Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

8470777360

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **May/June 2020**

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. Blank pages are indicated.

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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 24 people take part in a cookie-eating competition.
The number of cookies eaten by each person in two minutes is recorded.

11	12	13	8	12	8	12	10
9	11	8	13	11	10	12	9
9	10	10	9	10	9	9	12

(a) Complete the frequency table.

Number of cookies	8	9	10	11	12	13
Frequency	3					

[2]

(b) Find

(i) the mode,

..... [1]

(ii) the range,

..... [1]

(iii) the median,

..... [1]

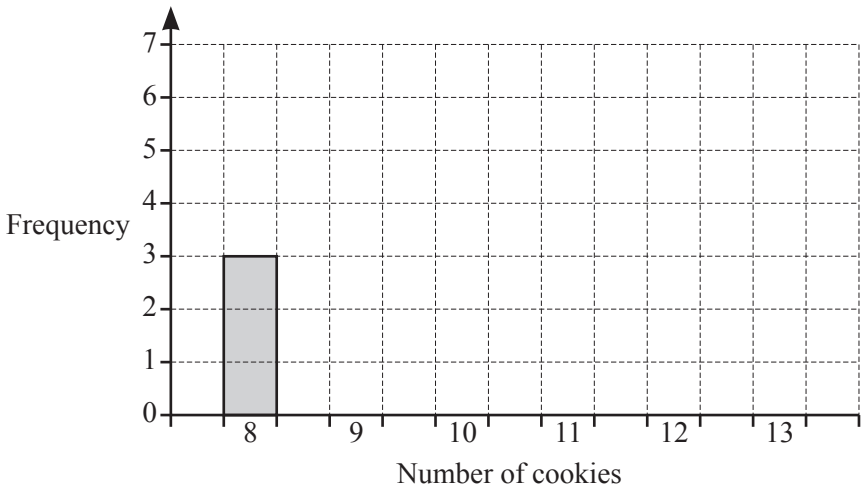
(iv) the mean,

..... [1]

(v) the interquartile range.

..... [2]

(c) Complete the bar chart.



[2]

2 **(a)** 1 2 3 4 5 6 7 8 9 10

From this list of numbers, write down

(i) a square number,

..... [1]

(ii) a triangle number,

..... [1]

(iii) a prime number,

..... [1]

(iv) a factor of 13,

..... [1]

(v) a multiple of 6.

..... [1]

(b) Work out 65% of 34.

..... [2]

(c) Write 9876.543

(i) correct to 2 decimal places,

..... [1]

(ii) correct to 4 significant figures,

..... [1]

(iii) correct to the nearest hundred.

..... [1]

(d) Write your answer to **part (c)(iii)** in standard form.

..... [1]

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(e) Work out.
Give each answer as a fraction in its simplest form.

(i) $\frac{2}{5}+\frac{1}{3}$

..... [1]

(ii) $\frac{5}{8}-\frac{1}{4}$

..... [1]

(iii) $3\frac{3}{10}\times\frac{5}{6}$

..... [1]

3 **(a)** Write down the rule for continuing each sequence.

(i) 86, 78, 70, 62, …

..... [1]

(ii) 4, 12, 36, 108, …

..... [1]

(iii) 80, 40, 20, 10, …

..... [1]

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

Work out the first two terms of this sequence.

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

(c) These are the first four terms of another sequence.

8 19 30 41

(i) Find the next two terms of this sequence.

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

(ii) Find the nth term of this sequence.

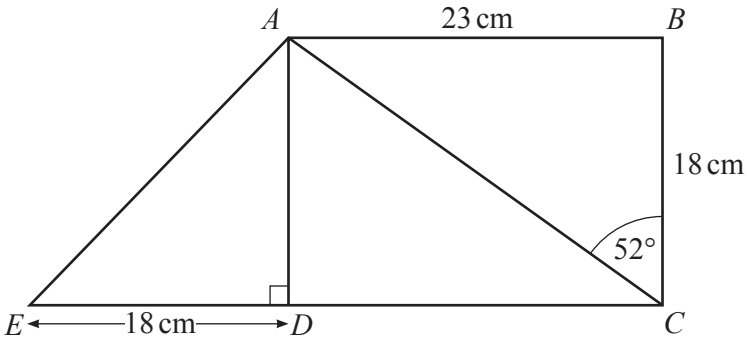
..... [2]

(iii) Use your expression from **part (ii)** to find the 30th term.

..... [1]

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NOT TO SCALE

ABCD is a rectangle and *EDC* is a straight line.
$DE = BC = 18$ cm, $AB = 23$ cm and angle $BCA = 52°$.

Find

(a) angle *BAC*,

Angle *BAC* = ... [1]

(b) angle *AED*,

Angle *AED* = ... [1]

(c) angle *EAC*,

Angle *EAC* = ... [2]

(d) *AE*,

AE = ... cm [2]

(e) the total perimeter of the shape *ABCE*.

..... cm [1]

5 **(a)** Cinzia goes to the zoo with her mother.
Cinzia is 12 years old.
The entrance fee is \$25 for each adult and \$14 for each child under the age of 16 years.

Work out the **total** entrance fee for Cinzia and her mother and how much change they receive from \$50.

Total entrance fee \$ .....

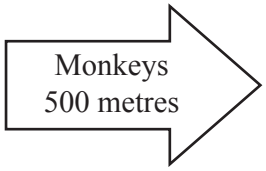
Change \$ ..... [2]

(b) Cinzia and her mother arrive at the zoo at 11 35 and leave at 15 45.

Find the time, in hours and minutes, that they are at the zoo.

..... h ..... min [1]

(c) Cinzia sees this notice.



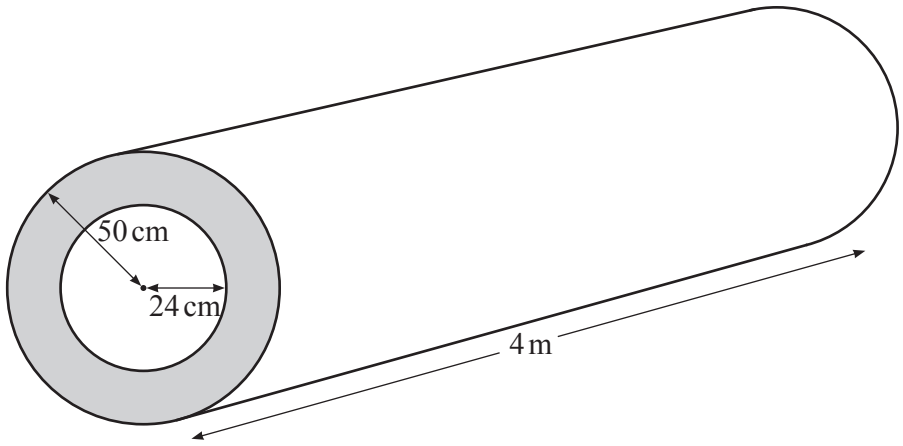
Cinzia can walk at 5 km/h.

Find how many minutes it takes Cinzia to walk to the monkeys.

..... min [3]

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6



NOT TO SCALE

The diagram shows a cylindrical pipe.
The external radius is 50 cm and the internal radius is 24 cm.

(a) Find the shaded area.

..... cm^2 [3]

(b) The pipe is 4 metres long.

(i) Change 4 metres into centimetres.

..... cm [1]

(ii) Find the volume of the pipe.

..... cm^3 [1]

(c) Work out the area of the outside curved surface of the pipe.

..... cm^2 [2]

7 **(a)** Solve.

(i) $4x - 6 = 8x + 14$

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

(ii) $2(x + 3) = 11$

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

(b) $C = 2M + 3N$

(i) Find C when $M = 1.8$ and $N = 1.3$.

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

(ii) Find M when $C = 8.4$ and $N = 0.6$.

$M =$ ..... [2]

(iii) Rearrange the formula to make N the subject.

$N =$ ..... [2]

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8 A boat sails 300 m on a bearing of 060° from A to B.
It then changes course and sails 220 m on a bearing of 150° from B to C.
The boat then returns directly to A.

(a) On the diagram, sketch the path of the boat.
Show the distances and bearings that you have been given.



NOT TO SCALE

[4]

(b) Angle $ABC = 90°$.

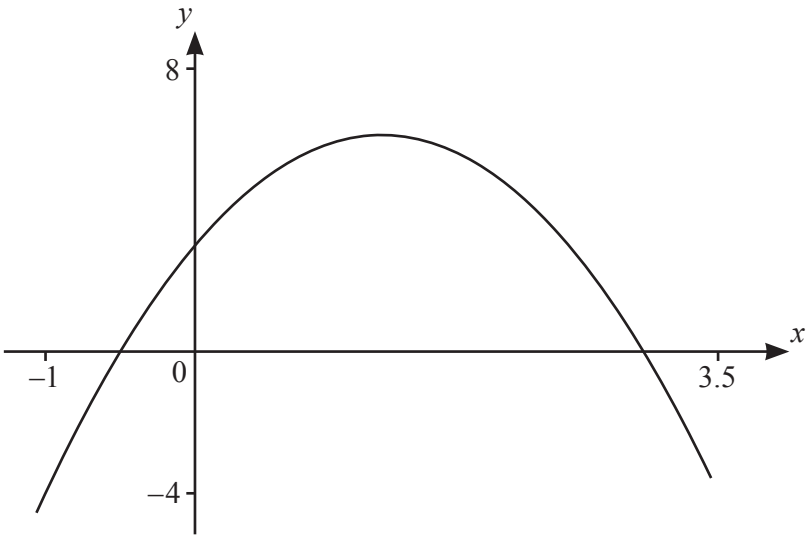
(i) Calculate angle BAC.

Angle $BAC =$ ..... [2]

(ii) Find the bearing of C from A.

..... [1]

9



The diagram shows the graph of $y = -2x^2 + 5x + 3$ for $-1 \leqslant x \leqslant 3.5$.

(a) Use your calculator to find

(i) the coordinates of the point of intersection of the graph with the y-axis,

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

(ii) the coordinates of the points of intersection of the graph with the x-axis,

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

(iii) the coordinates of the local maximum.

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

(b) On the diagram, sketch the graph of $y = 2x + 1$. [2]

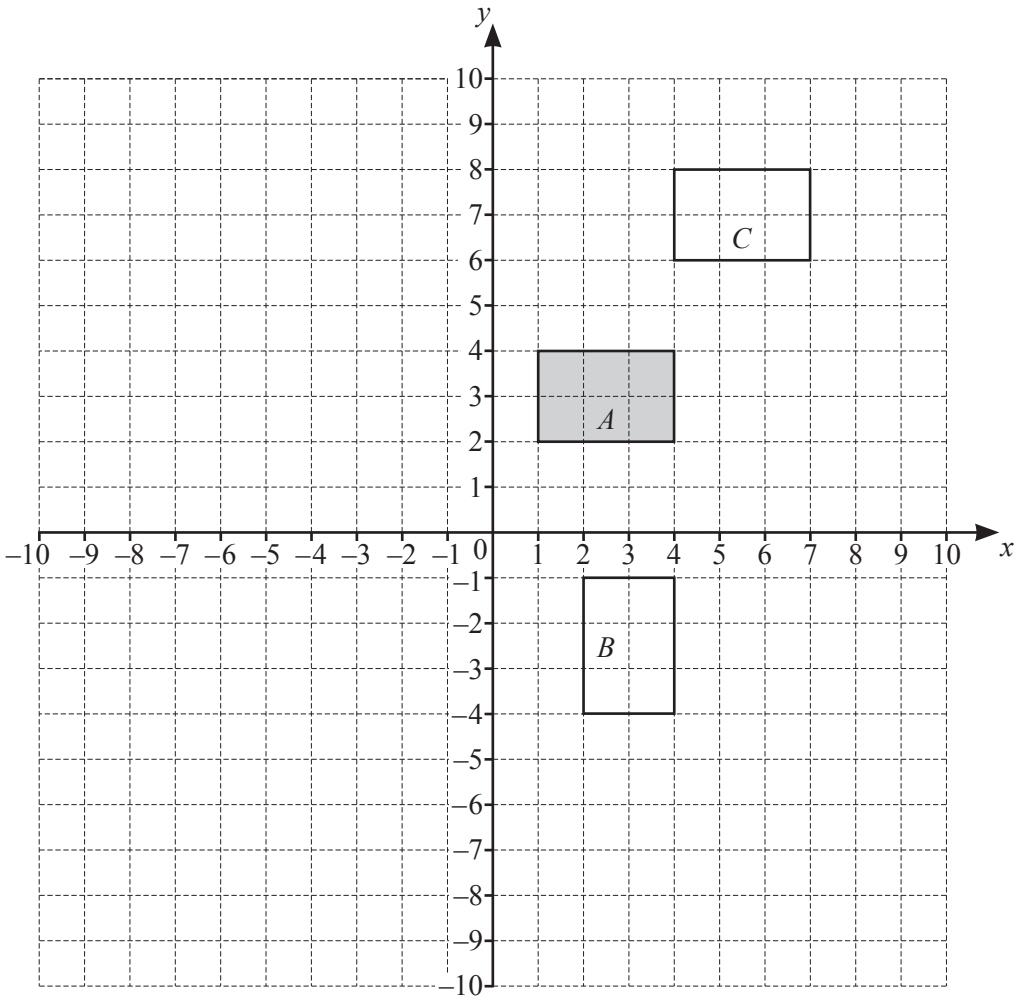
(c) Find the coordinates of the points of intersection of

$$y = -2x^2 + 5x + 3 \text{ and } y = 2x + 1.$$

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

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10



(a) Reflect shape A in the y-axis. [1]

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

.....

..... [3]

(c) Describe fully the **single** transformation that maps shape A onto shape C.

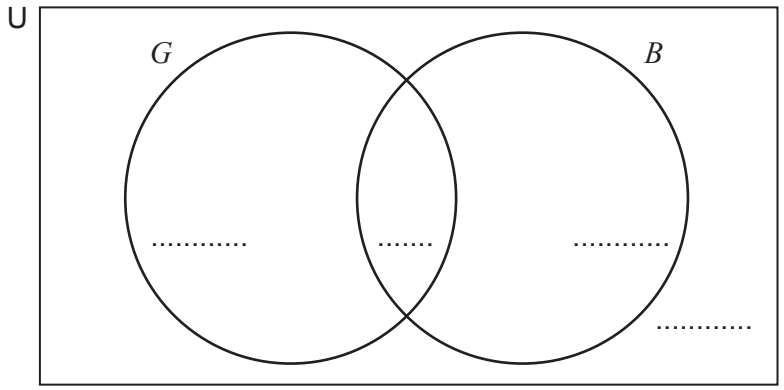
.....

..... [2]

(d) Enlarge shape A with centre (0, 0) and scale factor -2. [2]

11 **(a)** In a class of 24 students
- 10 students wear glasses (G)
- 12 students have black hair (B)
- 5 students do not wear glasses and do not have black hair.

(i) Complete the Venn diagram.



[2]

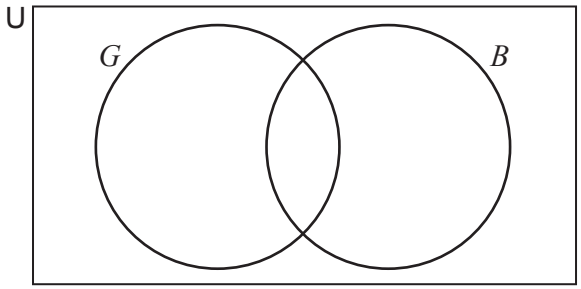
(ii) Describe in words the set $G \cap B$.

Students who ..... [1]

(iii) One of the 24 students is chosen at random.
Write down the probability that this student wears glasses but does not have black hair.

..... [1]

(iv) On the Venn diagram below, shade the region $G' \cap B$.



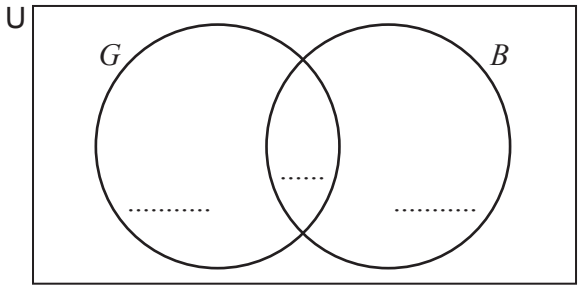
[1]

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(b) Another class has 20 students.

In this class
- 5 students wear glasses and have black hair
- 8 students wear glasses and do not have black hair
- all the students either wear glasses or have black hair or both.

(i) Complete the Venn diagram.



[2]

(ii) Write down the number of students in this class who have black hair.

..... [1]

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