Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/51**

Paper 5 (Core) **October/November 2017**

1 hour

Candidates answer on the Question Paper.

Additional Materials: 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.
You must show all relevant working to gain full marks for correct methods, including sketches.
In this paper you will also be assessed on your ability to provide full reasons and to communicate your mathematics clearly and precisely.
At the end of the examination, fasten all your work securely together.
The total number of marks for this paper is 24.

This document consists of **6** printed pages and **2** blank pages.

DC (KN/SG) 134793/2

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Answer **all** the questions.

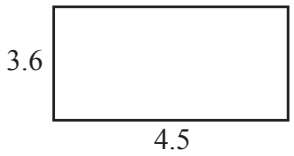
INVESTIGATION **EQUABLE SHAPES**

In this investigation, lengths are given in centimetres.
The area of a shape is A square centimetres and its perimeter is P centimetres.

This task investigates the dimensions of *equable* shapes.
The shape is *equable* if $A = P$.

All the diagrams in this investigation are not to scale.

1 **(a)**



This rectangle is equable.
Write down the calculations to show that $A = 16.2$ and $P = 16.2$.

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(b) All the rectangles in this table are equable.

Complete the table.

Length (x)	Width (y)	Area (A)	Perimeter (P)
4.5	3.6	16.2	16.2
7	2.8		
10		25	
12			28.8
	2.2	48.4	

(c) For the rectangle in **part (a)**, the value of $(x - 2)(y - 2)$ is

$$\begin{aligned} & (4.5 - 2)(3.6 - 2) \\ = \quad & 2.5 \times 1.6 \\ = \quad & 4. \end{aligned}$$

The rectangles in the table are equable.
Use your answers to **part (b)** to complete the first two columns of the table.
Calculate the value of $(x - 2)(y - 2)$ for each rectangle.

Length (x)	Width (y)	$(x - 2)(y - 2)$
4.5	3.6	$2.5 \times 1.6 = 4$
7	2.8	
10		
12		
	2.2	
42	2.1	

(d) Use what you notice about the value of $(x - 2)(y - 2)$ in **part (c)** to find all the equable rectangles that have **integer** lengths and widths.

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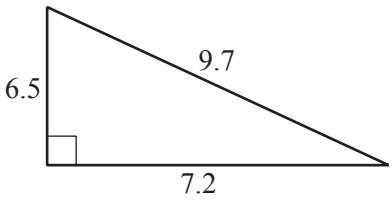
2 The area, A, of a triangle is $\frac{1}{2} \times$ base $\times$ height.

(a)



This right-angled triangle is equable.
Write down the calculations to show that $A = 23.4$ and $P = 23.4$.

.....

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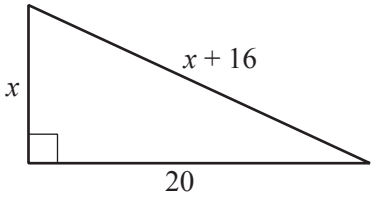
(b)



(i) Write down, in its simplest form, an expression, in terms of x, for the perimeter of this triangle.

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(ii) Write down, in its simplest form, an expression, in terms of x, for the area of this triangle.

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(iii) This triangle is equable.
Using your answers to **part (i)** and **part (ii)** find x.
Write down the length of each side.

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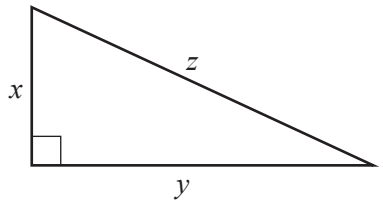
(c)



In the diagram, x, y and z are the lengths of the sides of a right-angled triangle.

All the right-angled triangles in the table below are equable.
Use this fact and your answer to **part (b)(iii)** to complete the table.

x	y	z	Area (A)	Perimeter (P)
6.5	7.2	9.7	23.4	23.4
	20			
	14	14.8		33.6
5.6	9			

(d) For the triangle in **part (a)**, the value of $(x - 4)(y - 4)$ is

$$\begin{aligned} & (6.5 - 4)(7.2 - 4) \\ = \; & 2.5 \times 3.2 \\ = \; & 8. \end{aligned}$$

The triangles in the table are equable.
Use your answers to **part (c)** to complete the first column of this table.
Calculate the value of $(x - 4)(y - 4)$ for each triangle.

x	y	$(x - 4)(y - 4)$
6.5	7.2	$2.5 \times 3.2 = 8$
4.4	24	
	20	
	14	
5.6	9	

(e) Use what you notice about the value of $(x - 4)(y - 4)$ in **part (d)** to find all the equable right-angled triangles that have **integer** bases and heights.
Find the lengths of the three sides for each triangle.

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