* 0000800000001 *

Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

* 7 7 6 4 0 2 2 1 4 4 *

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/43**

Paper 4 (Extended) **October/November 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/CB) 337377/4
© UCLES 2024

[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. $\quad A = \pi rl$

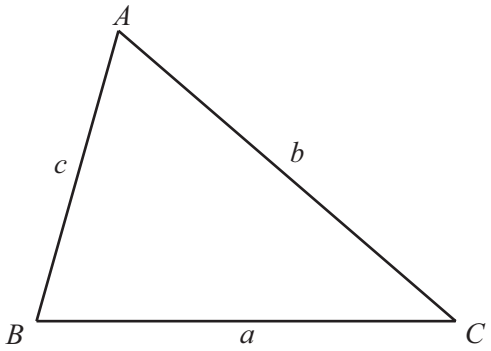
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

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



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

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

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

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

Answer **all** the questions.

1 The table shows the heights of 100 sunflower plants.

Height (h cm)	$90 < h \leqslant 110$	$110 < h \leqslant 120$	$120 < h \leqslant 130$	$130 < h \leqslant 150$	$150 < h \leqslant 170$	$170 < h \leqslant 200$
Frequency	10	12	22	35	14	7

(a) Calculate an estimate for the mean height of the sunflower plants.

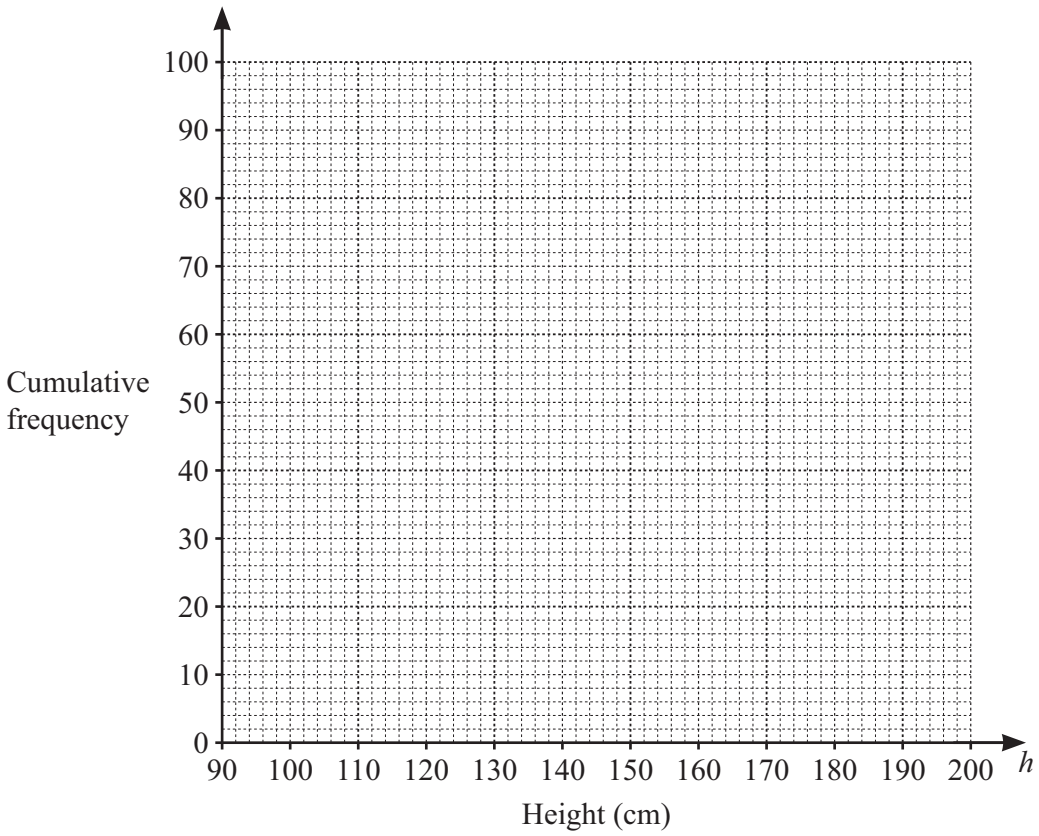
..... cm [2]

(b) Complete the cumulative frequency table for the heights of the sunflower plants.

Height (h cm)	$h \leqslant 110$	$h \leqslant 120$	$h \leqslant 130$	$h \leqslant 150$	$h \leqslant 170$	$h \leqslant 200$
Cumulative frequency						

[2]

(c) On the grid, draw a cumulative frequency curve to show this information.



[3]

(d) Use your cumulative frequency curve to estimate the number of sunflower plants that are more than 180 cm in height.

..... [2]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

2 **(a)** Work out 24% of \$15.50 .

\$ ..... [2]

(b) The price of a bookcase is \$123.
This price is increased by 7%.

Calculate the new price.

\$ ..... [2]

(c) An amount of money is shared between Ali, Kat and Lena in the ratio 5 : 3 : 4.
Lena's share is \$76.

Work out the total amount of money.

\$ ..... [3]

(d) A library has 32 800 books.
Each year the number of books in the library increases by 300.

Calculate the number of years it takes until there are 40 000 books in the library.

..... [2]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

(e) A different library has 32 695 books at the end of 2024.
Each year the number of books increases by 0.6% of the number of books in the library at the end of the previous year.

(i) Calculate the number of books the library had at the end of 2023.

..... [2]

(ii) Calculate the number of complete years from 2024 that it takes for the number of books to first be greater than 40 000.

..... [4]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

3 **(a)** AC is a straight line.
B is the mid-point of AC.
A is the point $(-1, 11)$ and B is the point $(3, 8)$.

(i) Find the length of AB.

..... [3]

(ii) Find the coordinates of C.

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

(iii) Find the equation of the perpendicular bisector of AC.

..... [4]

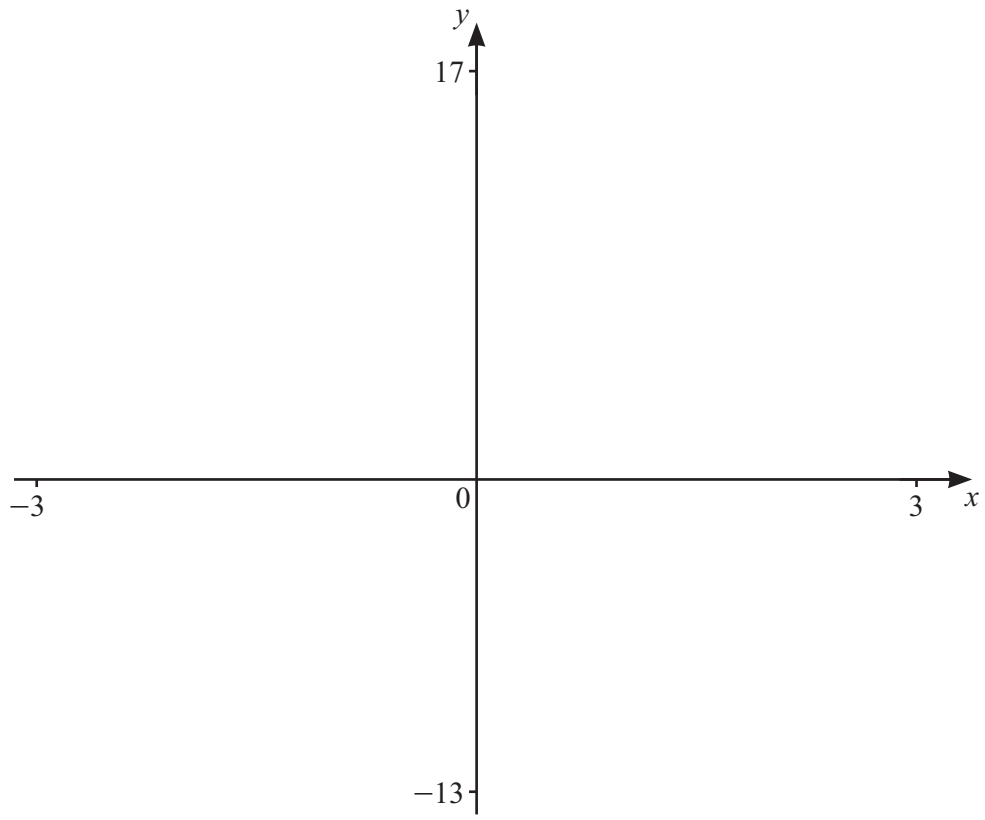
(b) PQR is a straight line.
P is the point $(-6, -1)$ and Q is the point $(-3, 1)$.
Q divides the line PR in the ratio $PQ : QR = 1 : 2$.

Find the coordinates of R.

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

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

4



$f(x) = x^3 - 4x + 2$ $\quad$ $g(x) = \frac{3}{x} + x^2$

(a) On the diagram, sketch the graph of $y = f(x)$ for values of x between -3 and 3. [2]

(b) Find the solutions of $f(x) = 0$.

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

(c) On the diagram, sketch the graph of $y = g(x)$ for values of x between -3 and 3. [3]

(d) Write down the equation of the asymptote of the graph of $y = g(x)$.

..... [1]

(e) Solve $f(x) \leqslant g(x)$.

..... [4]

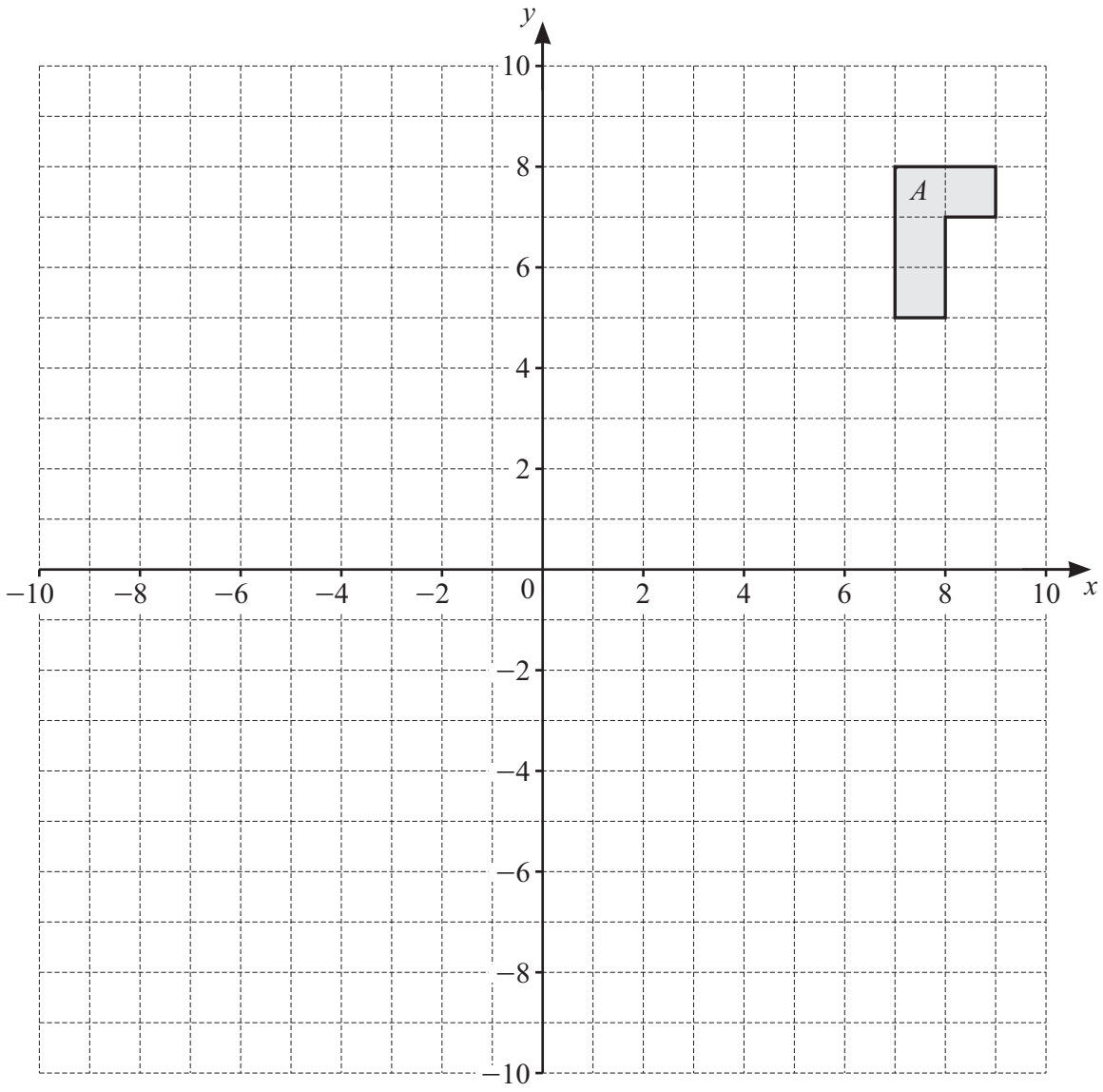
DO NOT WRITE IN THIS MARGIN DO NOT WRITE IN THIS MARGIN DO NOT WRITE IN THIS MARGIN DO NOT WRITE IN THIS MARGIN DO NOT WRITE IN THIS MARGIN

5 **(a)** Describe fully the **single** transformation that is the inverse of an enlargement with scale factor 3 and centre $(2, 2)$.

.....

..... [2]

(b)

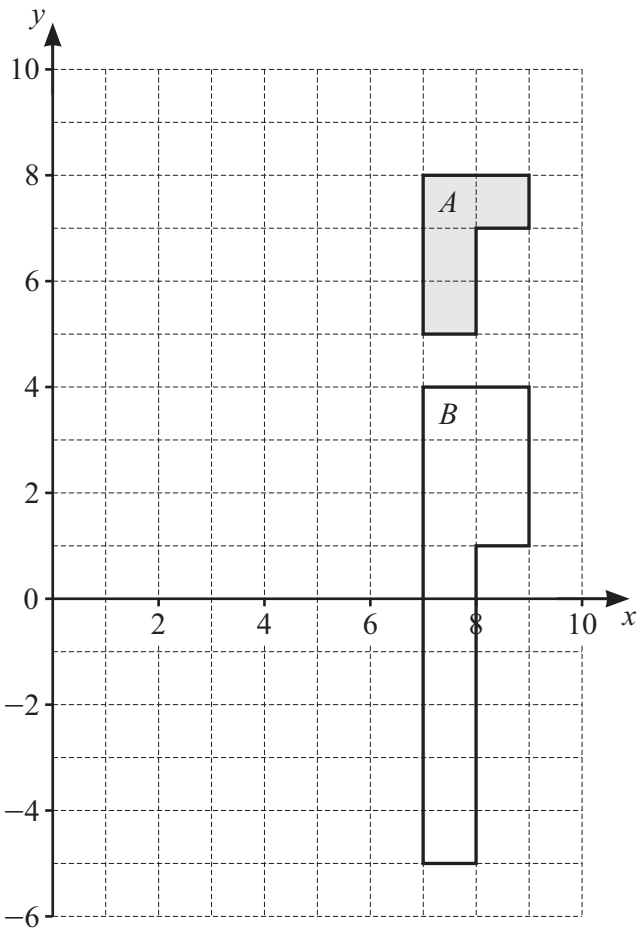


(i) Draw the image of shape A after a rotation of 90° anticlockwise with centre $(0, 0)$. [2]

(ii) Draw the image of shape A after a translation with vector $\begin{pmatrix} -5 \\ -4 \end{pmatrix}$ followed by an enlargement with scale factor -2 and centre $(0, 0)$. [4]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

(c)



Describe fully the **single** transformation that maps shape *A* onto shape *B*.

.....

..... [3]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

6 $f(x) = 5x - 1$ $g(x) = x^2 + x$ $h(x) = (x-1)^3$

The domain for all three functions is $x > 2$.

(a) Find $f(3)$.

..... [1]

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

..... [1]

(c) Find $g(f(4))$.

..... [2]

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

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

(e) Simplify fully.

$$\frac{10h(x)}{f(x)-4}$$

..... [3]

DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

7 **(a)** Find the next term and the nth term for each of these sequences.

(i) 19 16 11 4

next term = ...

nth term = ... [3]

(ii) 20 10 5 2.5

next term = ...

nth term = ... [3]

(b) The nth term of a sequence is $2n^2 - 3n + 1$.
The kth term is 465.

Work out the value of k.

k = ... [3]

8 **(a)** The amount charged for electricity in one month is $\$E$.
$\$E$ is the sum of a fixed charge $\$f$ and a cost of $\$d$ for each unit of electricity used.

Find a formula for the amount charged in one month when u units of electricity are used.

..... [2]

(b) Write as a single fraction in its simplest form.

$$\frac{x}{2} - \frac{2x}{3} + \frac{5x}{18}$$

..... [2]

(c) Solve $7n - 9 > 21 + 2n$.

..... [2]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

(d) Solve the simultaneous equations.
You must show all your working.

$$2x + 15y = -57$$
$$20x + 3y = 18$$

$x =$ .....

$y =$ ..... [3]

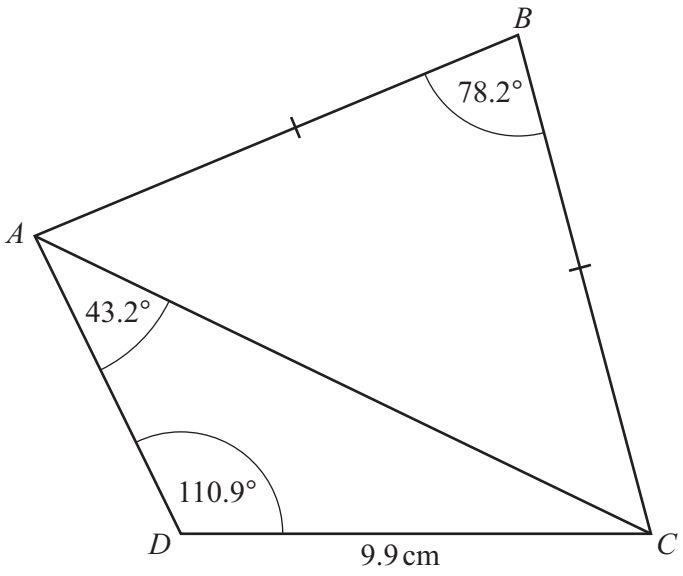
(e) y is proportional to the square of $(x-3)$.
$y = 5$ when $x = 7$.

Find the value of y when $x = 27$.

$y =$ ..... [3]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

9



NOT TO SCALE

Triangle ABC is isosceles with $AB = BC$.

(a) Show that $AC = 13.5\,\text{cm}$ correct to 3 significant figures.

[3]

(b) Calculate the length AB.

..... cm [3]

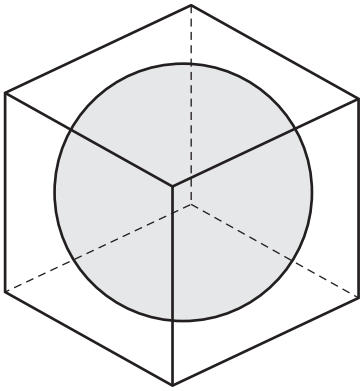
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

(c) Find the area of *ABCD*.

..... cm^2 [3]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

10 (a)



NOT TO SCALE

A metal sphere has a volume of 9203 cm^3.
The sphere is inside a cube and touches each face of the cube.

(i) Find the volume of the cube.

..... cm^3 [4]

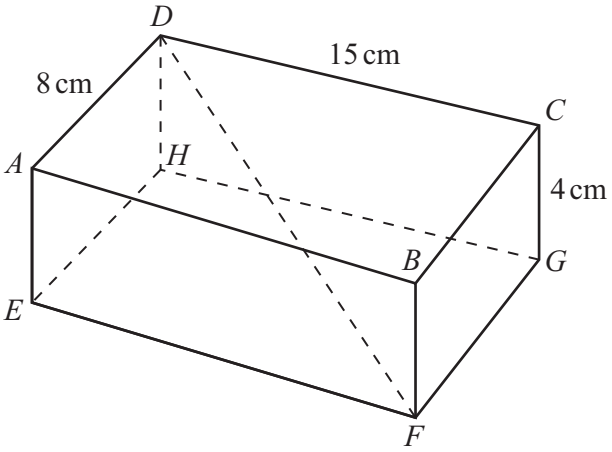
(ii) The sphere is melted and poured into the cube.

Find the depth of the metal.

..... cm [2]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

(b)



NOT TO SCALE

ABCDEFGH is a cuboid.

(i) Calculate the length *DF*.

..... cm [4]

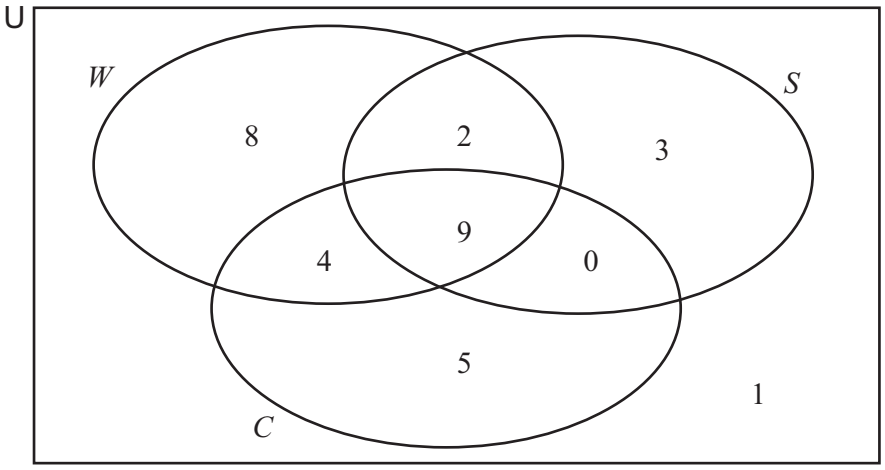
(ii) Calculate the angle that the diagonal *DF* makes with the base *EFGH*.

..... [2]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

11 32 students in a class are asked which of three activities they like.
W = {students who like walking}
S = {students who like swimming}
C = {students who like cycling}

The Venn diagram shows the number of students in each subset.



(a) One of these students is chosen at random.

Complete the sentence.

This student is most likely to belong in {students who like .....}. [1]

(b) Write down the number of students who like all three activities.

..... [1]

(c) Find $n((S' \cup C) \cap W')$.

..... [1]

(d) A student is chosen at random from the class.

Find the probability that this student likes both walking and swimming.

..... [1]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

(e) Two of the students who like swimming are chosen at random.

Find the probability that one of these students likes walking but not cycling and the other student only likes swimming.

..... [3]

(f) Three of the 32 students are chosen at random.

Find the probability that one student likes exactly one of the activities and the other two students like exactly two of the activities.

..... [3]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

BLANK PAGE

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.