Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

T820288690

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/43**

Paper 4 (Extended) **May/June 2024**

2 hours 15 minutes

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.
- You should use a graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use your calculator value.

INFORMATION

- The total mark for this paper is 120.
- The number of marks for each question or part question is shown in brackets [ ].

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

DC (DE/SG) 329176/2

[Turn over

Formula List

For the equation $ax^2 + bx + c = 0$ $\quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Curved surface area, A, of cylinder of radius r, height h. $\quad A = 2\pi rh$

Curved surface area, A, of cone of radius r, sloping edge l. $\quad A = \pi rl$

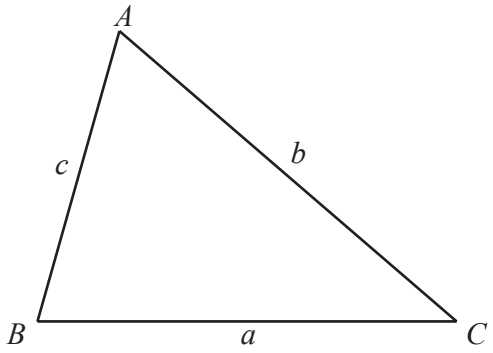
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $\quad V = \frac{1}{3}Ah$

Volume, V, of cylinder of radius r, height h. $\quad V = \pi r^2 h$

Volume, V, of cone of radius r, height h. $\quad V = \frac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $\quad V = \frac{4}{3}\pi r^3$



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

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

$$\text{Area} = \frac{1}{2}bc\sin A$$

Answer **all** the questions.

1 **(a)** There are 120 houses in a street.
The table shows the numbers of letters delivered to the houses one day.

Number of letters	0	1	2	3	4	5	6
Frequency	26	20	23	25	14	8	4

Find

(i) the mode

..... [1]

(ii) the median

..... [1]

(iii) the range

..... [1]

(iv) the upper quartile

..... [1]

(v) the mean.

..... [2]

(b) This table shows the numbers of letters delivered to the houses in another street one day.

Number of letters	0	1	2	3	4	5	6
Frequency	18	31	27	18	n	12	5

The mean number of letters delivered in this street is 2.28 .

Find the value of n.

$n =$ ..... [3]

2 **(a)** Ameera and Bertrand share some money in the ratio 4 : 5.
Bertrand gets \$3000.

Calculate Ameera's share.

\$ ..... [2]

(b) Bertrand invests \$3000 at a rate of r% per year simple interest.
At the end of 10 years the value of the investment is \$3840.

Find the value of r.

$r =$ ..... [3]

(c) Claudia invests \$6000 at a rate of s% per year compound interest.
At the end of 8 years the value of the investment is \$7367.67 .

Find the value of s.

$s =$ ..... [3]

(d) Dieter invests \$4000 at a rate of 1.8% per year compound interest.
At the end of n complete years the value of the investment is more than \$6000.

Calculate the smallest value of n.

$n =$ ..... [4]

3 **(a)** Noora throws a fair 6-sided die numbered from 1 to 6.

Write down the probability that the die shows

(i) a number less than 5

..... [1]

(ii) an even number.

..... [1]

(b) Dilshan has two fair 6-sided dice each numbered from 1 to 6.
He throws both dice.

Find the probability that

(i) both dice show a 6

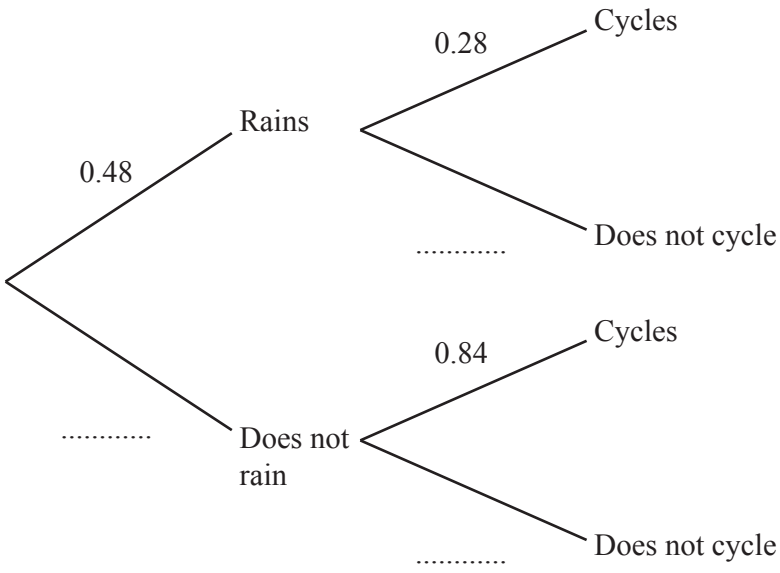
..... [2]

(ii) at least one die does not show a 6.

..... [1]

(c) The probability that it rains on Wednesday is 0.48 .
If it rains, the probability that Hannah cycles to work is 0.28 .
If it does not rain, the probability that Hannah cycles to work is 0.84 .

(i) Complete this tree diagram.



[2]

(ii) Find the probability that, on Wednesday, it does not rain and Hannah cycles.

..... [2]

4 Line L has equation $3y + 2x = 8$.

(a) Find the gradient and the y-intercept of line L.

gradient .....

y-intercept ..... [3]

(b) Line P passes through the point (2, 10) and is perpendicular to line L.

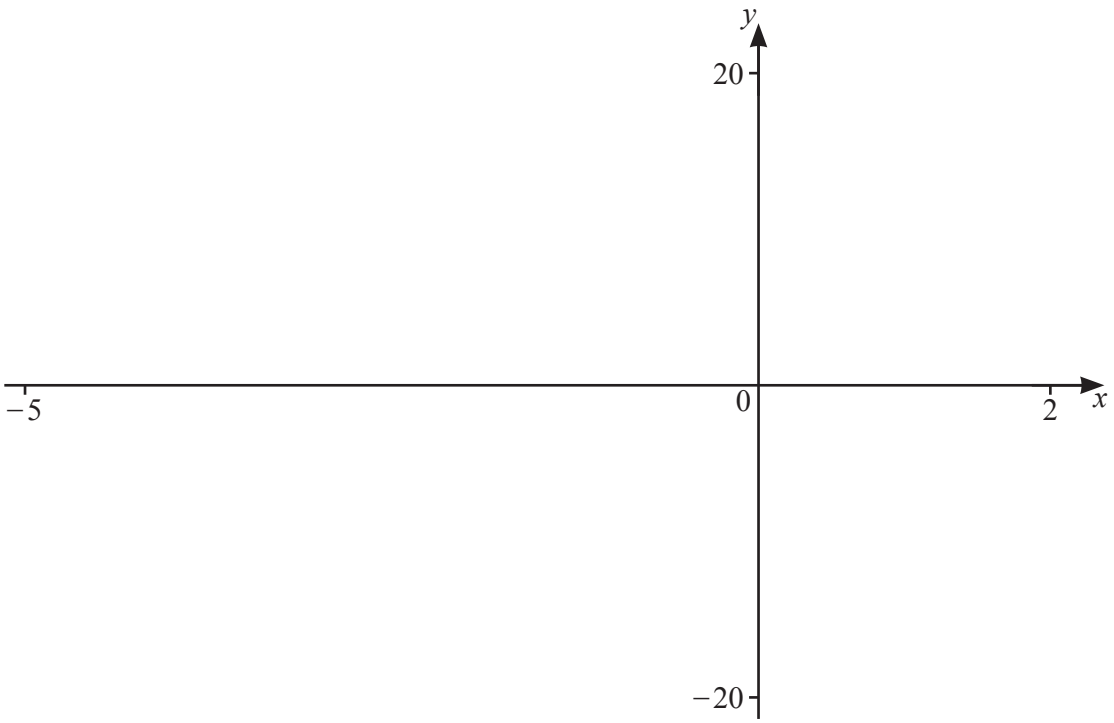
Show that the equation of line P is $2y - 3x = 14$.

[3]

(c) Find the coordinates of the point where line L and line P intersect.
You must show all your working.

(..... , ...) [4]

5



$\mathrm{f}(x) = 5 + 2x - 4x^2 - x^3 \quad \text{for } -5 \leqslant x \leqslant 2$

(a) On the diagram, sketch the graph of $y = \mathrm{f}(x)$. [2]

(b) Find the zeros of $\mathrm{f}(x)$.

..... [3]

(c) Write down the coordinates of the local minimum.

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

(d) The point (a, b) lies on the graph of $y = \mathrm{f}(x)$ where the gradient is positive.

Find the range of values for a.

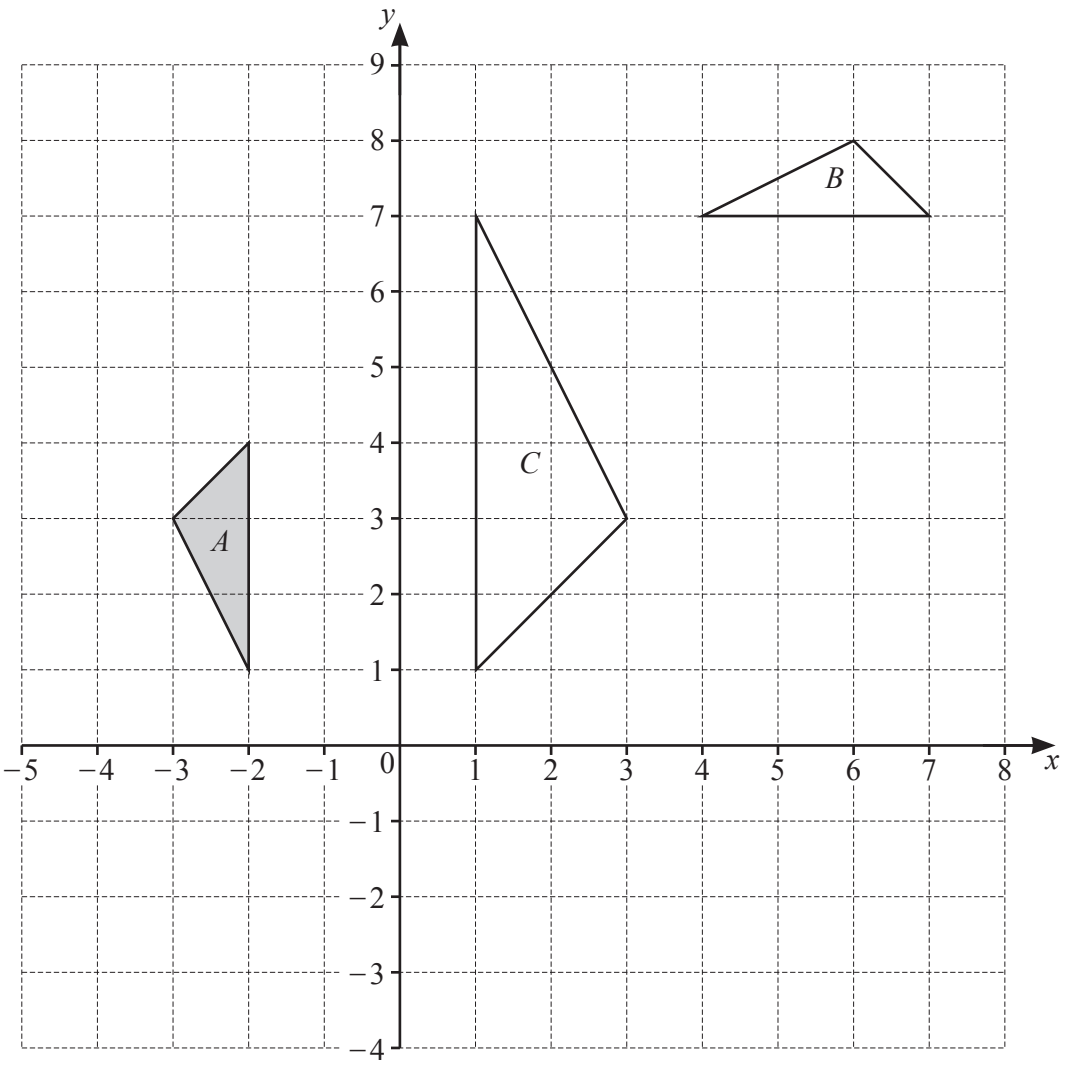
..... [2]

(e) The equation $5 + 2x - 4x^2 - x^3 = k$ has exactly one solution.

Write down a possible value of the integer k.

..... [1]

6 (a)



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

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

.....

..... [3]

(iii) Describe fully the **single** transformation that maps triangle A onto triangle C.

.....

..... [3]

(b) Write down the inverse of each of these transformations.

(i) Translation with the vector $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$

.....

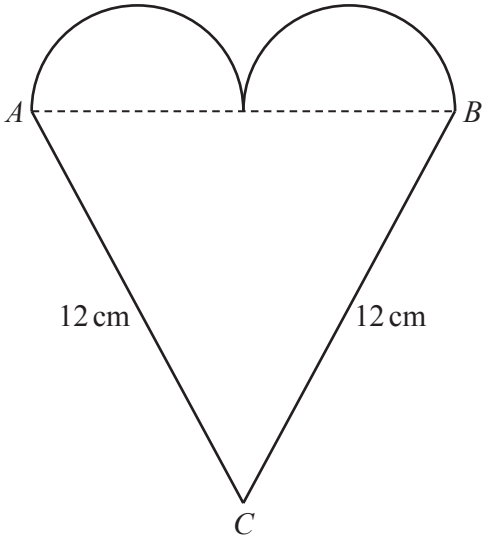
..... [2]

(ii) Stretch with the line $y = 1$ invariant and stretch factor 3

.....

..... [3]

7



NOT TO SCALE

The diagram shows a logo made from an isosceles triangle and two semicircles.
The perimeter of the logo is 37 cm.

(a) Show that the diameter of each semicircle is 4.14 cm, correct to 3 significant figures.

[2]

(b) Calculate angle ACB.

Angle ACB = ... [3]

(c) Calculate the area of the logo.

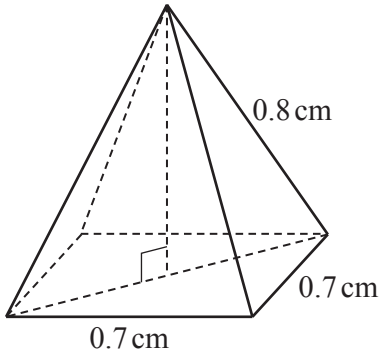
..... cm^2 [3]

(d) A mathematically similar logo has an area of $35\,cm^2$.

Calculate the perimeter of this logo.

..... cm [3]

8



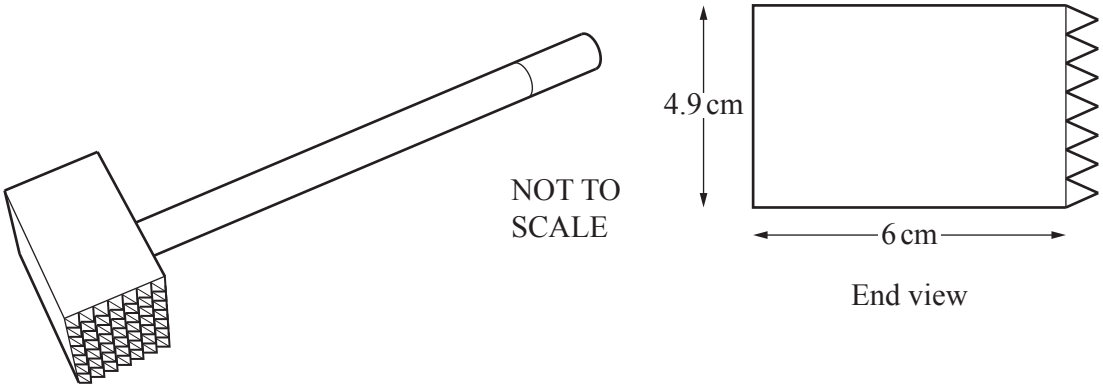
NOT TO SCALE

The diagram shows a square-based pyramid.
The side of the base of the pyramid is 0.7 cm.
The length of each sloping edge is 0.8 cm.

(a) Show that the perpendicular height of the pyramid is 0.628 cm, correct to 3 significant figures.

[4]

(b)



The diagram shows a kitchen tool made from wood.
The tool is formed from a cuboid, a cylinder and 49 of the square-based pyramids from **part (a)**.

The cylinder has a radius of 1.2 cm and length 25 cm.
The cuboid measures 4.9 cm by 4.9 cm by 6 cm.
The mass of 1 cm^3 of the wood is 0.63 grams.

Calculate the total mass of the tool.

..... g [5]

9 **(a)** Solve.

(i) $2x+3=1-5x$

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

(ii) $|x+3|=2$

..... [2]

(b) Factorise completely.

$6x^3y^2-3x^2y^3$

..... [2]

(c) Write $\frac{5}{2x+3}-\frac{2}{x-5}$ as a single fraction in its simplest form.

..... [3]

(d) Solve $2x^2+3x=7$.
You must show all your working and give your answers correct to 2 decimal places.

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

10 $f(x) = 5 - \frac{1}{2}x$ $g(x) = 3(x+1)$ $h(x) = \sin x^\circ$ for $0 \leqslant x \leqslant 180$

(a) Find $f(3)$.

..... [1]

(b) Solve $f(x) = 2$.

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

(c) Find and simplify $f(g(x))$.

..... [2]

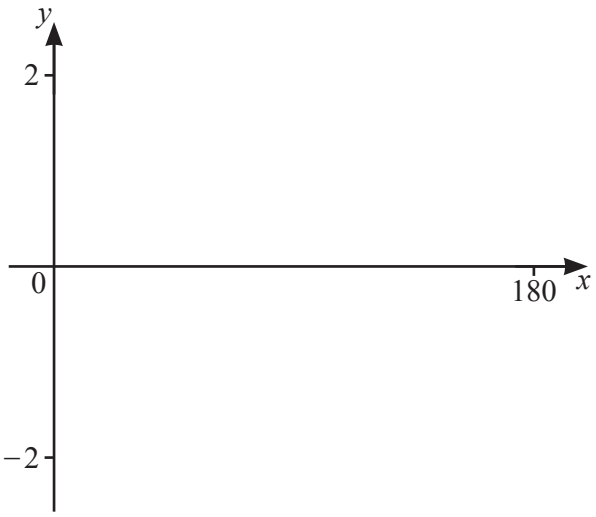
(d) Find $g^{-1}(x)$.

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

(e) Find $h(g(29))$.

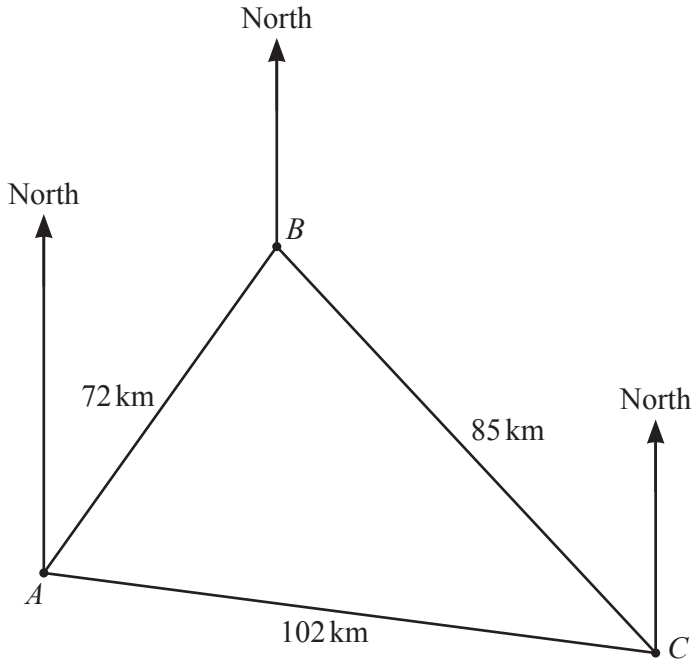
..... [2]

(f) Using a graphical method, solve $h(g(x)) = 1 - 0.01x$.



..... [5]

11



NOT TO SCALE

A, B, and C are three ports.
The bearing of B from A is 040°.

(a) Show that angle $ABC = 80.6°$, correct to 1 decimal place.

[3]

(b) Find the bearing of B from C.

..... [2]

(c) A ship leaves port A at 13 00.
It sails directly towards C at a speed of 32 km/h.
At point P the ship is at its shortest distance from B.

Find the time when the ship reaches point P.
Give your answer correct to the nearest minute.

..... [6]

BLANK PAGE