



Cambridge O Level

CANDIDATE
NAME



CENTRE
NUMBER

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NUMBER

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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.

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 .

$$V = \frac{1}{3}\pi r^2 h$$

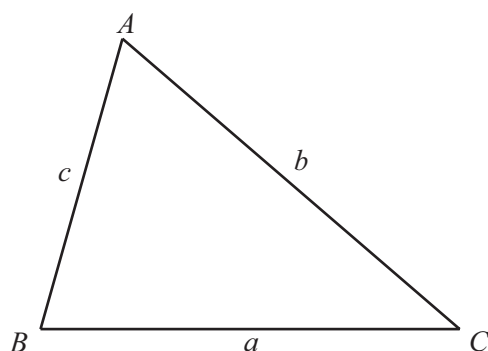
Volume, V , of sphere of radius r .

$$V = \frac{4}{3}\pi r^3$$

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 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 10 05.

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 16 20.

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]

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.

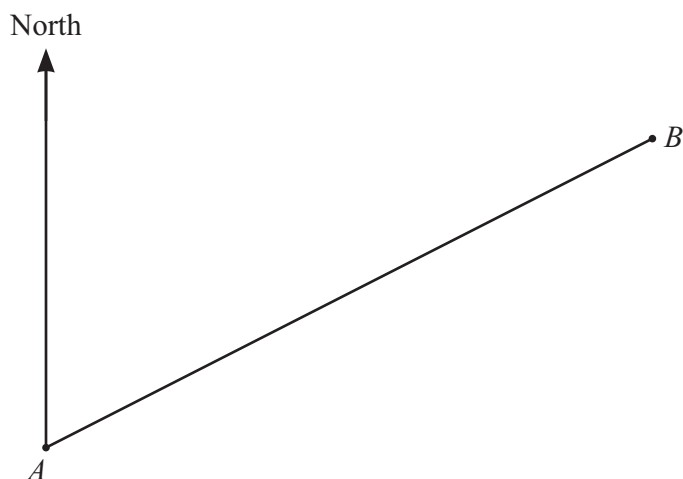
Complete the two-way table.

	red	green	total
square		16	
triangle			
total		20	60

[2]



- 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]

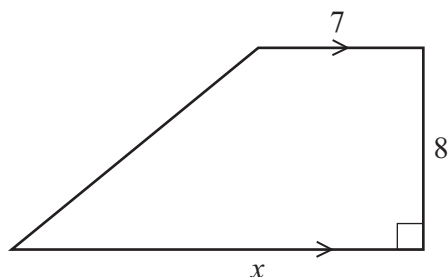
- 6 Pran invests \$2000 in a savings account.
The account pays simple interest at a rate of 3.5% per year.

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

\$ [3]



- 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 .

$x = \dots\dots\dots$ [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.

$\dots\dots\dots$ [1]

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

$\dots\dots\dots$ [1]

- (c) Mary spins this spinner 100 times.

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

$\dots\dots\dots$ [1]



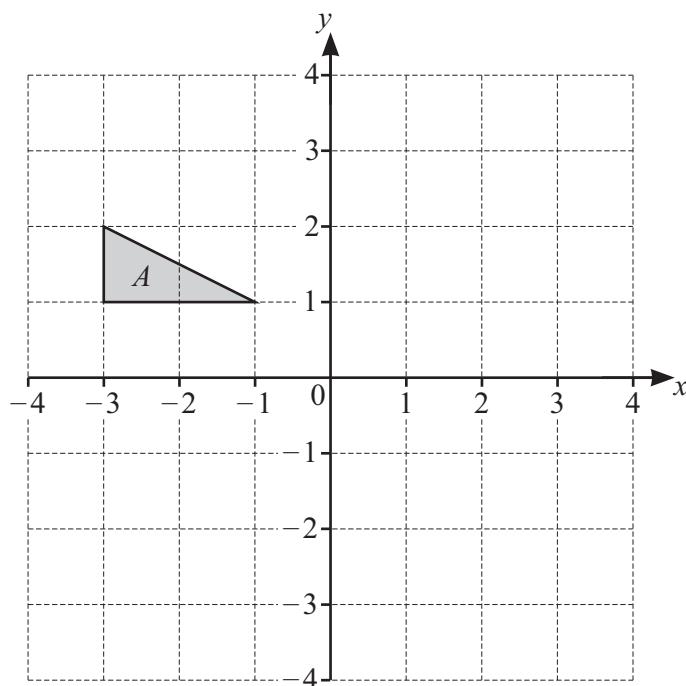
9 Work out.

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

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]

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]



- 13 (a) The n th 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.

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

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

..... [1]

- (ii) Find an expression for the n th term of the sequence, T .

$T_n =$ [2]

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

The k th term of this sequence is 5.

Find the value of k .

$k =$ [3]





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]



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 $(-1, -5)$.

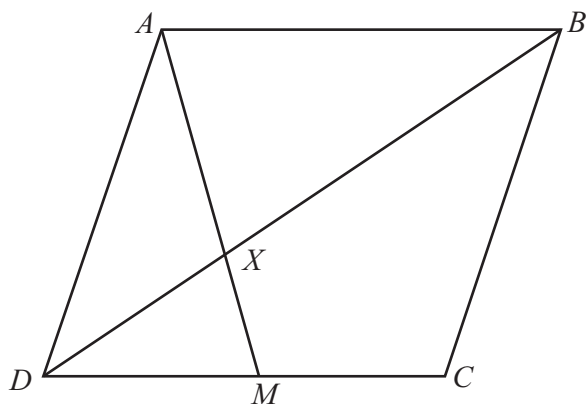
Show that the equation of line M is $y = 2x - 3$.

[2]

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

(..... ,) [3]





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 .
 $AB = 8\text{ cm}$ and $BD = 15\text{ cm}$.

- (i) Calculate DX .

$DX = \dots\dots\dots \text{ cm}$ [2]

- (ii) Complete the statement.

area of triangle AXB : area of triangle $MXD = \dots\dots\dots : 1$ [1]



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.

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

$$x = \dots\dots\dots \text{ or } x = \dots\dots\dots [3]$$

(c) Find the area of the triangle.

$$\dots\dots\dots \text{ cm}^2 [2]$$



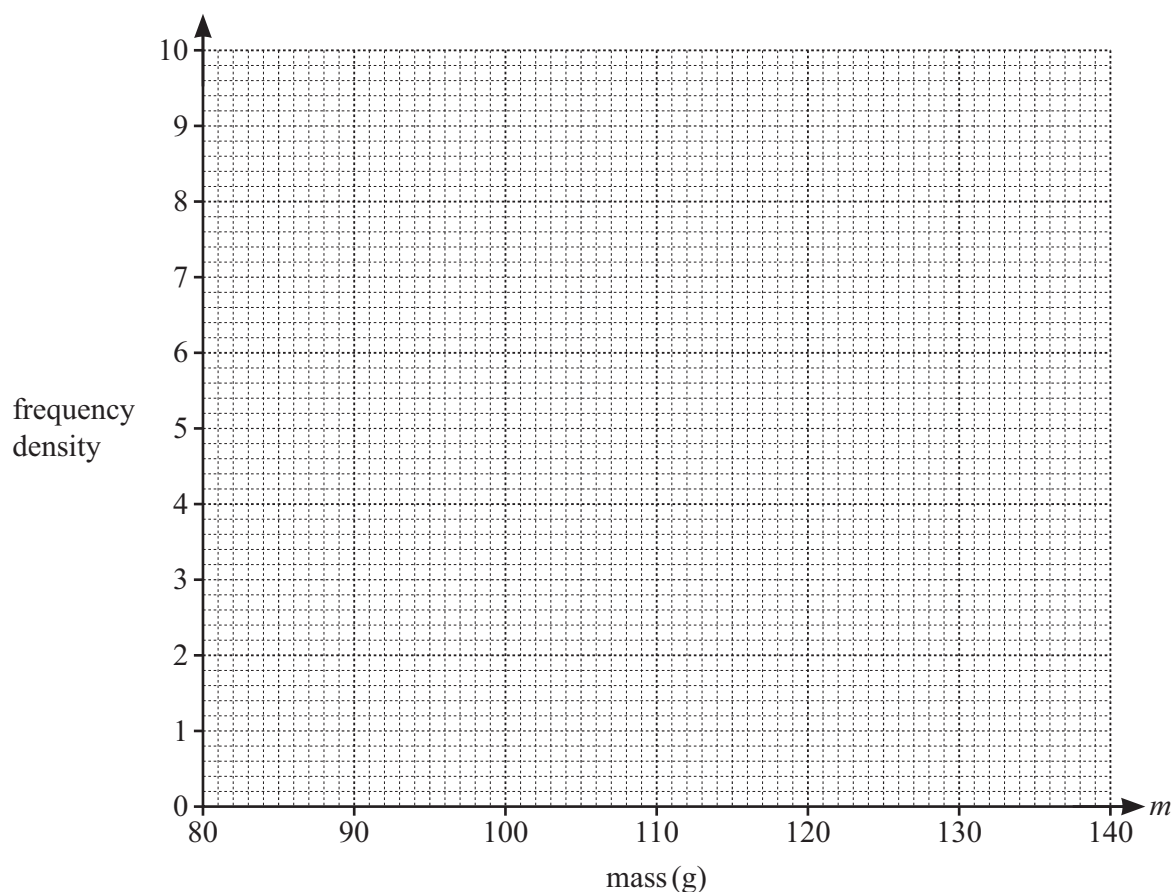
18 The masses of 200 apples are summarised in the table.

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

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

..... % [2]

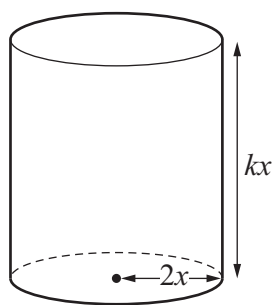
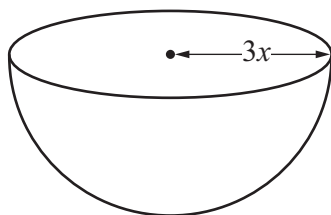
(b) On the grid, draw a histogram to represent the information in the table.



[3]



- 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 $2x$.

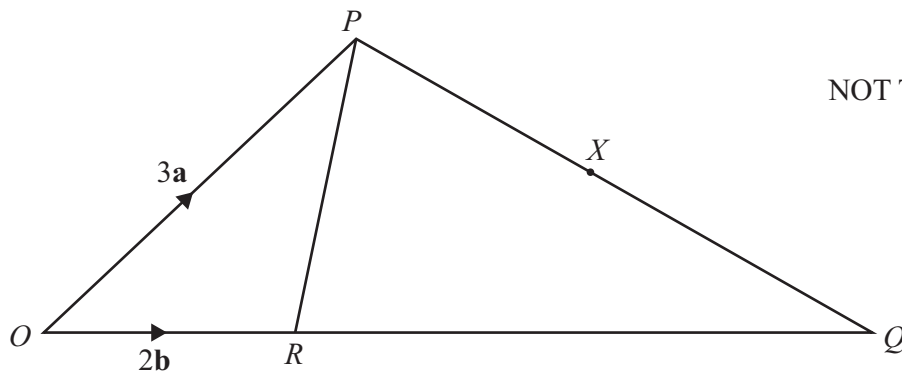
The height of the cylinder is kx .

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]



OPQ is a triangle and O is the origin.

R is a point on OQ and $OQ = 3OR$.

$\vec{OP} = 3\mathbf{a}$ and $\vec{OR} = 2\mathbf{b}$.

X is the midpoint of PQ .

Find as simply as possible in terms of $\mathbf{a}$ and/or $\mathbf{b}$

(a) $\vec{PR}$

$\vec{PR} = \dots\dots\dots [1]$

(b) $\vec{RQ}$

$\vec{RQ} = \dots\dots\dots [1]$

(c) the position vector of X .

$\dots\dots\dots [3]$



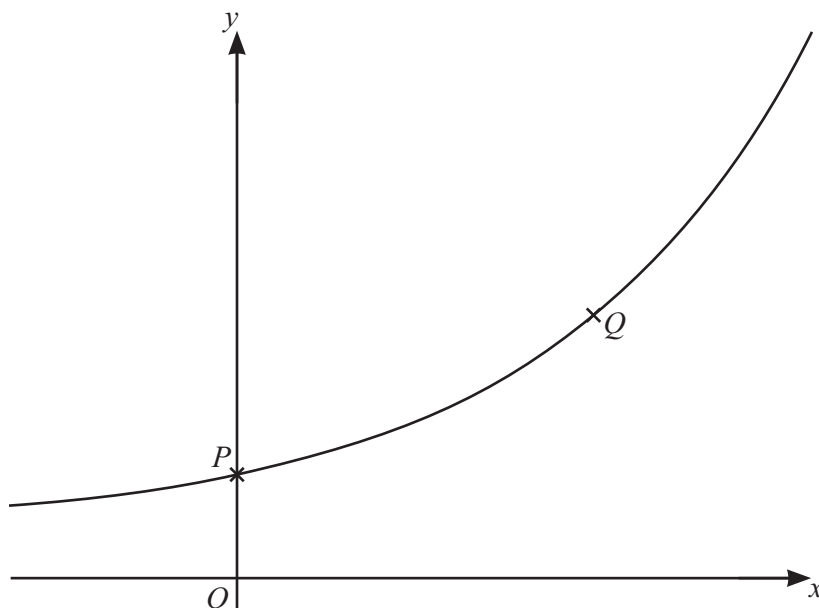


21 Write as a single fraction in its simplest form.

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

..... [4]





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]





23 Find the value of x .

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

$x = \dots\dots\dots$ [3]

24 Expand and simplify.

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

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

$\dots\dots\dots$ [3]





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