



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

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**CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/05**

Paper 5 (Core)

**May/June 2013**

**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, 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.

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 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 **5** printed pages and **3** blank pages.



Answer **all** the questions.

## INVESTIGATION

## DIAGONALS OF RECTANGLES

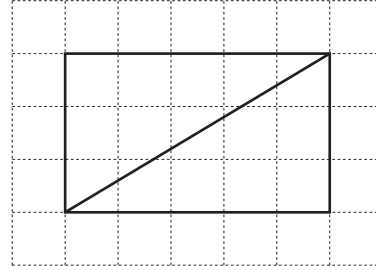
Rectangles are drawn on a grid.

The sides of each rectangle lie on gridlines and the length is greater than or equal to the width.

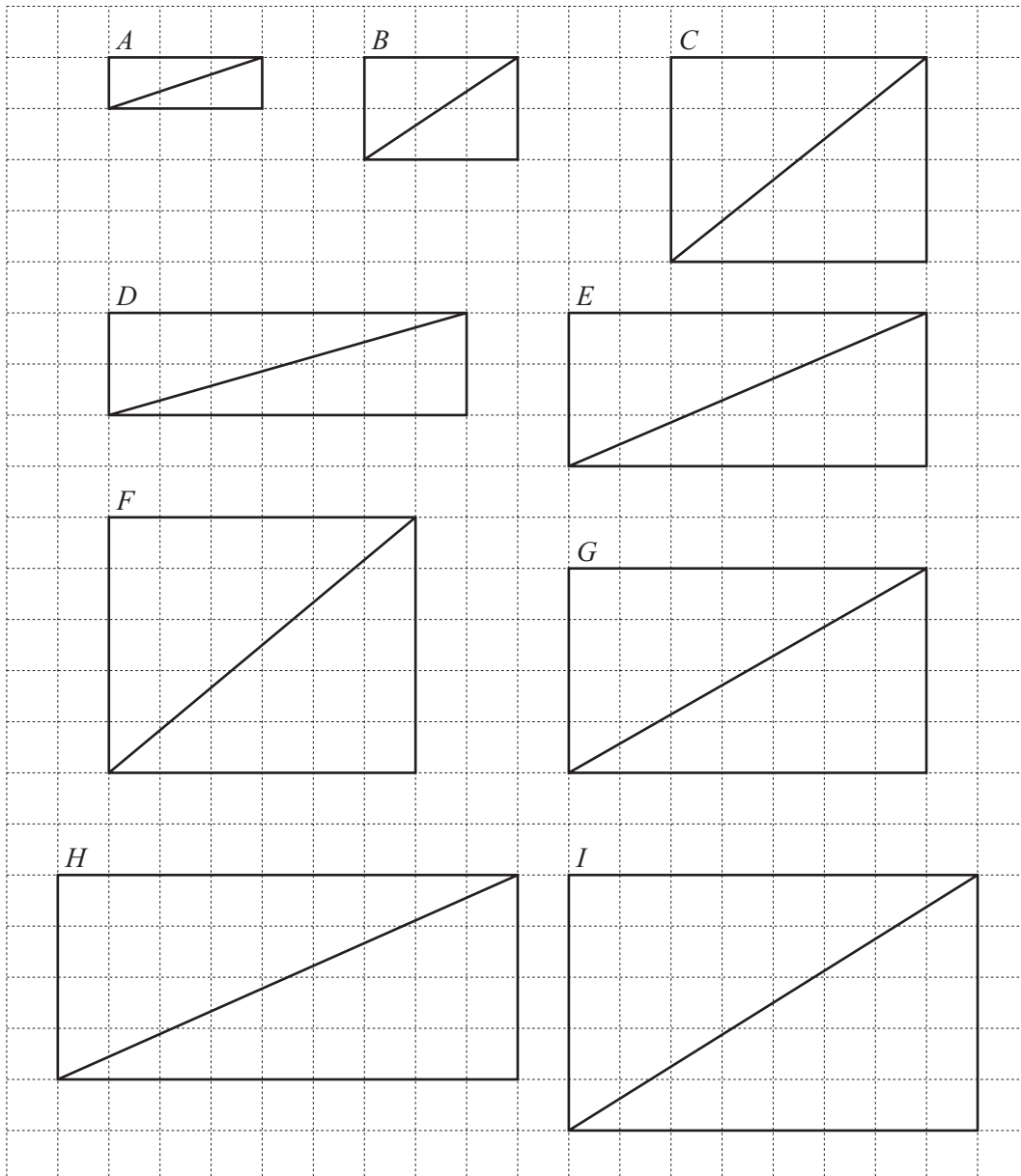
This investigation looks for a method for calculating the number of small squares through which a diagonal passes.

### Example

The diagram shows a rectangle with length 5 and width 3. Its diagonal passes through 7 small squares.



1



- (a) Complete the table for the rectangles  $A$  to  $I$ .

Rectangle	Length ( $x$ )	Width ( $y$ )	Number of squares passed through ( $S$ )
<i>Example</i>	5	3	7
$A$			
$B$			
$C$			
$D$			
$E$			
$F$			
$G$			
$H$	9	4	12
$I$			

- (b) Write down an equation connecting  $x + y$  and  $S$ .

.....

- (c) Use this equation to find  $x$  and  $y$  for the three rectangles where the diagonal passes through 6 squares.

$$x = \dots\dots\dots \quad y = \dots\dots\dots$$

$$x = \dots\dots\dots \quad y = \dots\dots\dots$$

$$x = \dots\dots\dots \quad y = \dots\dots\dots$$

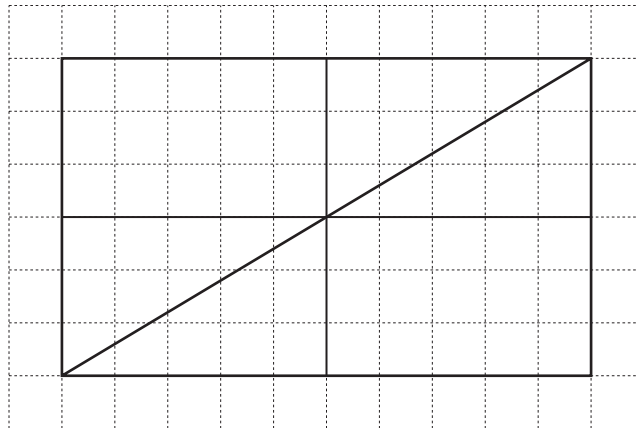
- 2 When  $x$  and  $y$  do not have a common factor, the  $x$  by  $y$  rectangle is called a basic rectangle.

In **question 1**,  $x$  and  $y$  did not have a common factor.  
In this question  $x$  and  $y$  do have a common factor.

*Example*

The diagram below shows a large rectangle with  $x = 10$  and  $y = 6$ .  
 $x$  and  $y$  have a common factor of **2**.

The basic 5 by 3 rectangle has a diagonal passing through 7 squares.  
So the 10 by 6 rectangle has a diagonal passing through  $2 \times 7 = 14$  squares.



Complete the following table.

Length ( $x$ )	Width ( $y$ )	Common factor	Dimensions of the basic rectangle	Calculation to find $S$
10	6	2	5 by 3	$2 \times 7 = 14$
6	2			=
8	6			=
25	15			=
13	13			=

- 3 A rectangle has an area of 18 squares.

Use **question 1** and **question 2** to find the minimum and maximum values of  $S$ .

minimum = .....

maximum = .....

- 4 The diagonal of a rectangle passes through 4 squares.

Use **question 1** and **question 2** to find the length and the width of each possible rectangle.





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