Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
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3080309733

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **May/June 2023**

1 hour 45 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 96.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

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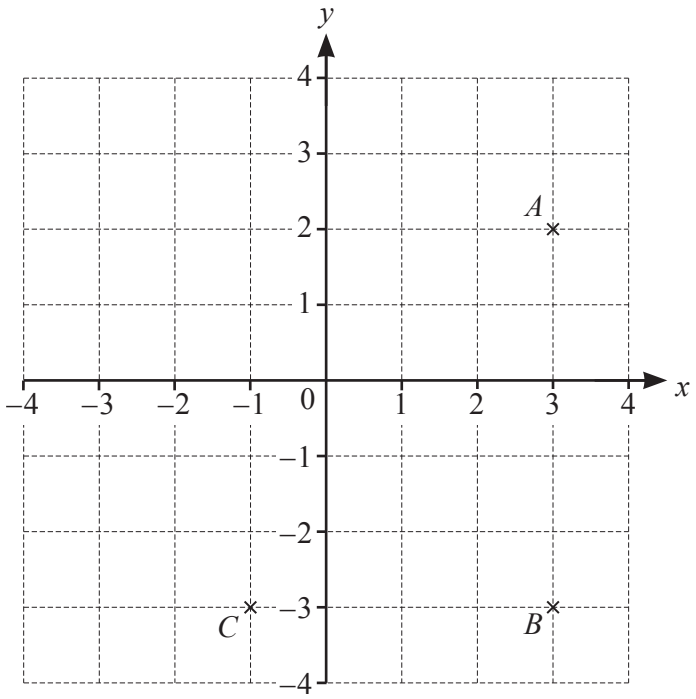
Formula List

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)** The points A, B, and C are drawn on a 1 cm square grid.



(i) Write down the coordinates of point A and point C.

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

C = (..... , ...) [2]

(ii) $ABCD$ is a rectangle.

Plot point D on the grid.
Write down the coordinates of point D.

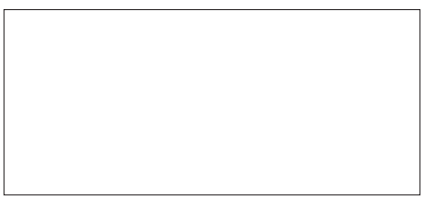
D = (..... , ...) [2]

(iii) Draw rectangle $ABCD$ and find its area and perimeter.

Area ..... cm^2

Perimeter ..... cm [2]

(b) On the rectangle below, draw all the lines of symmetry.



[2]

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2 **(a)** Tilda and Kim sell bottles of salad dressing.

At the beginning of Monday, they have 200 bottles of salad dressing for sale.
During Monday, Tilda sells half of the 200 bottles and Kim sells 10% of the 200 bottles.

Work out how many of the 200 bottles are left at the end of Monday.

..... [3]

(b) A bottle of salad dressing costs $3.25 .

Work out the greatest number of bottles of salad dressing that can be bought with $20 and how much change there is.

..... bottles with $ ..... change [3]

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(c) Salad dressing is made by mixing oil and vinegar in this ratio.

oil : vinegar = 5 : 3

Work out how much oil and how much vinegar is needed to make 1 litre of salad dressing.
Give your answers in millilitres.

Oil ..... ml

Vinegar ..... ml

[3]

(d) Kim invests $5000 at 4% per year simple interest.

Work out how much the investment is worth at the end of 3 years.

$ ..... [3]

3 **(a)** Some students take a test.
Their scores are shown in the stem-and-leaf diagram.

0	8						
1	2	5	7				
2	1	1	1	2	3	6	9
3	2	2	5				
4	0						

Key : 4 | 0 means 40

(i) Find how many students take the test.

..... [1]

(ii) Find the range.

..... [1]

(iii) Find the mode.

..... [1]

(iv) Find the median.

..... [1]

(v) One of the students is chosen at random.

Find the probability that this student scored more than 20.

..... [2]

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(b) Ten students take a different test.
These are their scores.

18 29 32 36 40 30 27 9 39 40

(i) Find the mean of these ten scores.

..... [1]

(ii) Complete a stem-and-leaf diagram for these ten scores.

0	
1	
2	
3	
4	

Key : 4 | 0 means 40 [2]

(iii) One of these students scored 32 out of 40.

Write $\frac{32}{40}$ as a fraction in its simplest form.

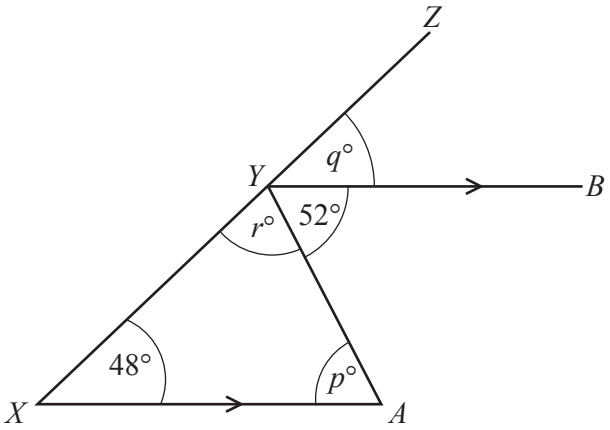
..... [1]

(iv) One of these students scored 36 out of 40.

Write $\frac{36}{40}$ as a percentage.

..... % [1]

4 (a)



NOT TO SCALE

In the diagram, XYZ is a straight line.
YB is parallel to XA.

Find the value of p, the value of q and the value of r.
Give a geometrical reason for each of your answers.

$p =$ ..... because .....

.....

$q =$ ..... because .....

.....

$r =$ ..... because .....

..... [6]

(b) Find the size of one exterior angle of a regular polygon with 15 sides.

..... [2]

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5 **(a)** Write these decimals in order of size, starting with the smallest.

0.6 0.63 0.069 0.608

.... [2]
smallest

(b) Find the value of $\sqrt{29}$.
Write your answer correct to 3 significant figures.

..... [2]

(c) **(i)** Write 0.000 035 in standard form.

..... [1]

(ii) Work out $\dfrac{4 \times 10^{6}}{8 \times 10^{-2}}$.
Give your answer in standard form.

..... [2]

6 **(a)** Tanvir works out his total pay using this word formula.

Total pay = hourly rate × number of hours worked + bonus

One week, Tanvir works for 40 hours.
His hourly rate is \$8.50 and his bonus is \$20.

Work out Tanvir's total pay for this week.

\$ ..... [2]

(b) Perry buys m kg of potatoes.

(i) Perry's shopping bag has a mass of 1.5 kg.

Write down a formula for the total mass, W kg, of the bag and the potatoes.

$W =$ ..... [1]

(ii) Potatoes cost 98 cents per kilogram.

Write down a formula for the cost, \$$C$, of m kg of potatoes.

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

(c) $P = (S - B) \times n$

(i) Find P when $S = 9$, $B = 4$ and $n = 6$.

$P =$ ..... [1]

(ii) Find n when $P = 90$, $S = 23$ and $B = 8$.

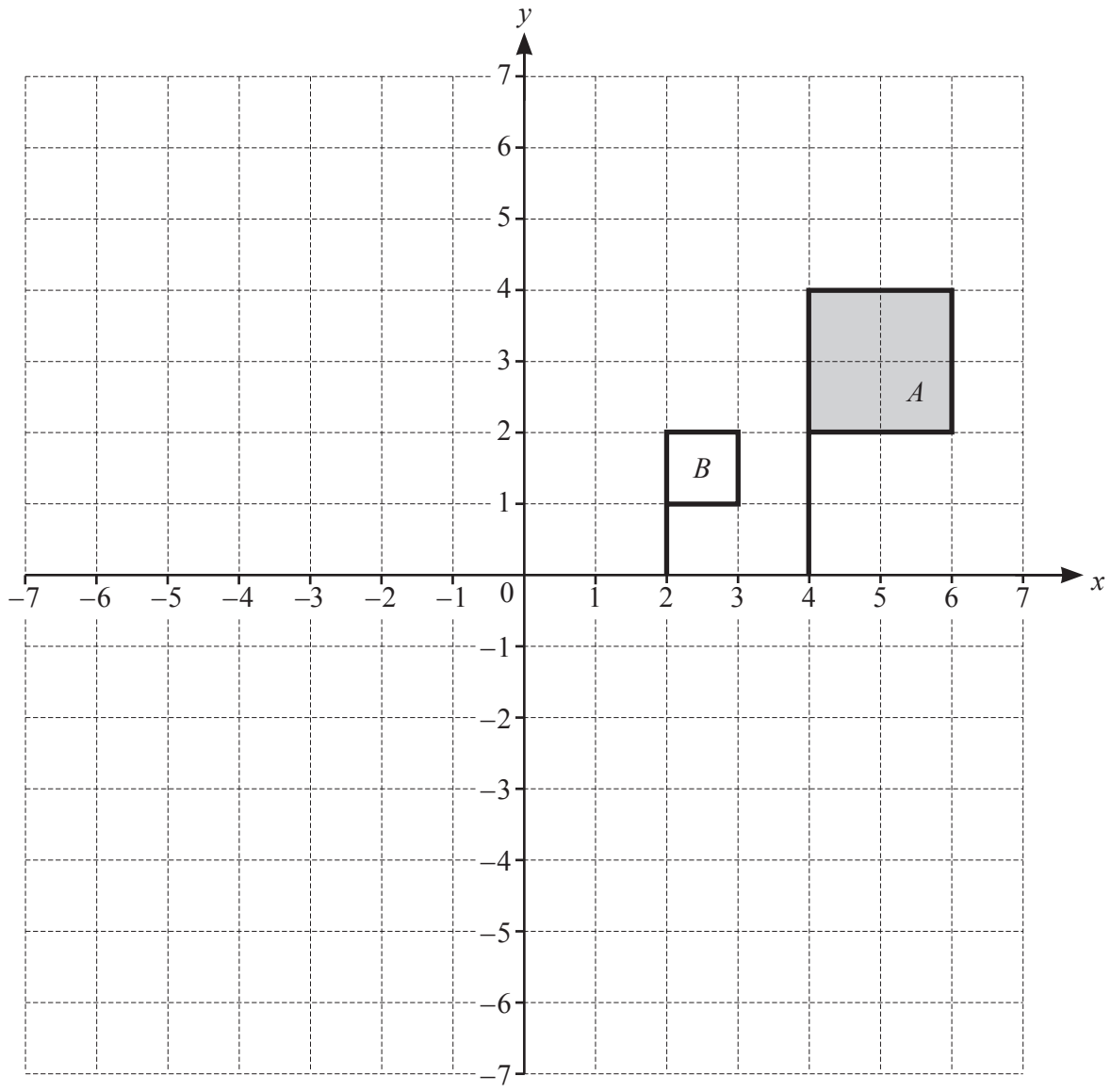
$n =$ ..... [2]

(iii) Rearrange the formula $P = (S - B) \times n$ to make S the subject.

$S =$ ..... [2]

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7



The grid shows two shapes, A and B.

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

.....

..... [3]

(b) Reflect shape A in the y-axis.
Label the image P. [1]

(c) Translate shape A by $\begin{pmatrix} -8 \\ -5 \end{pmatrix}$.
Label the image Q. [2]

(d) Rotate shape A by 90° clockwise about (0, 0).
Label the image R. [2]

8 **(a)** Simplify.

$5x + 4x + 3x$

..... [1]

(b) Expand.

$x(5x - 9)$

..... [2]

(c) Factorise completely.

$20x + 6xy$

..... [2]

(d) Solve.

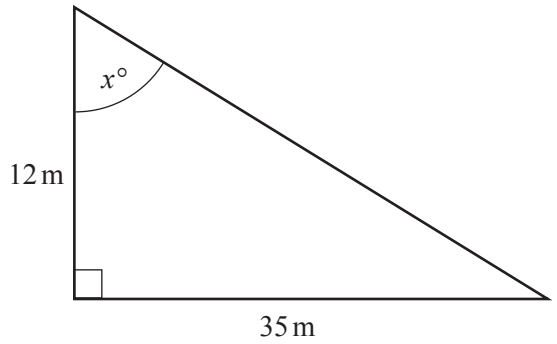
(i) $4(2x - 3) = 28$

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

(ii) $3x - 11 = x + 4$

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

9



NOT TO SCALE

(a) Work out the area of the triangle.
Give the units of your answer.

.... [2]

(b) Work out the perimeter of the triangle.

..... m [3]

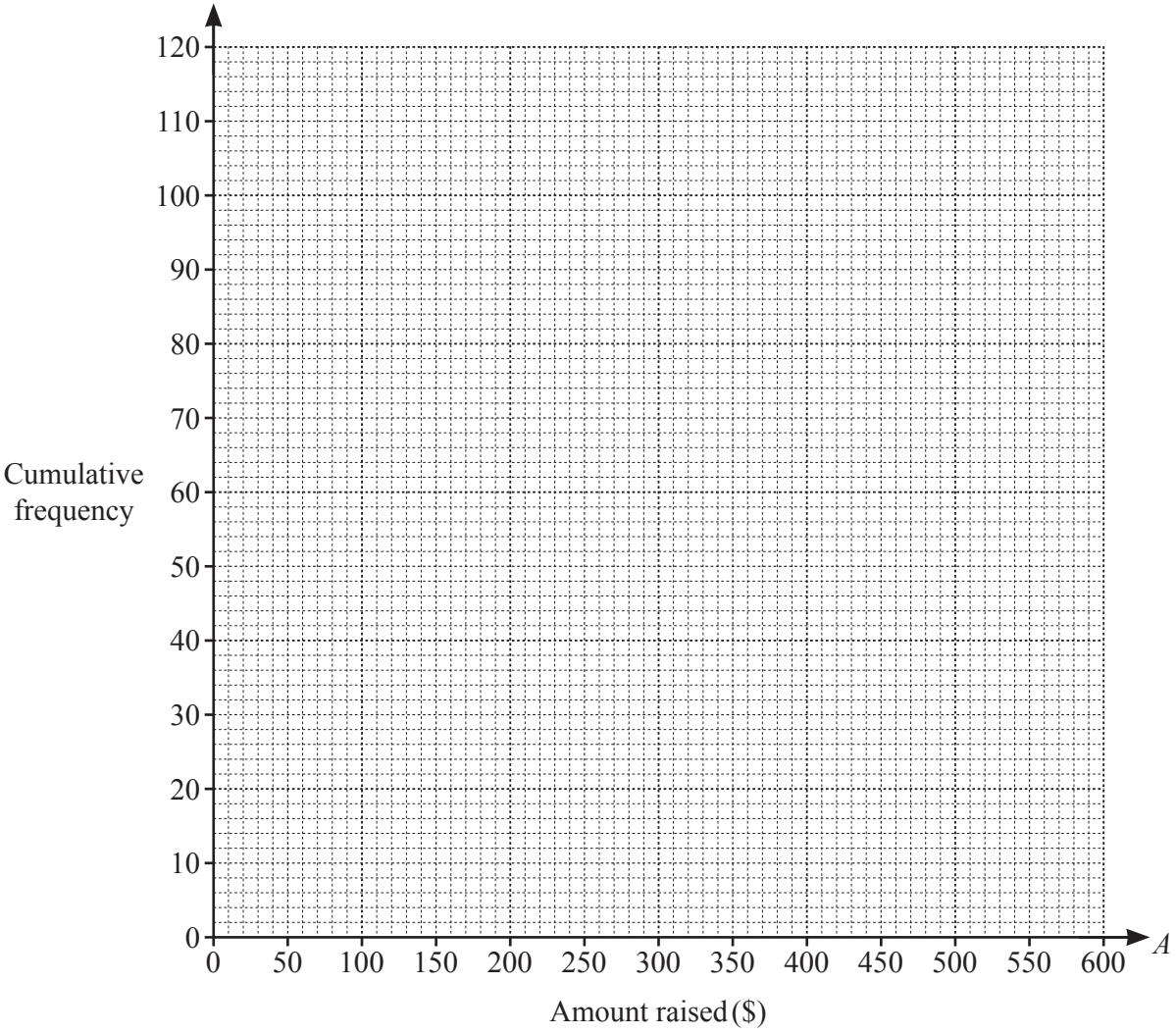
(c) Find the value of x.

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

10 120 students take part in a sponsored swim.
The cumulative frequency table shows the amounts, in \$, they raised.

Amount raised (\$$A$)	$A \leqslant 100$	$A \leqslant 200$	$A \leqslant 300$	$A \leqslant 400$	$A \leqslant 500$	$A \leqslant 600$
Cumulative frequency	4	10	18	40	96	120

(a) On the grid, draw a cumulative frequency curve to show the information in the table.



[3]

(b) Use your cumulative frequency curve to find

(i) the median amount raised

$ ..... [1]

(ii) the interquartile range

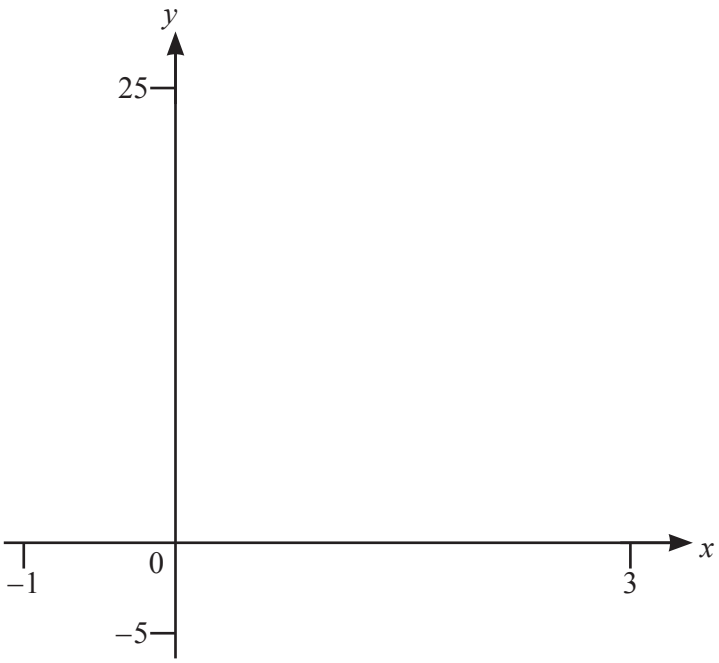
$ ..... [2]

(iii) the number of students who raised more than $525.

..... [2]

Question 11 is printed on the next page.

11



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

(ii) Find the coordinates of the point where the graph crosses the y-axis.

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

(b) On the diagram, sketch the graph of $y = 4x + 3$ for $-1 \leqslant x \leqslant 3$. [2]

(c) Find the x-coordinate of each point of intersection of $y = 4x + 3$ and $y = 3 \times 2^x$.

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

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