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0607/51

May/June 2016

1 hour

Additional Materials: Graphics Calculator

DO **NOT** WRITE IN ANY BARCODES.

The total number of marks for this paper is 24.

This document consists of **8** printed pages.

Answer **all** the questions.

INVESTIGATION

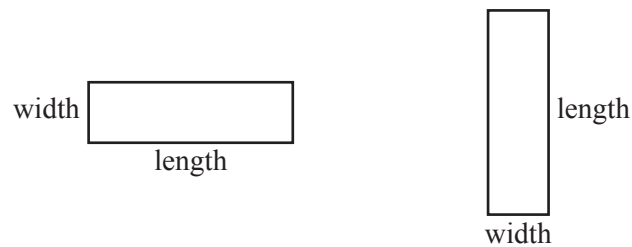
DIVIDING RECTANGLES

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



In this investigation

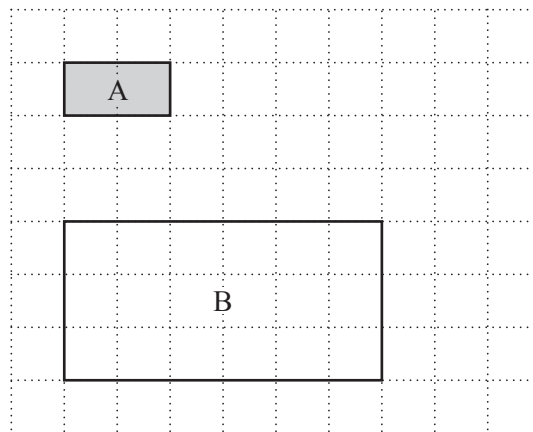
- the length of a rectangle is always longer than its width



- 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.

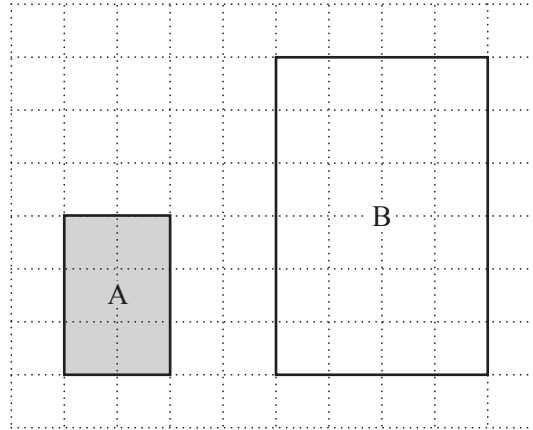
(a)



Write down the scale factor of this enlargement.

.....

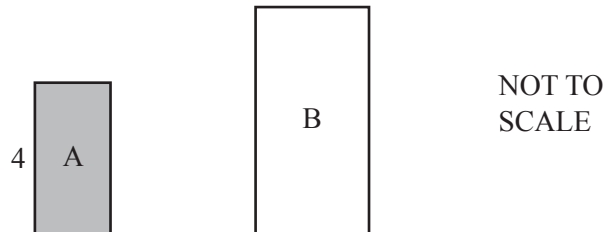
(b)



Write down the scale factor of this enlargement.

.....

(c)

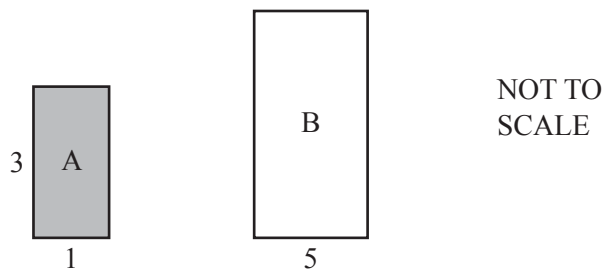


For this pair of rectangles, the scale factor is 10.

Work out the length of rectangle B.

.....

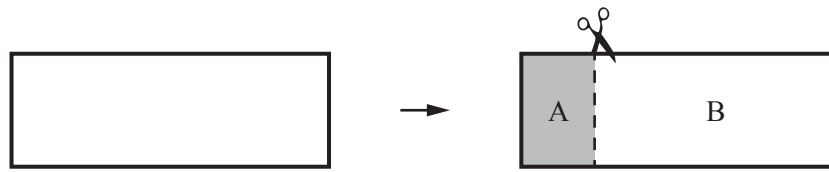
(d)



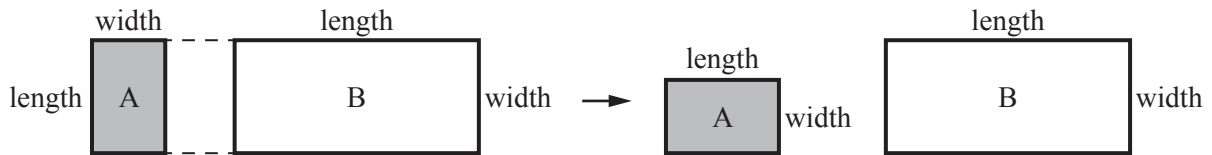
Work out the length of rectangle B.

.....

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

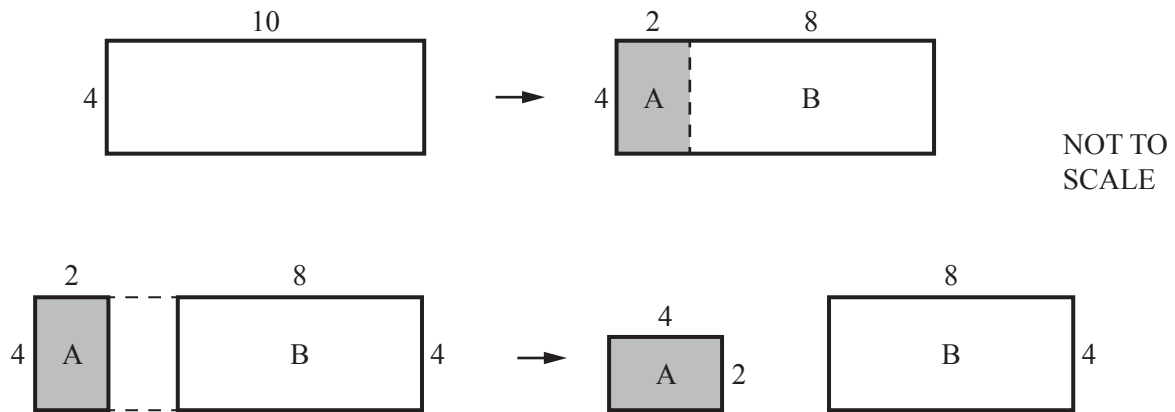


When B is an enlargement of A, the original rectangle is called a *scale-rectangle*.



Example

A 4 by 10 rectangle is cut as shown.

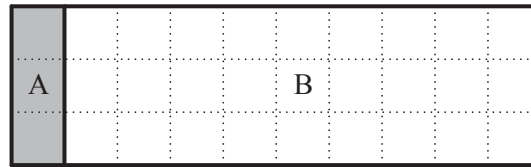


$$\frac{\text{length of B}}{\text{length of A}} = \frac{8}{4} = 2 \quad \text{and} \quad \frac{\text{width of B}}{\text{width of A}} = \frac{4}{2} = 2$$

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.

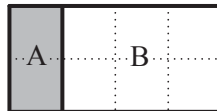
(a)



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

Show that it has a factor of 3.

(b)

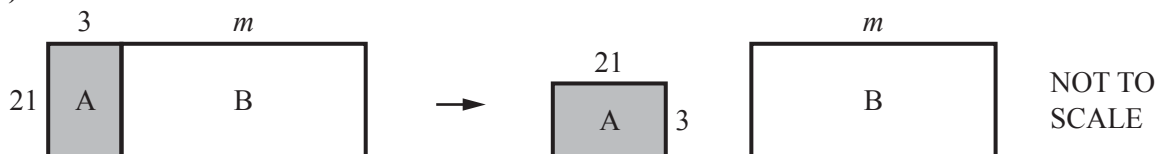


The diagram shows a 2 by 4 rectangle.

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.

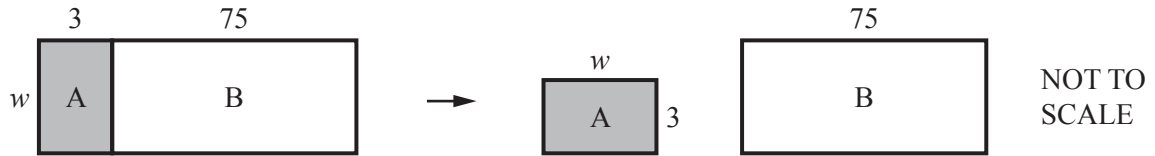
(i) Find m .

.....

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

..... by

(d)



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

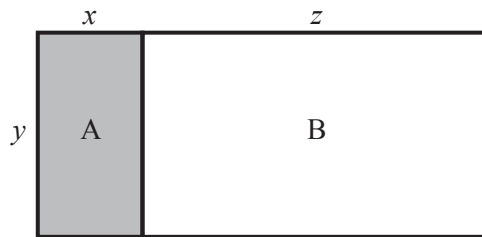
(i) Find w .

.....

(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,

$$z = \dots \times x$$

(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 ,

.....

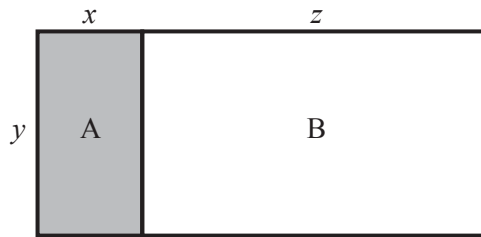
(ii) work out the dimensions of this *scale-rectangle*.

..... 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.



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

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

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