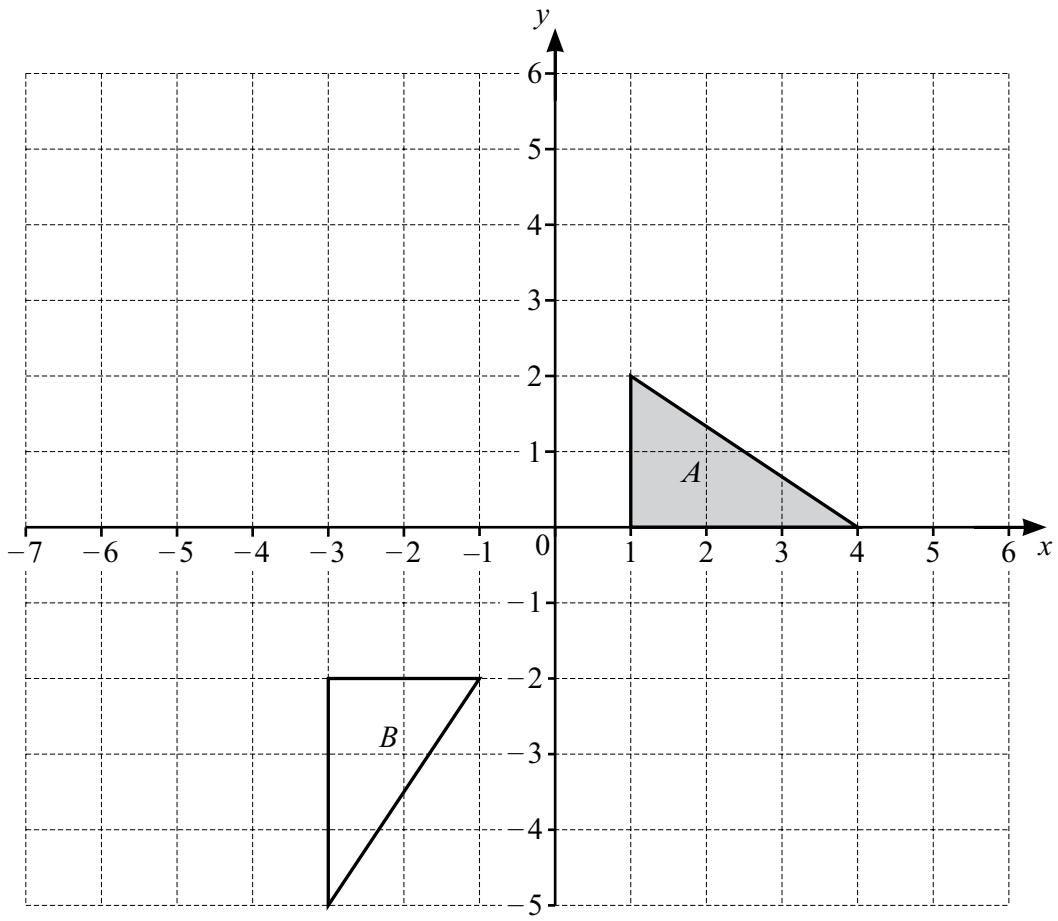
Find the number of minutes Freya takes to complete the crossword on Monday.

..... minutes [3]

15 Write $0.3\dot{1}\dot{2}$ as a fraction.
Give your answer in its simplest form.

..... [3]

16



(a) On the grid, draw the image of

(i) triangle A after a reflection in the line $y = x + 2$ [3]

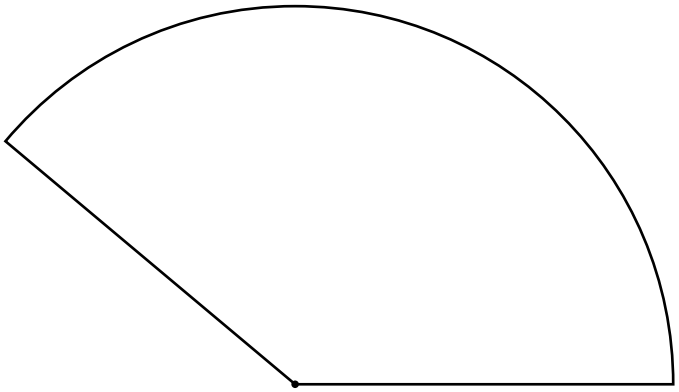
(ii) triangle A after an enlargement by scale factor $\frac{3}{2}$ with centre (1, 0). [2]

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

.....

..... [3]

17



NOT TO SCALE

The diagram shows a sector of a circle with radius 6 cm.
The area of the sector is 15π cm^2.

(a) Work out the perimeter of the sector.
Give your answer in the form $a + b\pi$, where a and b are integers.

..... cm [4]

(b) The sector is the cross-section of a prism of length 10 cm.

Work out, giving your answer in terms of π,

(i) the volume of the prism

..... cm^3 [1]

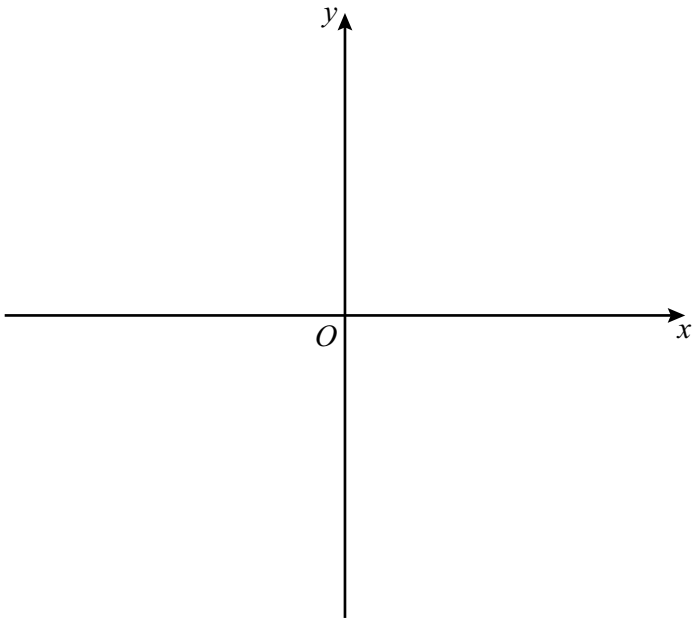
(ii) the total surface area of the prism.

..... cm^2 [3]

18 **(a)** Write $x^2 - 8x + 10$ in the form $(x - p)^2 - q$.

..... [2]

(b) Sketch the graph of $y = x^2 - 8x + 10$.
On the sketch, label the coordinates of the turning point and the y-intercept.



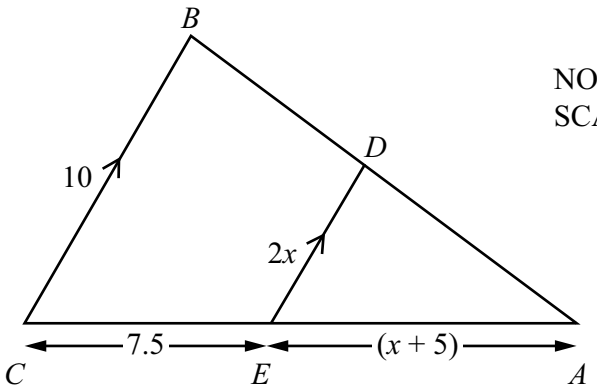
[3]

19 Rationalise the denominator and simplify.

$$\frac{8}{1 - \sqrt{5}}$$

..... [3]

20 In this question all lengths are given in centimetres.



NOT TO SCALE

Triangle ABC is mathematically similar to triangle ADE.

(a) (i) Show that $2x^2 + 15x - 50 = 0$.

[3]

(ii) Solve by factorising $2x^2 + 15x - 50 = 0$.

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

(iii) Find the length AC.

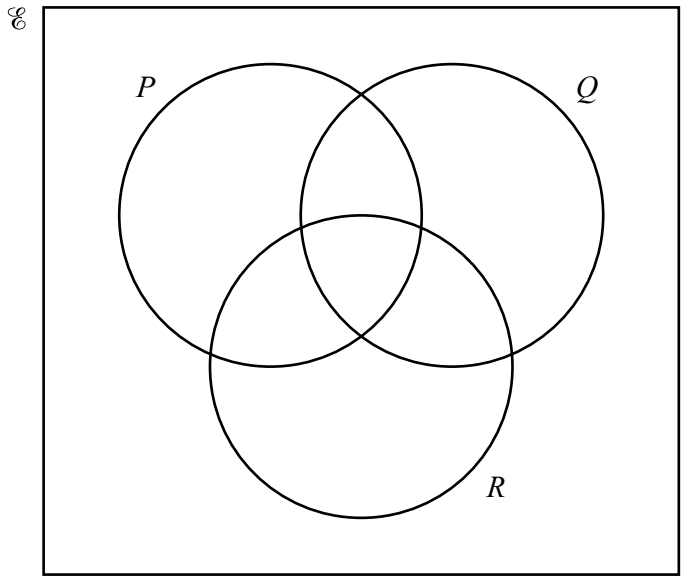
$AC =$ ..... cm [1]

(b) The area of triangle ABC is $k\,\text{cm}^2$.

Find an expression for the area of the quadrilateral $BCED$.
Give your answer in terms of k.

..... cm^2 [2]

21



In the Venn diagram, shade the region $P \cup Q' \cup R'$. [1]

22 Expand and simplify.

$$(2x - 3)(x + 1)(2 - 3x)$$

..... [3]

23 Rearrange the formula to make p the subject.

$$d = \frac{2p + 3}{2 - py}$$

$p =$ ..... [4]

24 **(a)** Simplify.

(i) $(2xy)^0$

..... [1]

(ii) $\left(\frac{81m^8}{3m^2}\right)^{\frac{2}{3}}$

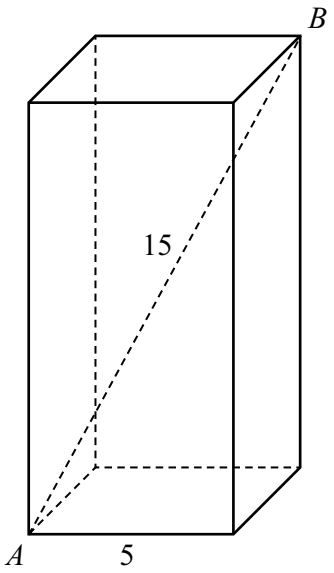
..... [3]

(b) Find the value of x.

$$32^x \times 2^{x+3} = \frac{1}{4}$$

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

25



NOT TO SCALE

The diagram shows a cuboid with a square base.
The length of the edge of the base is 5 cm.
The length of the diagonal AB is 15 cm.

Work out the height of the cuboid.
Give your answer as a surd in its simplest form.

..... cm [4]

