Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

3879825335

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **October/November 2016**

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, highlighters, glue or correction fluid.
You may use a 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.

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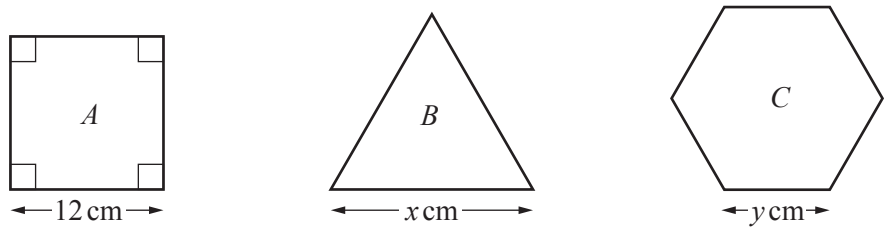
Formula List

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.	$V = \pi r^2h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

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Answer **all** the questions.

1



NOT TO SCALE

The diagram shows three regular shapes A, B and C.

(a) Write down the correct mathematical name of each shape.

Shape A .....

Shape B .....

Shape C ..... [4]

(b) Each shape has the same perimeter.

Find the value of x and the value of y.

$x =$ ..... cm

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

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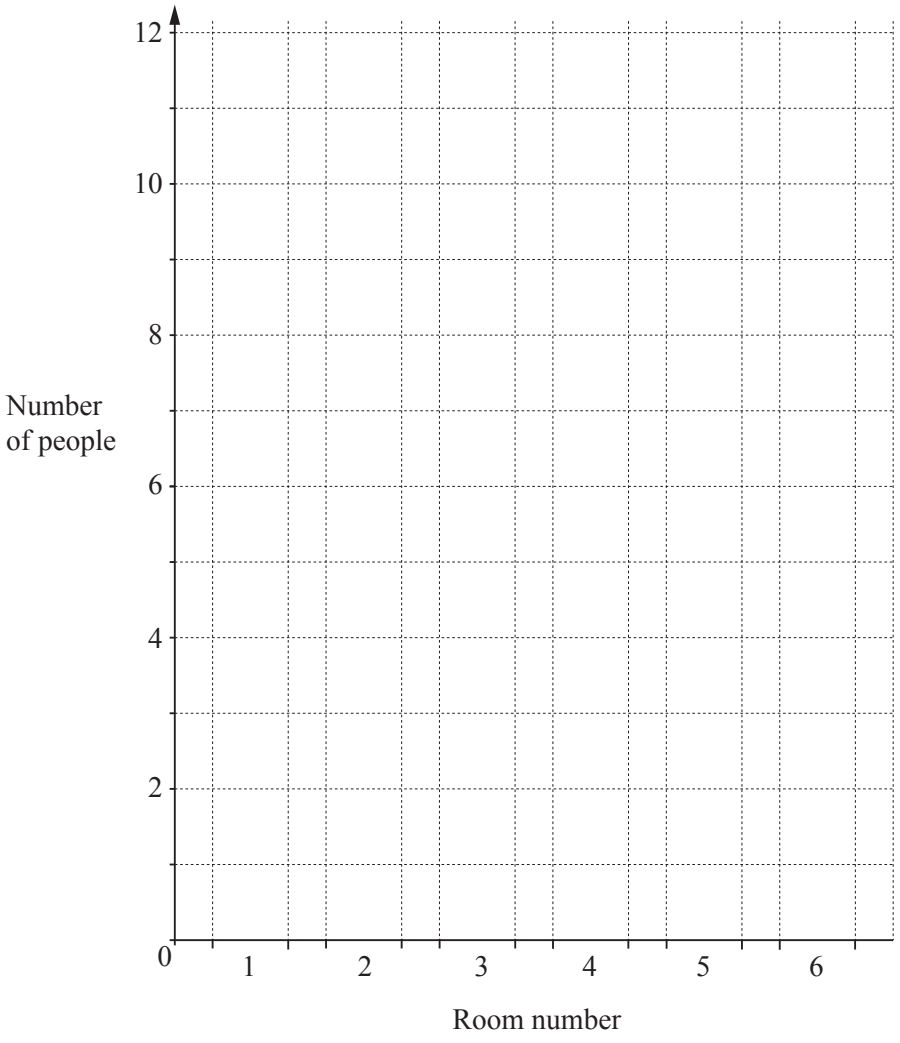
2 A conference centre has 6 rooms.
One day all the rooms are used.

Room Number	Number of people
1	7
2	6
3	12
4	10
5	9
6	11

(a) Find the total number of people in the six rooms.

..... [1]

(b) Complete the bar chart for the information above.



[2]

(c) The cost of using each of the rooms for the day is $300.
The cost is shared equally between the people using it.

(i) Calculate the total cost of using all six rooms.

$..... [1]

(ii) For Room 4, find the cost per person to use the room.

$..... [1]

(iii) Each person in Room 2 has a lunch that costs $8 per person.

Find the **total** amount paid by all six people in Room 2.

$..... [2]

3 **(a)** $\sqrt{3}$ $\quad 9 \quad \frac{5}{8} \quad 21 \quad -6 \quad \pi \quad -0.75 \quad 0.33 \quad -18 \quad 3\frac{2}{5}$

From this list, write down

(i) a positive integer,

..... [1]

(ii) a negative integer,

..... [1]

(iii) a square number,

..... [1]

(iv) a number between 0.5 and 1,

..... [1]

(v) an irrational number.

..... [1]

(b) Write $\sqrt{3}$ as a decimal

(i) correct to 4 decimal places,

..... [1]

(ii) correct to 4 significant figures.

..... [1]

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(c) Write 0.33 as a fraction.

..... [1]

(d) Write $3\frac{2}{5}$ as a decimal.

..... [1]

(e) Write $\frac{5}{8}$ as a percentage.

..... % [1]

4 **(a)**

MONEY

Write down all the letters from this word that have

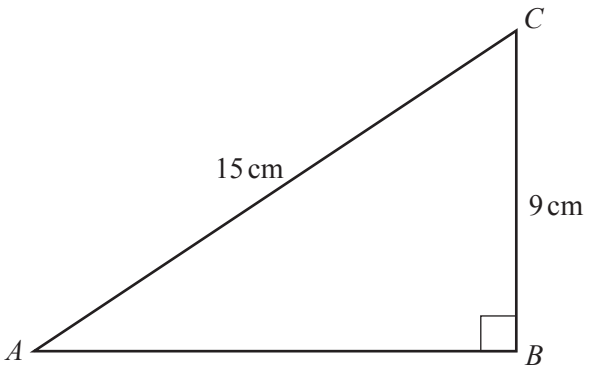
(i) line symmetry,

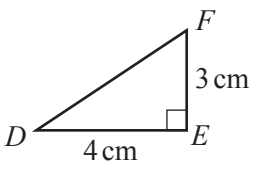
..... [2]

(ii) rotational symmetry.

..... [2]

(b)





NOT TO SCALE

The diagram shows two right-angled triangles.
Triangle *ABC* is similar to triangle *DEF*.

(i) Work out the lengths *AB* and *DF*.

AB = ... cm

DF = ... cm [3]

(ii) Find the ratio area of triangle *ABC* : area of triangle *DEF*.

..... : ..... [2]

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5 Tutku counts the number of petals on each of 100 flowers.
Her results are shown in the table.

Number of petals	Frequency
15	5
16	10
17	12
18	24
19	27
20	14
21	6
22	2

Find

(a) the mode,

..... [1]

(b) the median,

..... [1]

(c) the interquartile range,

..... [2]

(d) the mean.

..... [2]

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6 These are the first four terms of a sequence.

326 319 312 305

(a) Find the next two terms in this sequence.

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

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

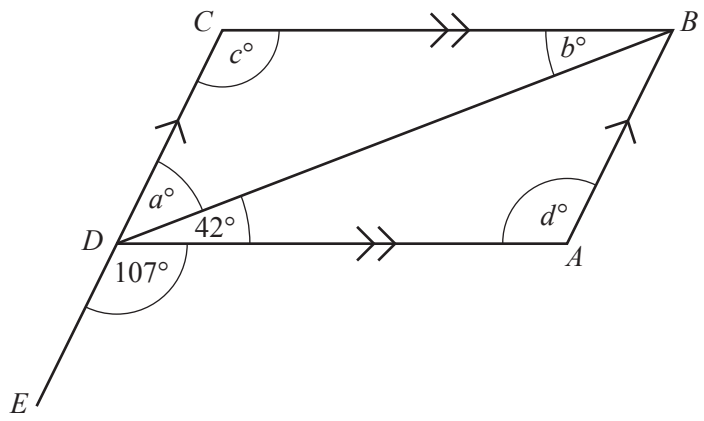
..... [2]

(c) Pedro says that 249 is a term in this sequence.

Is he correct? Show working to support your answer.

[1]

7 (a)



NOT TO SCALE

The diagram shows a parallelogram *ABCD* and a straight line *CDE*.

Find the values of *a*, *b*, *c* and *d*.

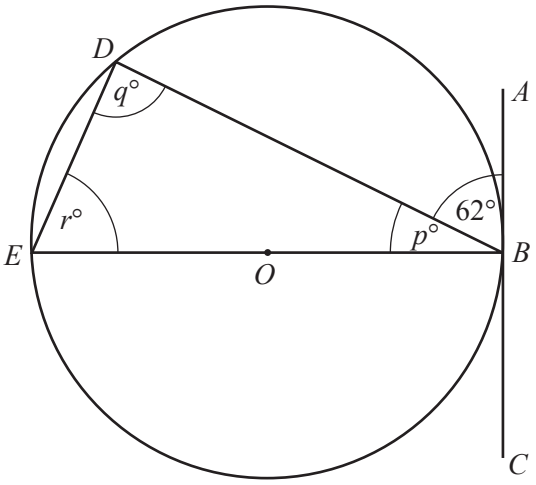
a = ...

b = ...

c = ...

d = ... [4]

(b)



NOT TO SCALE

The diagram shows a circle, centre *O*, with diameter *EB*.
The line *AC* is a tangent to the circle at *B*.
D is a point on the circumference and angle *ABD* = 62°.

Find the values of *p*, *q* and *r*.

p = ...

q = ...

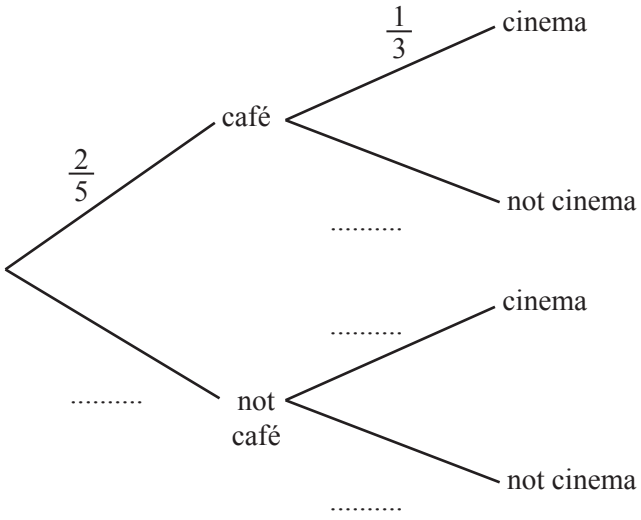
r = ... [3]

8 On any evening, the probability that Elise goes to a café is $\frac{2}{5}$.

If Elise goes to a café, the probability that she then goes to the cinema is $\frac{1}{3}$.

If she does not go to a café, the probability that she then goes to the cinema is $\frac{4}{7}$.

(a) Complete the tree diagram.



[3]

(b) Find the probability that, on one evening, Elise goes to a café **and** goes to the cinema.

..... [2]

(c) Find the probability that, on one evening, Elise goes to the cinema.

..... [3]

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9 Sally leaves home to go to school at 07 45.
She walks 100 metres to the bus stop and arrives at 07 50.

(a) Work out her average walking speed in km/h.

..... km/h [3]

(b) The bus leaves the bus stop at 07 55.

It travels the 6 km to school at an average speed of 40 km/h.

(i) Calculate the number of minutes that the bus takes to get to school.

..... min [3]

(ii) Work out the time that the bus gets to school.

..... [1]

(iii) Sally takes 5 minutes to walk from the bus to the classroom.
The lesson starts at 08 15.

Show that Sally gets to the classroom before the lesson starts.

[1]

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[Turn over

10 **(a)** Solve.

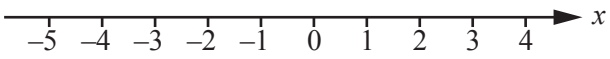
(i) $5x + 2 = 3x + 6$

..... [2]

(ii) $4x - 10 < 10$

..... [2]

(b) Show $x > -2$ on the number line.



[1]

(c) Simplify.

(i) $6x^2 \times 2x^6$

..... [2]

(ii) $\dfrac{15y^8}{5y^2}$

..... [2]

(d) Yassar buys 2 bottles of drink and 3 bars of chocolate for \$5.25 .
Hassan buys 1 bottle of drink and 2 bars of chocolate for \$3.05 .

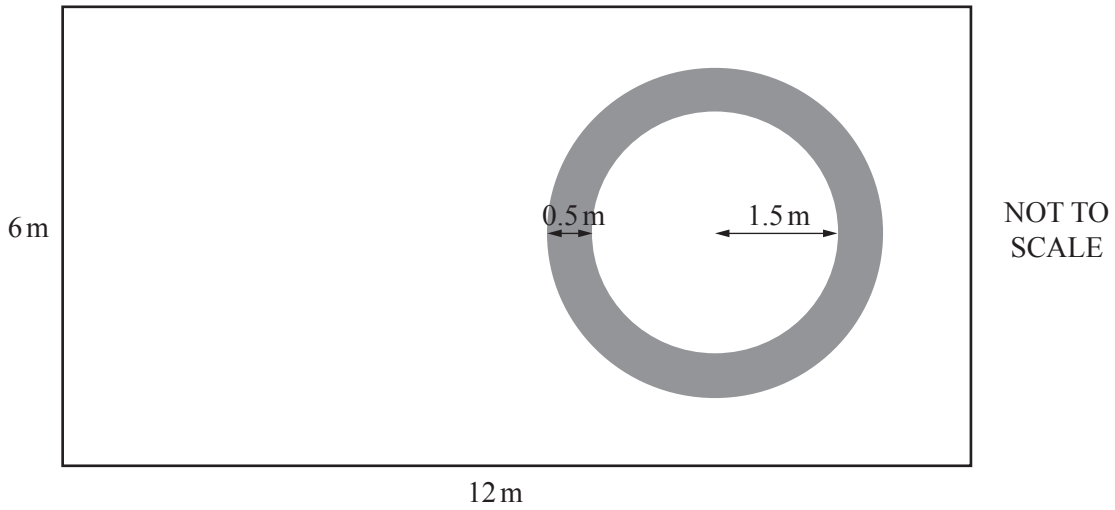
Find the cost of 1 bottle of drink and the cost of 1 bar of chocolate.
Show all your working.

1 bottle of drink = \$ .....

1 bar of chocolate = \$ ..... [4]

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11



The diagram shows a rectangular garden, 6 m by 12 m.
In the garden there is a circular pond with radius 1.5 m.
There is a circular path of width 0.5 m around the pond.

(a) The pond is 0.6 m deep.

Work out the volume of water in the pond when it is full.

.....m^3 [2]

(b) Work out the area of the path.

.....m^2 [2]

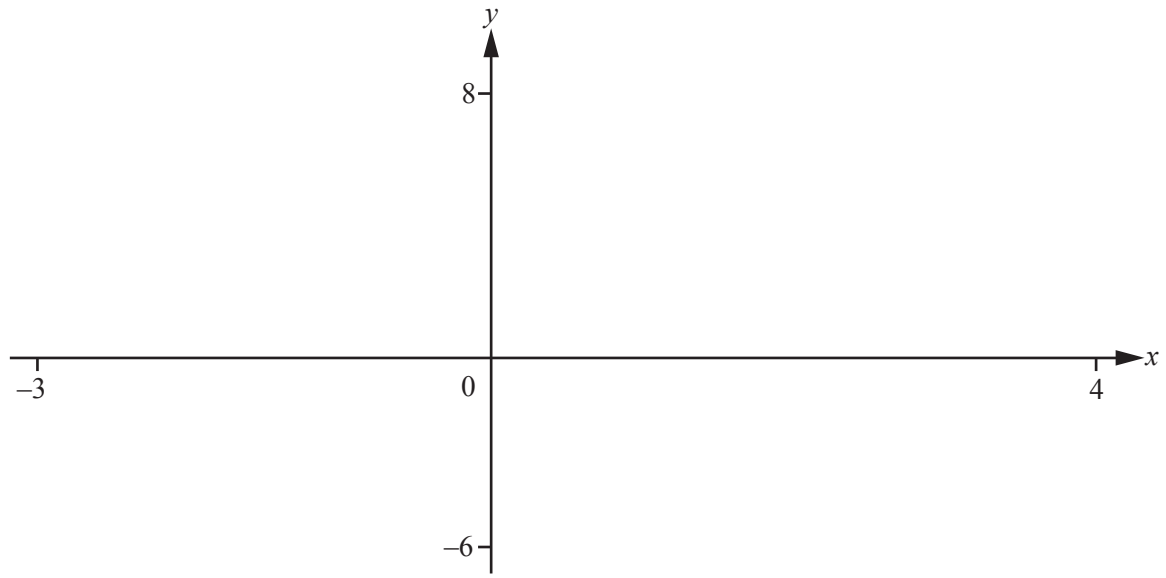
(c) The rest of the garden, apart from the pond and the path, is covered by grass.

Work out the area covered by grass.

.....m^2 [2]

Question 12 is printed on the next page.

12



$f(x) = 6 + x - x^2$

(a) (i) On the diagram, sketch the graph of $y = f(x)$ for $-3 \leqslant x \leqslant 4$. [2]

(ii) Find the co-ordinates of the point where the graph cuts the y-axis.

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

(iii) Find the co-ordinates of the points where the graph cuts the x-axis.

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

(iv) Find the co-ordinates of the local maximum point.

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

(b) $g(x) = x + 4$

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

(ii) Find the co-ordinates of the points of intersection of the graph of $f(x)$ and the graph of $g(x)$.

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

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