Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

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7314200078

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **May/June 2019**

1 hour 45 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Graphics Calculator

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
Do not use staples, paper clips, glue or correction fluid.
You may use an HB pencil for any diagrams or graphs.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions.
Unless instructed otherwise, give your answers exactly or correct to three significant figures as appropriate.
Answers in degrees should be given to one decimal place.
For π, use your calculator value.
You must show all the relevant working to gain full marks and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 96.

This document consists of **18** printed pages and **2** blank pages.

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[Turn over

Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, 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.	$A = \pi rl$
Curved 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.	$V = \frac{4}{3}\pi r^3$

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Answer **all** the questions.

1 **(a)** Write in words the number 6015.

..... [1]

(b) Find the value of

(i) 4^3,

..... [1]

(ii) $\frac{2(3+9)}{3\times 16}$,

..... [1]

(iii) 3×5^2,

..... [1]

(iv) $40-10\times 2$.

..... [1]

(c) Find

(i) $\sqrt{81}$,

..... [1]

(ii) a prime number between 20 and 30,

..... [1]

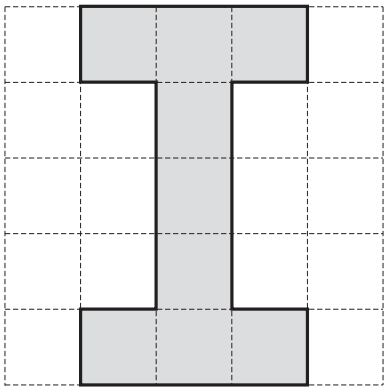
(iii) 60 as a product of prime factors.

..... [2]

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[Turn over

2



This shape is drawn on a 1 cm^2 grid.

(a) **(i)** Work out the area and the perimeter of the shape.
Give the units of each answer.

Area = ...

Perimeter = ... [4]

(ii) The shape is enlarged by a scale factor of 3.

Find the perimeter of the enlarged shape.
Give your answer in metres.

..... m [3]

(b) Write down the order of rotational symmetry of the shape.

..... [1]

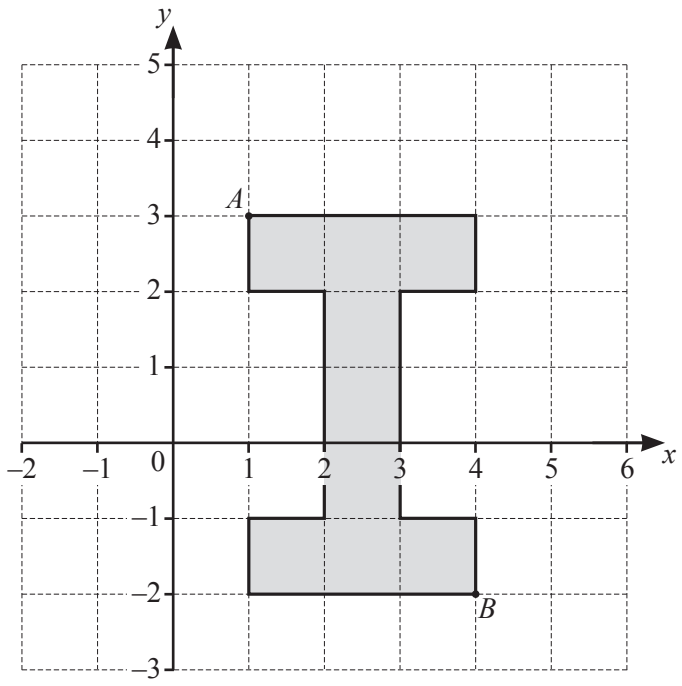
(c) On the diagram, draw all the lines of symmetry. [2]

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(d) Work out the sum of all the interior angles of the shape.

..... [3]

(e)



Write down the co-ordinates of point *A* and point *B*.

A (..... , ...)

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

3 **(a)** A packet of cereal costs $2.80 .

Work out the largest number of these packets that can be bought with $20.
How much change would you get?

..... packets and $ ..... change [3]

(b) A packet originally contained 450 g of cereal.
The mass of cereal in the packet is increased by 15%.

Work out how much **extra** cereal is added to the packet.

..... g [2]

(c) 51 out of 300 people said they would buy the heavier packet of cereal.

Work out 51 as a percentage of 300.

..... % [1]

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4 This formula can be used to change a temperature in degrees Celsius, C, to a temperature in degrees Fahrenheit, F.

$$F = 2C + 30$$

(a) Find the value of F when

(i) $C = 0$,

..... [1]

(ii) $C = 120$.

..... [1]

(b) Find the value of C when $F = 350$.

..... [2]

(c) Find the value of C when $F = C$.

..... [2]

(d) Rearrange the formula to make C the subject.

$$F = 2C + 30$$

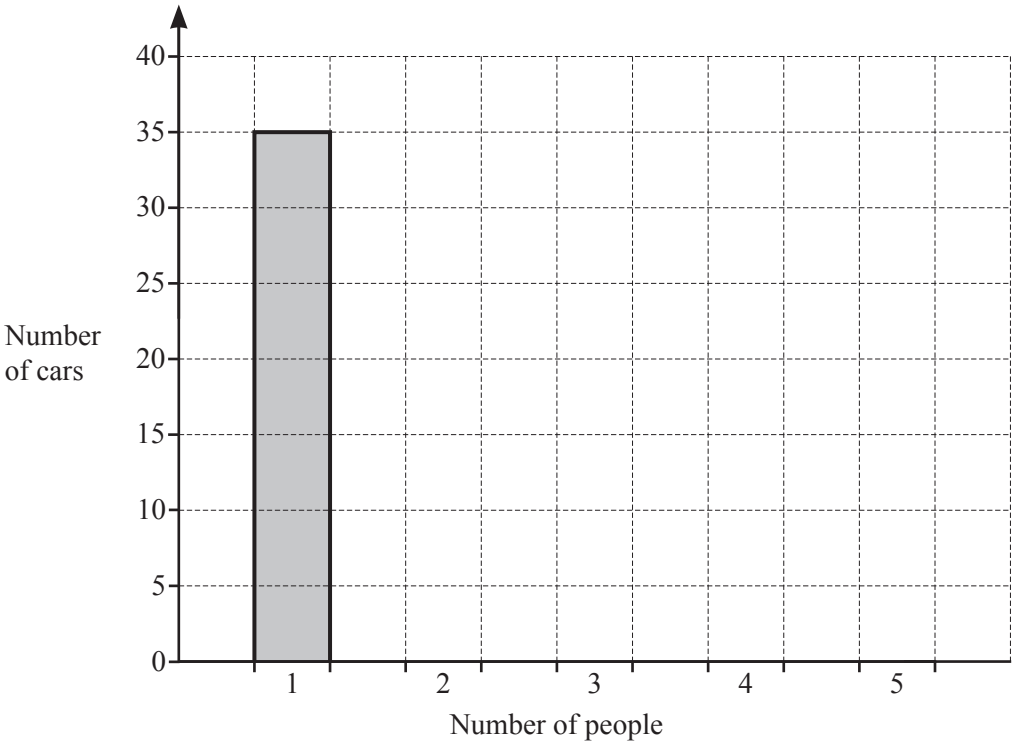
$C =$ ..... [2]

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5 Henri records the number of people in each car passing through his village.
The results are shown in the table.

Number of people	Number of cars
1	35
2	25
3	20
4	10
5	10

(a) Complete the bar chart to show this information.



[2]

(b) Find the total number of cars that Henri recorded.

..... [1]

(c) Using the results in the table, work out

(i) the mode,

..... [1]

(ii) the median,

..... [1]

(iii) the mean.

..... [2]

(d) One of the cars is chosen at random.
Work out the probability that it contains

(i) 4 people,

..... [1]

(ii) 1 or 2 people.
Give your answer as a fraction in its simplest form.

..... [2]

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[Turn over

6 **(a)** These are the first four terms of a sequence.

11 18 25 32

(i) Write down the rule for continuing this sequence.

..... [1]

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

..... [2]

(b) Here are the first four terms of another sequence.

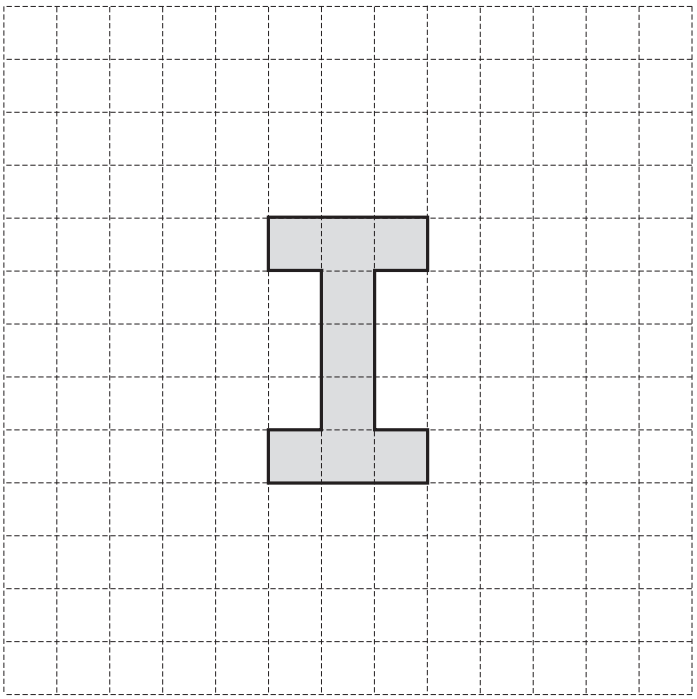
23 18 13 8

Find the next two terms of this sequence.

..... , ... [2]

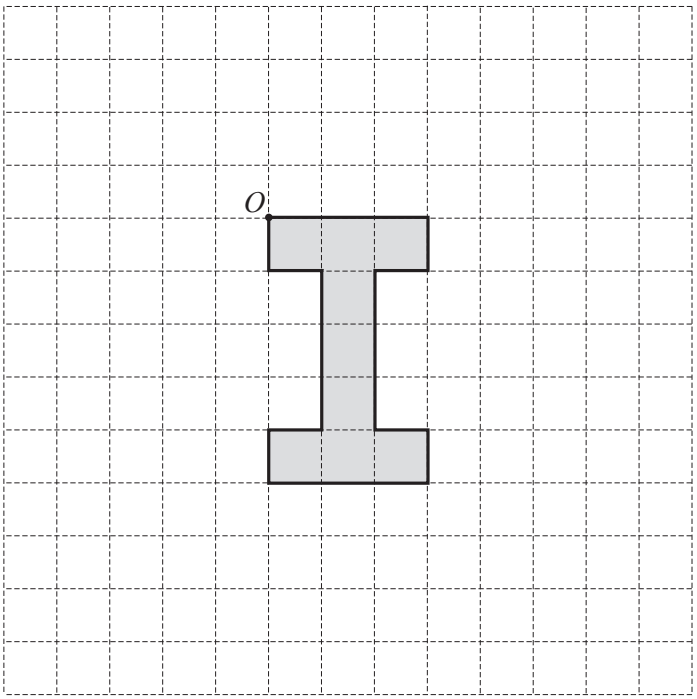
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7 **(a)** On the grid, draw the image of the shape after a translation by vector $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$.



[2]

(b) On the grid, draw the image of the shape after a rotation of 90° anticlockwise about the point O.



[2]

8 **(a)** Simplify.

$$4a + 2a - 3a$$

..... [1]

(b) Solve.

(i) $17 - x = 4$

$x =$ ..... [1]

(ii) $\frac{x}{5} = 4$

$x =$ ..... [1]

(iii) $2(3x + 1) = 44$

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

(c) Factorise fully.

$$12x - 30$$

..... [2]

(d) Simplify fully.

(i) $\dfrac{x^4 \times x^3}{x^7}$

..... [2]

(ii) $\dfrac{15y^6}{3y^2}$

..... [2]

9 Crystal carries out a survey of cars, vans and lorries that drive past her house.

(a) She sees a total of 500 of these types of vehicle.
The ratio cars : vans : lorries = 14 : 4 : 7.

Work out how many of each type of vehicle she sees.

Cars .....

Vans .....

Lorries ..... [3]

(b) One car travels 2.5 km in 5 minutes.

Work out the speed of this car in kilometres per hour.

..... km/h [2]

(c) Crystal measures the speed of each of the 500 vehicles.
Her results are shown in the table.

Speed (s km/h)	Frequency
$0 < s \leqslant 10$	0
$10 < s \leqslant 20$	20
$20 < s \leqslant 30$	230
$30 < s \leqslant 40$	170
$40 < s \leqslant 50$	60
$50 < s \leqslant 60$	20

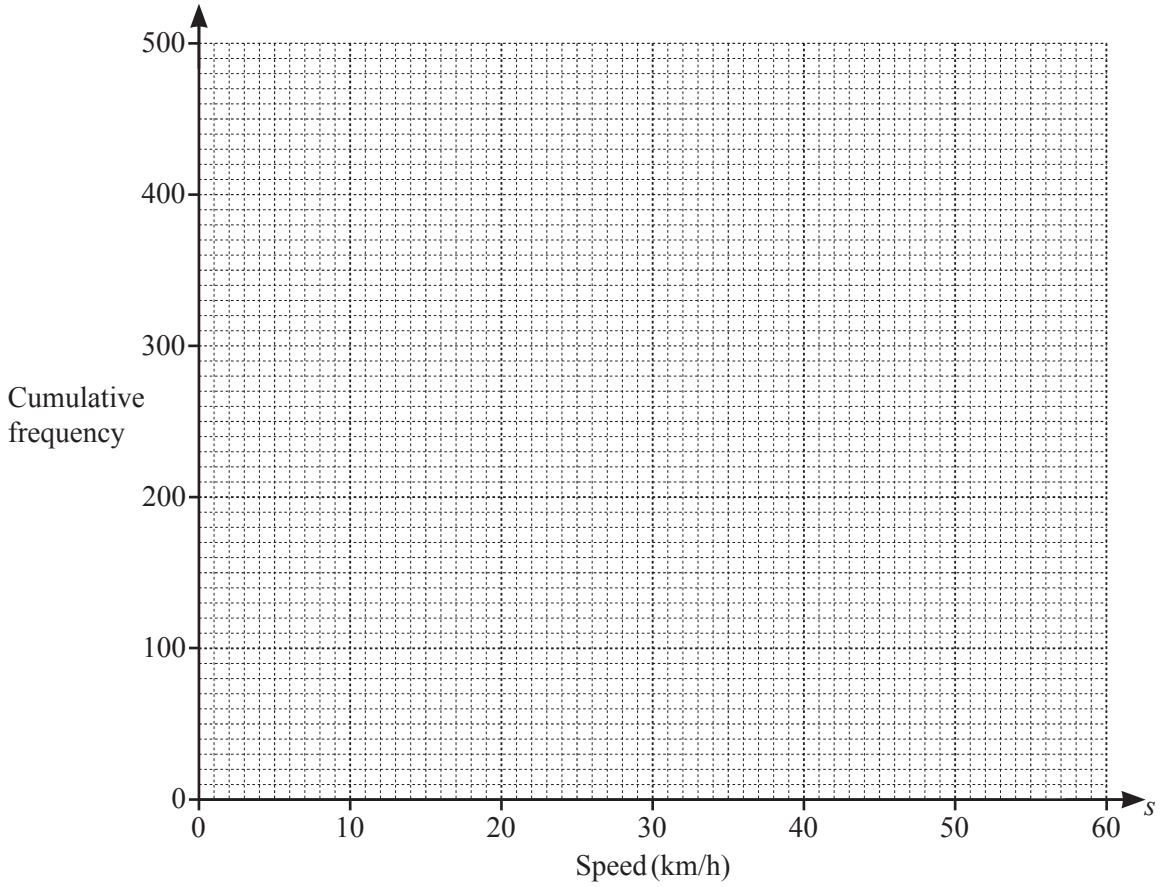
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(i) Complete the cumulative frequency table.

Speed (s km/h)	Cumulative Frequency
$s \leqslant 10$	0
$s \leqslant 20$	
$s \leqslant 30$	
$s \leqslant 40$	
$s \leqslant 50$	
$s \leqslant 60$	500

[1]

(ii) On the grid, draw a cumulative frequency curve for this information.



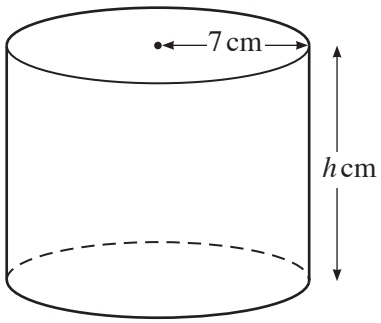
[3]

(iii) Use your cumulative frequency curve to estimate the number of cars travelling **faster than** 35 km/h.

..... [2]

10

NOT TO SCALE



A cylinder has radius 7 cm and height h cm.

(a) Show that the area of the circular end of the cylinder is 154 cm^2, correct to the nearest whole number.

[2]

(b) The volume of the cylinder is 2 litres.

Work out the value of h.

$h =$ ..... [2]

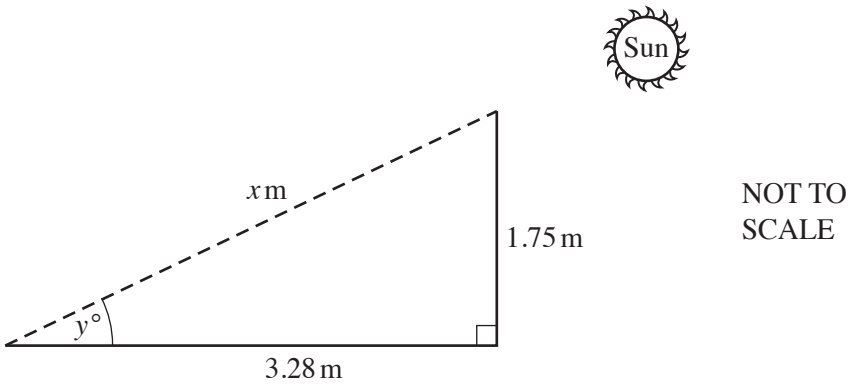
(c) A cube has side length x cm.
It has the same volume as the cylinder.

Find the value of x.

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

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11 A vertical post, 1.75 m tall, stands on horizontal ground.
One day, the post casts a shadow of length 3.28 m.



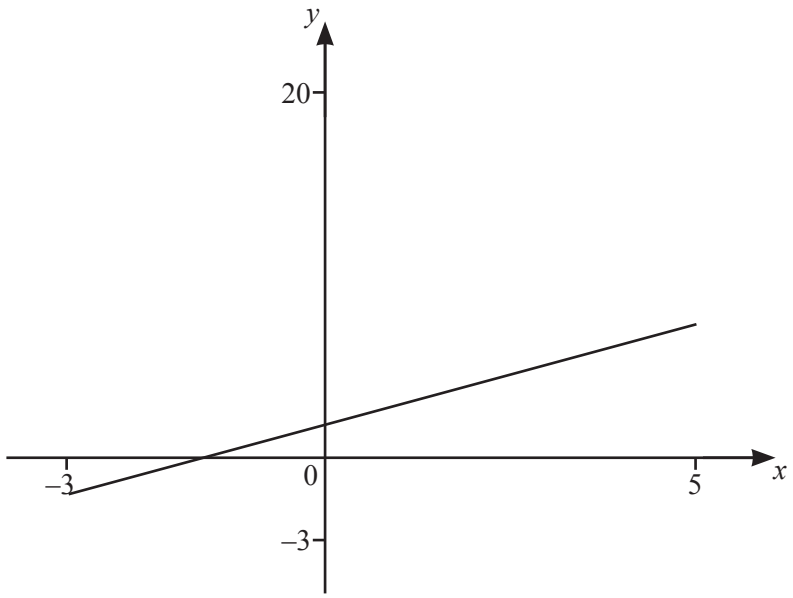
(a) Find the value of x.

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

(b) Find the value of y, the angle of elevation of the Sun.

$y =$ ..... [2]

12



The diagram shows the graph of $y = x + 2$ for $-3 \leqslant x \leqslant 5$.

(a) Find the co-ordinates of the y-intercept.

(..... , ...) [1]

(b) On the diagram, sketch the graph of $y = x^2 - x - 1$ for $-3 \leqslant x \leqslant 5$. [2]

(c) Solve this equation.

$$x^2 - x - 1 = x + 2$$

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

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