

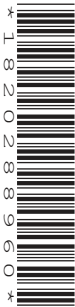


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CAMBRIDGE INTERNATIONAL MATHEMATICS

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.

Formula List

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

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 . $A = \pi rl$

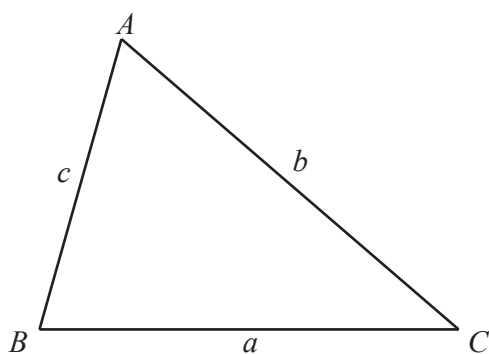
Curved surface area, A , of sphere of radius r . $A = 4\pi r^2$

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



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

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

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

3

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]

4

- 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]

5

- (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 .

$n = \dots\dots\dots$ [4]

6

- 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

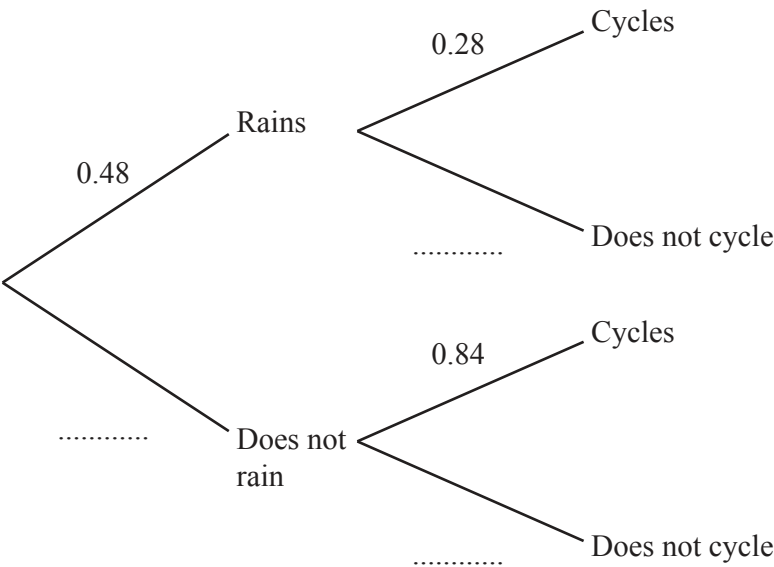
..... [2]

- (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]

8

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 $2y - 3x = 14$.

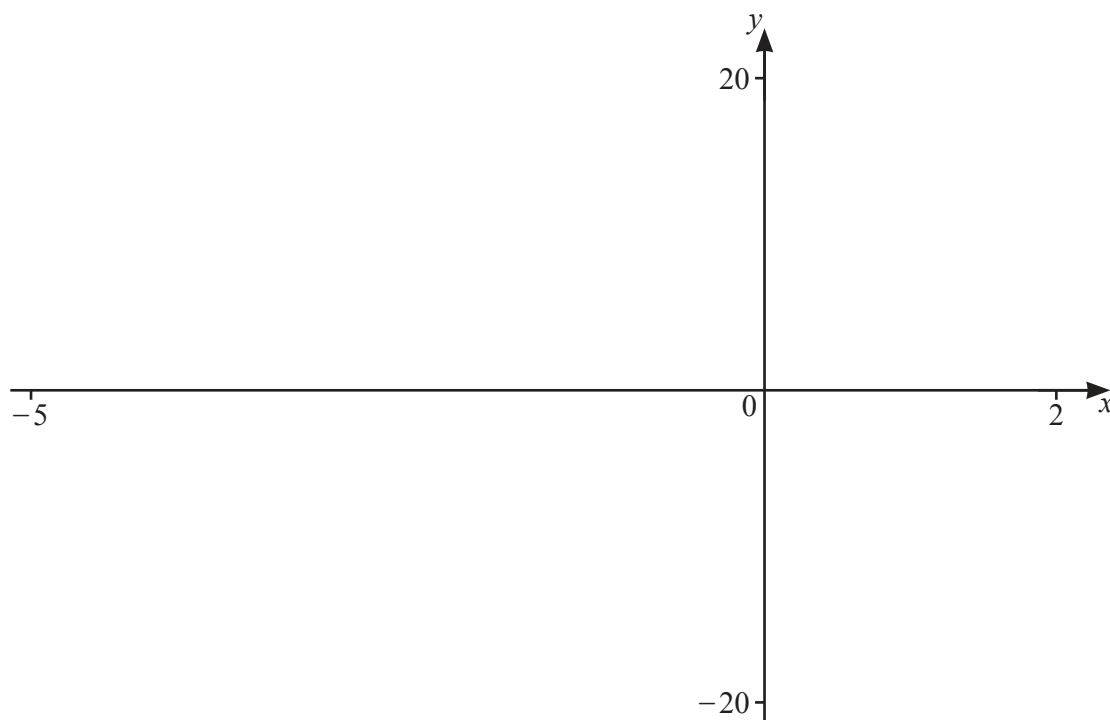
[3]

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

(..... ,) [4]

9

5



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

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

(b) Find the zeros of $f(x)$.

..... [3]

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

(..... ,) [2]

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

Find the range of values for a .

..... [2]

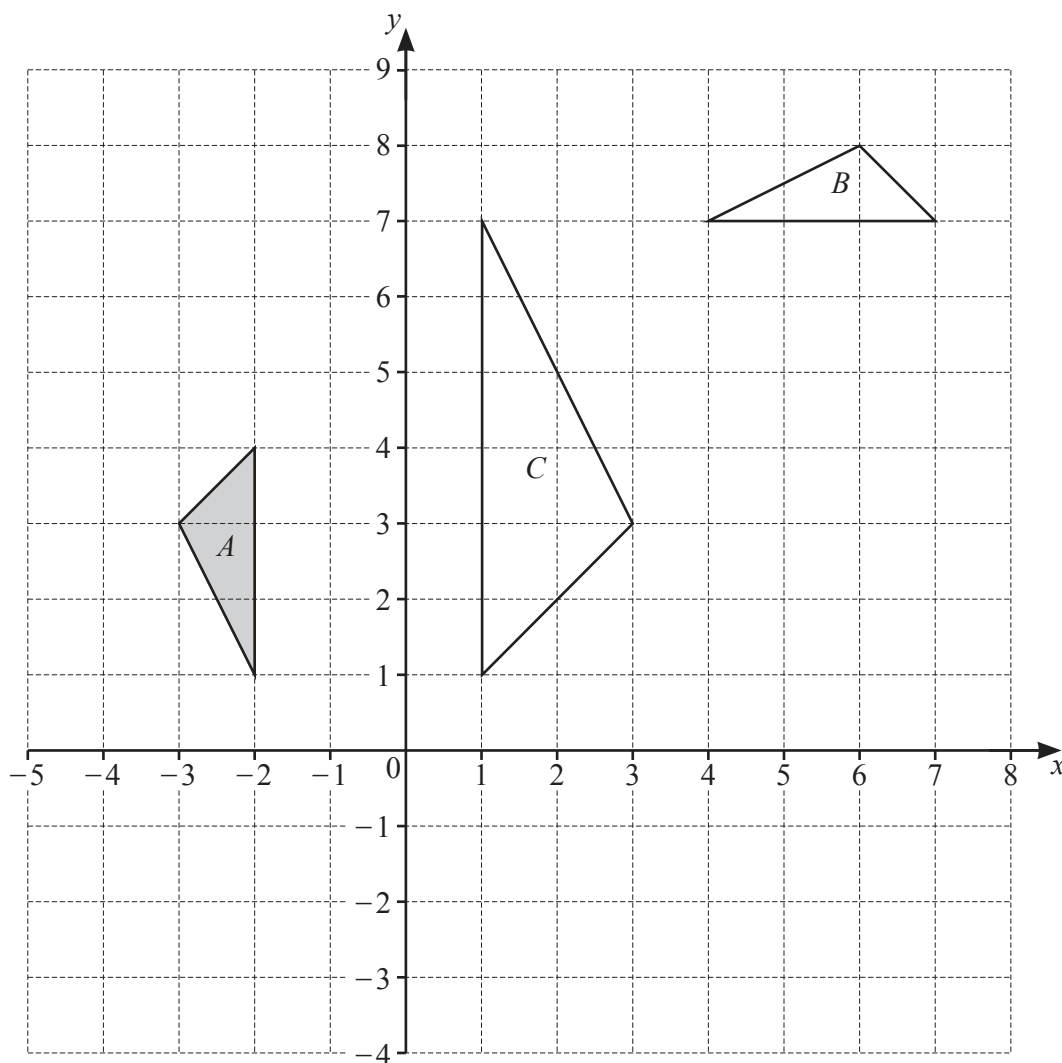
(e) The equation $5 + 2x - 4x^2 - x^3 = k$ has exactly one solution.

Write down a possible value of the integer k .

..... [1]

10

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]

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

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

.....

..... [2]

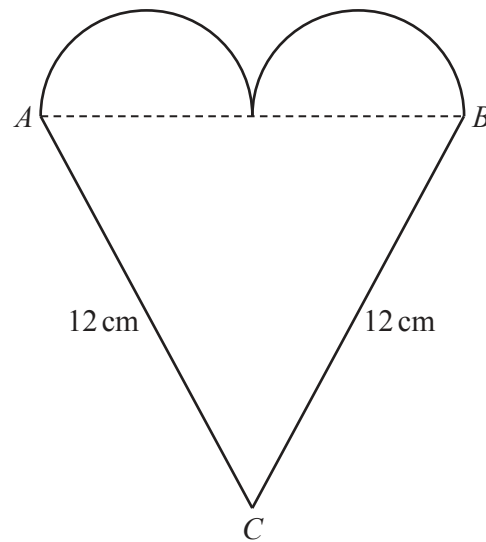
- (ii)** Stretch with the line $y = 1$ invariant and stretch factor 3

.....

..... [3]

12

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]

13

(c) Calculate the area of the logo.

..... cm² [3]

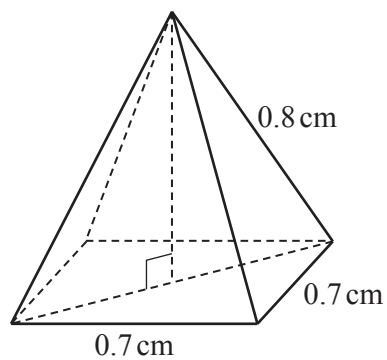
(d) A mathematically similar logo has an area of 35 cm².

Calculate the perimeter of this logo.

..... cm [3]

14

8

NOT TO
SCALE

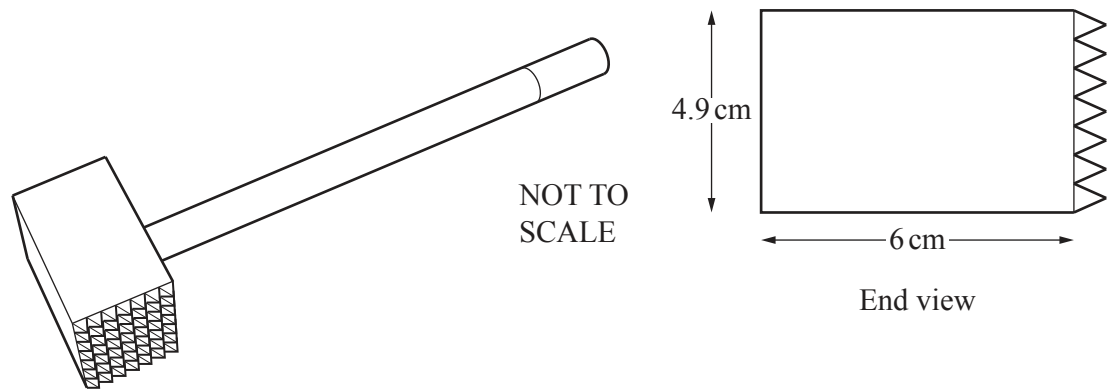
The diagram shows a square-based pyramid.
The side of the base of the pyramid is 0.7 cm.
The length of each sloping edge is 0.8 cm.

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

[4]

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(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 cm³ of the wood is 0.63 grams.

Calculate the total mass of the tool.

..... g [5]

16

9 (a) Solve.

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

$x = \dots\dots\dots$ [2]

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

$\dots\dots\dots$ [2]

(b) Factorise completely.

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

$\dots\dots\dots$ [2]

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

$\dots\dots\dots$ [3]

(d) Solve $2x^2 + 3x = 7$.

You must show all your working and give your answers correct to 2 decimal places.

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

..... [1]

$x =$ [2]

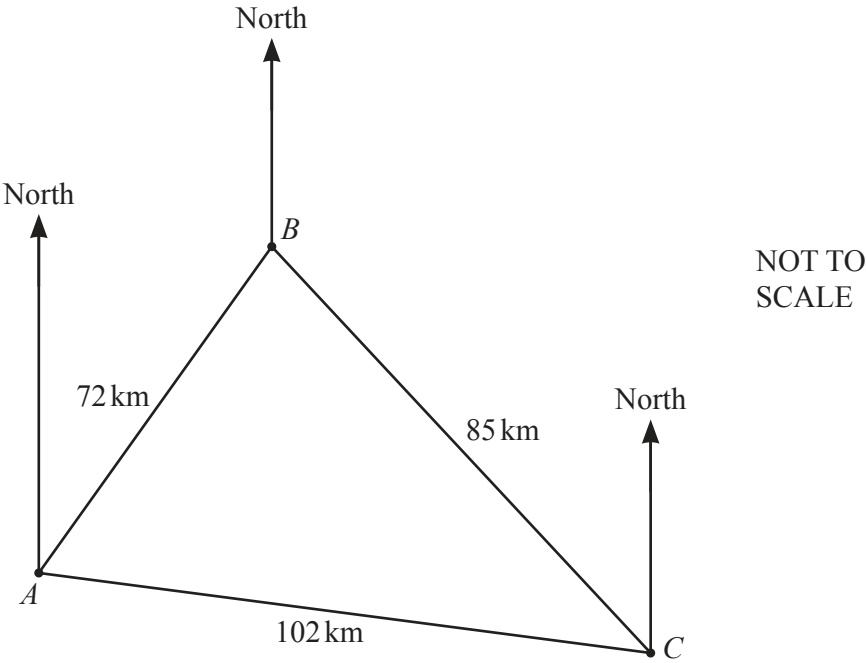
..... [2]

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

..... [2]

..... [5]

11



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

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

[3]

(b) Find the bearing of B from C .

..... [2]

19

- (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]

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