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Cambridge O Level

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7839032516

MATHEMATICS (SYLLABUS D) **4024/12**

Paper 1 Non-calculator **May/June 2026**

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. Do **not** use correction fluid or tape.
- 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.

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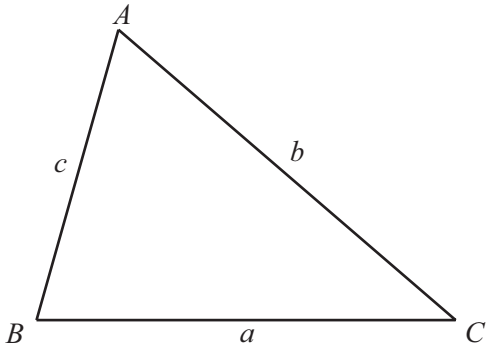
List of formulas

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,



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

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

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

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

1 Write down the value of

(a) 5^3

..... [1]

(b) $\sqrt{121}$.

..... [1]

2 Buses travel from the city centre to the airport.

(a) A bus leaves the city centre at 1005.
The bus journey from the city centre to the airport takes 1 hour 25 minutes.

Work out the time the bus arrives at the airport.

..... [1]

(b) Another bus arrives at the airport at 1620.
This bus journey from the city centre to the airport takes 1 hour 35 minutes.

Work out the time this bus leaves the city centre.

..... [1]

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3 These are the scores for each of 10 children in a spelling test.

7 10 10 15 7 5 11 7 13 5

(a) Work out the median.

..... [2]

(b) Work out the mean.

..... [2]

4 Ana has 60 cards.
Each card is red or green.

(a) The ratio red cards : green cards = 2 : 1.

Show that there are 20 green cards.

[1]

(b) Each of the 60 cards is a square or a triangle.
The ratio square cards : triangle cards = 5 : 1.

There are 16 green square cards.

Complete the two-way table.

	red	**green**	**total**
square		16	
triangle			
total		20	60

[2]

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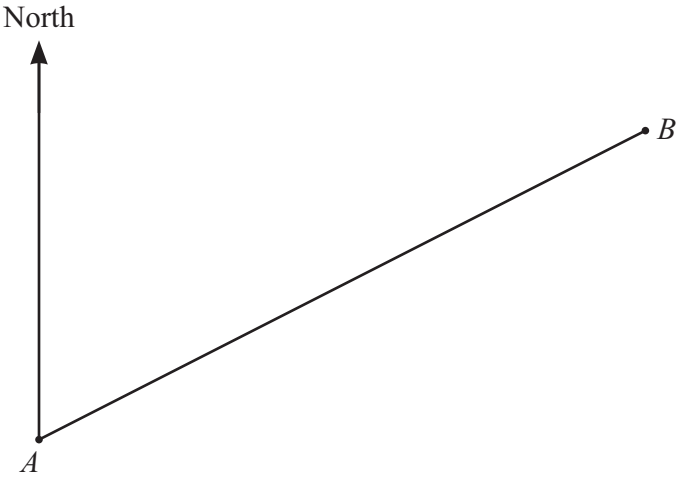
5 The scale drawing shows the positions of two villages, *A* and *B*.
The scale is 2 cm to 1 km.



scale: 2 cm to 1 km

Farm *C* is 4 km from village *A* and 2.5 km from village *B*.
Farm *C* is further south than village *B*.

(a) Using a ruler and compasses only, construct the position of farm *C*. [3]

(b) Measure the bearing of farm *C* from village *A*.

..... [1]

6 Pran invests $2000 in a savings account.
The account pays simple interest at a rate of 3.5% per year.

Calculate the value of the investment at the end of 4 years.

$ ..... [3]

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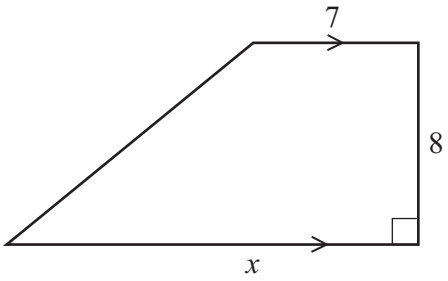
7 The diagram shows a trapezium.
All the lengths are in centimetres.



NOT TO SCALE

The area of the trapezium is $100\,cm^2$.

Work out the value of x.

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

8 Leo has a 5-sided spinner numbered from 1 to 5.
Leo spins the spinner 500 times.
His results are shown in the table.

number on spinner	1	2	3	4	5
frequency	105	96	95	104	100

(a) Leo says that the results show that the spinner is fair.

Explain why he is correct.

..... [1]

(b) Find the relative frequency of the spinner landing on 5.

..... [1]

(c) Mary spins this spinner 100 times.

Find the number of times Mary should expect the spinner to land on 5.

..... [1]

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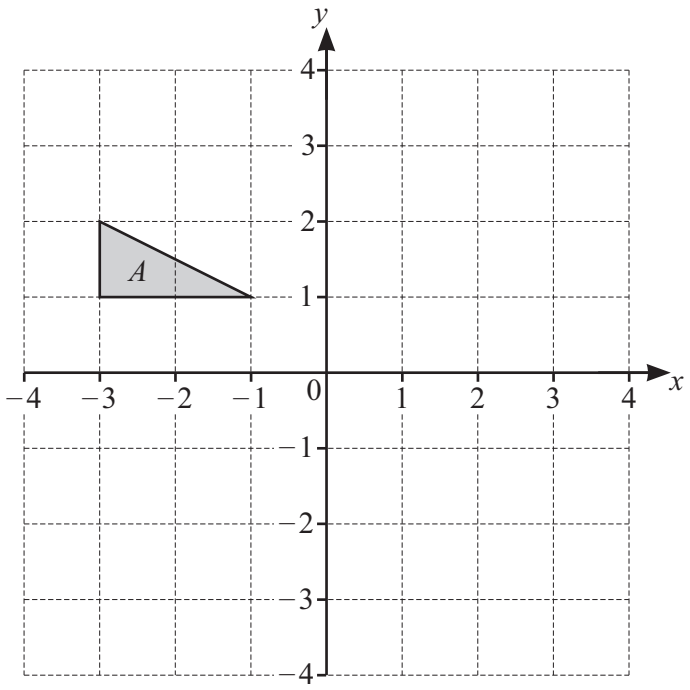
9 Work out.

$$1\frac{2}{3} \times \frac{9}{10} + 2\frac{1}{5}$$

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

..... [4]

10 The diagram shows triangle A.



Reflect triangle A in the line $y = x$. [2]

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11 **(a)** Write 400 as a product of its prime factors.

..... [2]

(b) Find the highest common factor (HCF) of 400 and 180.

..... [2]

12 Rearrange the formula to make m the subject.

$$k = 4(m - p)$$

$m =$ ..... [2]

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13 **(a)** The nth term of a sequence is $n+8$.

Find the first three terms of this sequence.

..... , ... , ... [1]

(b) These are the first four terms of a different sequence.

$T_1 = 4$ $T_2 = 10$ $T_3 = 16$ $T_4 = 22$

(i) Write down the term-to-term rule for this sequence.

..... [1]

(ii) Find an expression for the nth term of the sequence, T.

$T_n =$ ..... [2]

(c) The nth term of another sequence is $R_n = \dfrac{T_n}{n+8}$.

The kth term of this sequence is 5.

Find the value of k.

$k =$ ..... [3]

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14 **(a)** Write $350\,000$ in standard form.

..... [1]

(b) Write 2.7×10^{-4} as an ordinary number.

..... [1]

(c) Work out.

$$1.3 \times 10^{12} + 4.5 \times 10^{13}$$

Give your answer in standard form.

..... [2]

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15 The equation of line L is $2y + x = 19$.

(a) (i) Find the gradient of line L.

..... [2]

(ii) Find the y-intercept of line L.

..... [1]

(b) Line M is perpendicular to line L.
Line M passes through the point $(-1, -5)$.

Show that the equation of line M is $y = 2x - 3$.

[2]

(c) Find the coordinates of the point of intersection of the lines $2y + x = 19$ and $y = 2x - 3$.

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

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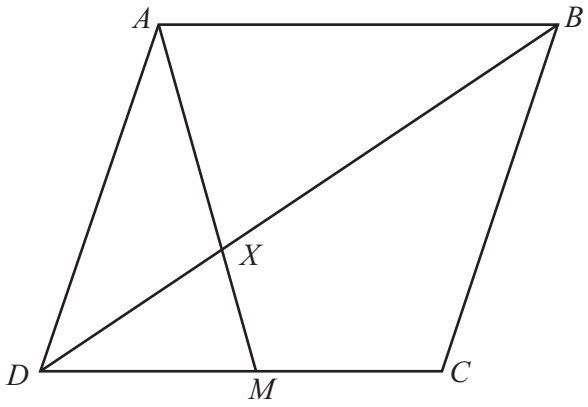

NOT TO SCALE

ABCD is a rhombus.
M is a point on *DC*.
AM and *BD* intersect at *X*.

(a) Show that triangle *AXB* is similar to triangle *MXD*.
Give a geometrical reason for each statement you make.

.....

.....

.....

..... [3]

(b) *M* is the midpoint of *DC*.
AB = 8 cm and *BD* = 15 cm.

(i) Calculate *DX*.

DX = ... cm [2]

(ii) Complete the statement.

area of triangle *AXB* : area of triangle *MXD* = ... : 1 [1]

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17 In a right-angled triangle

- the base is x cm
- the height is 7 cm shorter than the base
- the hypotenuse (longest side) is 2 cm longer than the base.

(a) Use this information to form an equation and show that it simplifies to $x^2 - 18x + 45 = 0$.

[4]

(b) Solve by factorising.

$$x^2 - 18x + 45 = 0$$

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

(c) Find the area of the triangle.

..... cm^2 [2]

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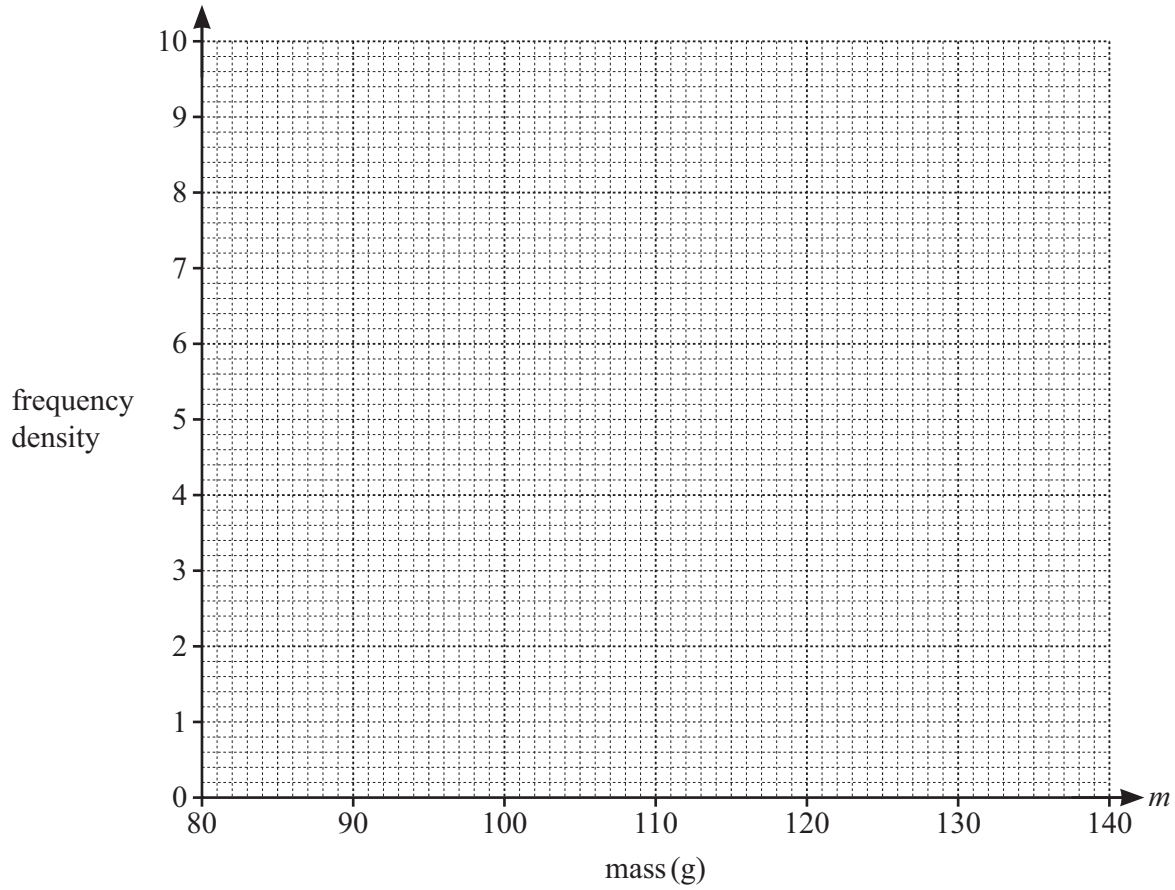
18 The masses of 200 apples are summarised in the table.

mass (m grams)	$80 < m \leqslant 100$	$100 < m \leqslant 110$	$110 < m \leqslant 120$	$120 < m \leqslant 140$
frequency	30	50	80	40

(a) Find the percentage of apples with a mass greater than 110 g.

..... % [2]

(b) On the grid, draw a histogram to represent the information in the table.



[3]

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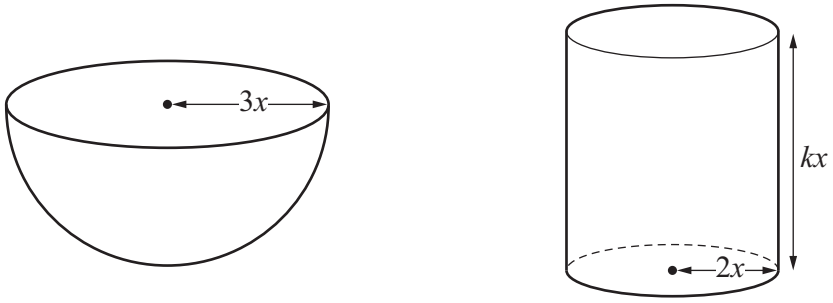
19 The diagram shows a solid hemisphere and a solid cylinder.
All the lengths are in centimetres.



NOT TO SCALE

The radius of the hemisphere is $3x$.
The radius of the cylinder is $2x$.
The height of the cylinder is kx.

The volume of the hemisphere is equal to the volume of the cylinder.

Work out the total surface area of the cylinder.
Give your answer in the form $a\pi x^2$, where a is an integer.

..... cm^2 [6]

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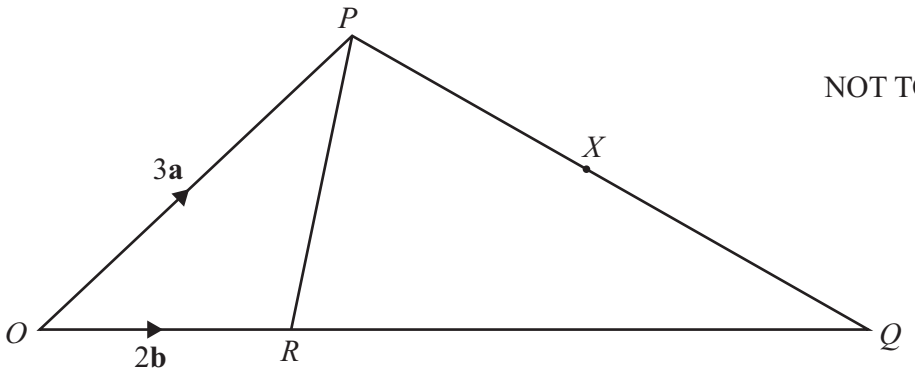

NOT TO SCALE

OPQ is a triangle and O is the origin.
R is a point on OQ and $OQ = 3OR$.
$\overrightarrow{OP} = 3\mathbf{a}$ and $\overrightarrow{OR} = 2\mathbf{b}$.
X is the midpoint of PQ.

Find as simply as possible in terms of **a** and/or **b**

(a) $\overrightarrow{PR}$

$\overrightarrow{PR} =$ ..... [1]

(b) $\overrightarrow{RQ}$

$\overrightarrow{RQ} =$ ..... [1]

(c) the position vector of X.

..... [3]

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21 Write as a single fraction in its simplest form.

$$\frac{2x+3}{x-1} - \frac{5x}{4-x}$$

..... [4]

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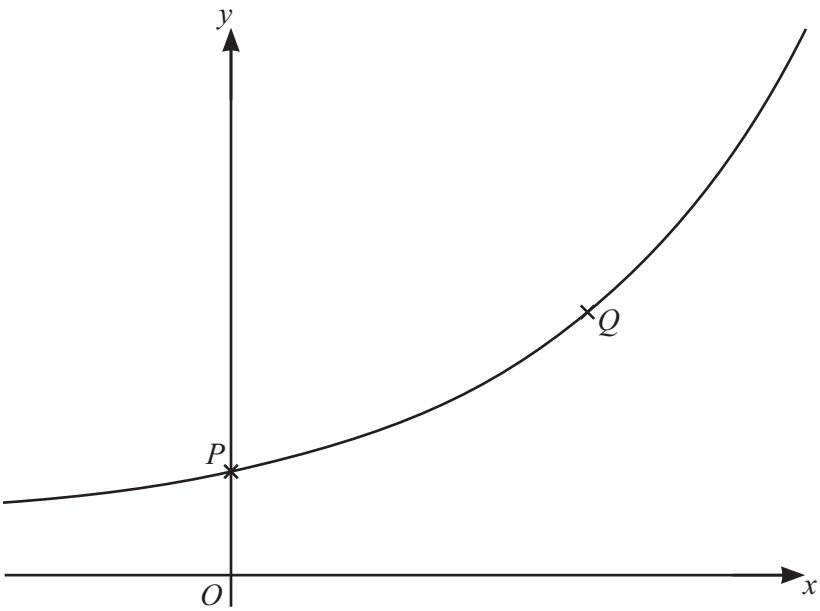

NOT TO SCALE

The diagram shows a sketch of the graph of $y = a^x + b$.
The graph passes through point P (0, 5) and point Q (2, 13).

(a) Find the value of a and the value of b.

$a =$ .....

$b =$ .....
[3]

(b) Find the equation of the asymptote to the graph.

..... [1]

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23 Find the value of x.

$$27^{-\frac{4}{3}} = 9^x$$

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

24 Expand and simplify.

$$\left(3+5\sqrt{2}\right)\left(2\sqrt{8}-1\right)$$

Give your answer in the form $a+b\sqrt{2}$.

..... [3]

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