Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

7235961311

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/51**

Paper 5 (Core) **May/June 2016**

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 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 **8** printed pages.

CAMBRIDGE International Examinations

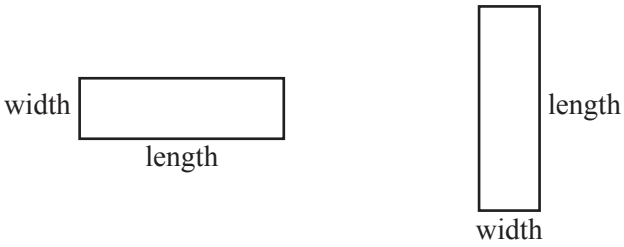
Answer **all** the questions.

INVESTIGATION **DIVIDING RECTANGLES**

This investigation looks at the connections between the rectangles made by dividing one rectangle into two smaller rectangles.

In this investigation

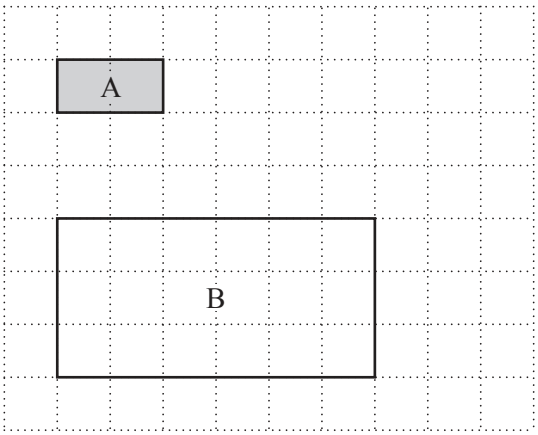
- the length of a rectangle is always longer than its width



- the length and width of a rectangle are always a whole number of units
- the scale factor of any enlargement is greater than 1.

1 In the diagrams below, rectangle B is an enlargement of rectangle A.

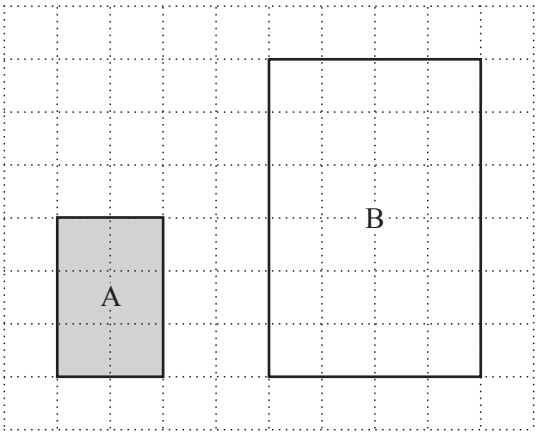
(a)



Write down the scale factor of this enlargement.

.....

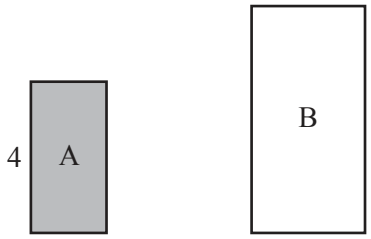
(b)



Write down the scale factor of this enlargement.

.....

(c)



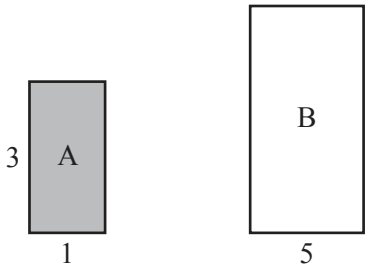
NOT TO SCALE

For this pair of rectangles, the scale factor is 10.

Work out the length of rectangle B.

.....

(d)

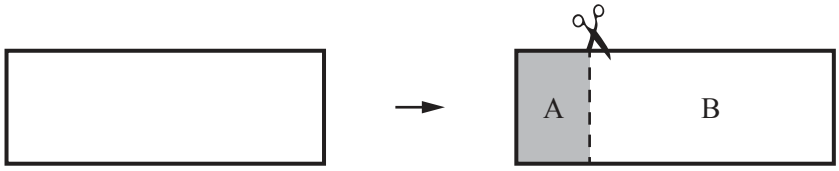


NOT TO SCALE

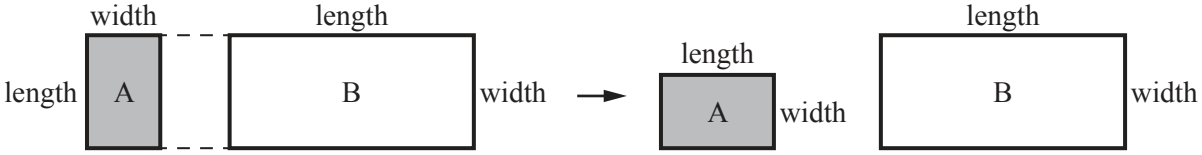
Work out the length of rectangle B.

.....

2 A rectangle is cut into two smaller rectangles, A and B.

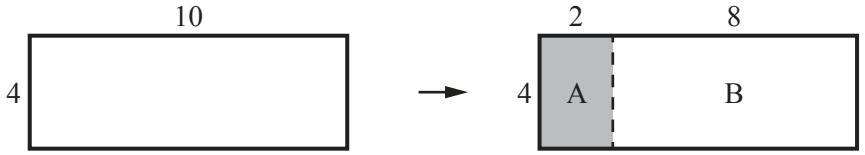


When B is an enlargement of A, the original rectangle is called a *scale-rectangle*.

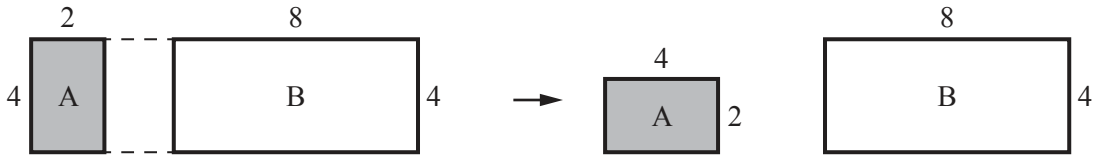


Example

A 4 by 10 rectangle is cut as shown.



NOT TO SCALE

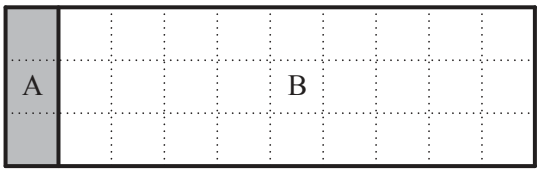


$$\frac{\text{length of B}}{\text{length of A}} = \frac{8}{4} = 2 \quad \textbf{and} \quad \frac{\text{width of B}}{\text{width of A}} = \frac{4}{2} = 2$$

So B is an enlargement of A with scale factor 2.

This means that the rectangle with dimensions 4 by 10 is a *scale-rectangle* with a factor of 2.

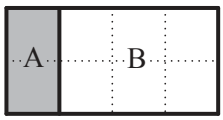
(a)



The diagram shows a 3 by 10 rectangle.
This is a *scale-rectangle*.

Show that it has a factor of 3.

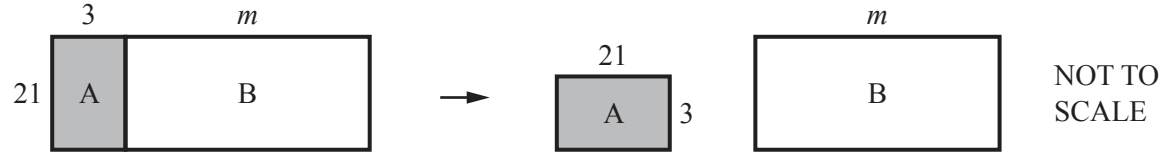
(b)



The diagram shows a 2 by 4 rectangle.

Is this a *scale-rectangle*?
Write Yes or No and give reasons for your answer.

(c)



The diagram shows a *scale-rectangle* with a factor of 7.

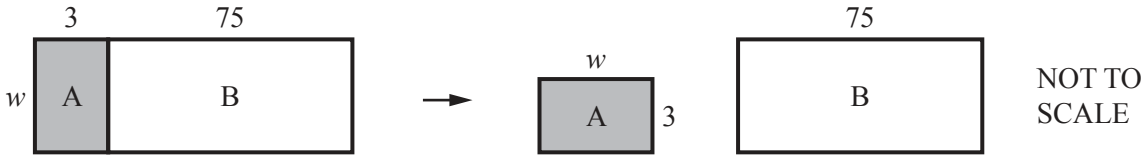
(i) Find *m*.

.....

(ii) Write down the dimensions of the *scale-rectangle*.

..... by .....

(d)



The diagram shows a *scale-rectangle* with a factor of 5.

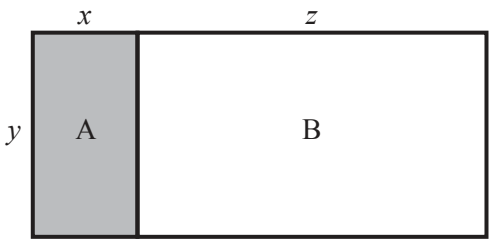
(i) Find w.

.....

(ii) Write down the dimensions of the *scale-rectangle*.

..... by .....

3



The diagram shows a *scale-rectangle* with a factor of n.

(a) When $x = 2$ and $n = 6$,

(i) work out y,

.....

(ii) find z,

.....

(iii) complete this statement with a number,

$z =$ ..... $\times x$

(iv) write down the connection between your answer to **part (iii)** and the factor, n.

(b) When $x = 2$ and $z = 18$,

(i) find n,

.....

(ii) work out the dimensions of this *scale-rectangle*.

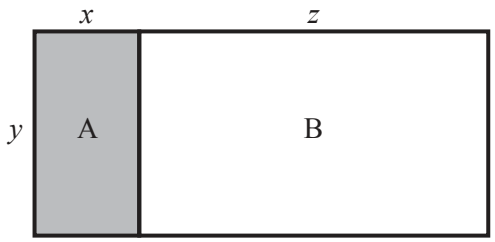
..... by .....

(c) Use your answers to **part (a)** and **part (b)** to complete the second and third rows of the table. Complete the remaining rows of the table.

n	x	y	z	Dimensions
2	2	4	8	4 by 10
6	2			..... by .....
	2		18	..... by .....
5	7			..... by .....
	1	4	16	4 by 17
	5		20	..... by .....

Question 4 is printed on the next page.

4



The diagram shows a *scale-rectangle* with a factor of n.

(a) Work out the dimensions of this *scale-rectangle* in terms of n and x.

..... by .....

(b) Show that, for any *scale-rectangle*, its dimensions are in the ratio

$$\text{width : length} = n : n^2 + 1.$$