

## Lesson 10

### GCSE Mathematics Ratio and Similarity

#### 10.1 Test

Marks Available : 60

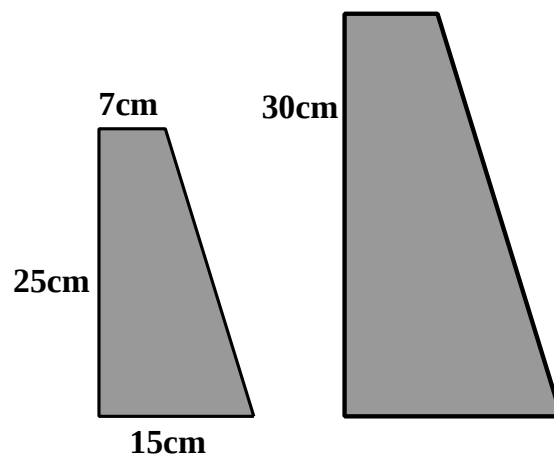
##### Question 1

A larger cuboid has lengths that are six times longer than a similar smaller cuboid.  
The smaller cuboid measures 9 cm by 11 cm by 16 cm.  
What are the measurements of the larger cuboid ?

[ 2 marks ]

##### Question 2

The two shapes shown below are similar.



( i ) Work out the area of the left hand shape.

[ 1 mark ]

( ii ) What is the **LENGTH** scale factor, greater than 1, of the similarity ?

[ 1 mark ]

( iii ) What is the **AREA** scale factor, greater than 1 of the similarity ?

[ 1 mark ]

( iv ) Work out the area of the right hand shape.

[ 1 mark ]

### Question 3

True or false ?

( i ) All cubes are congruent.

[ 1 mark ]

( ii ) All equilateral triangles are similar.

[ 1 mark ]

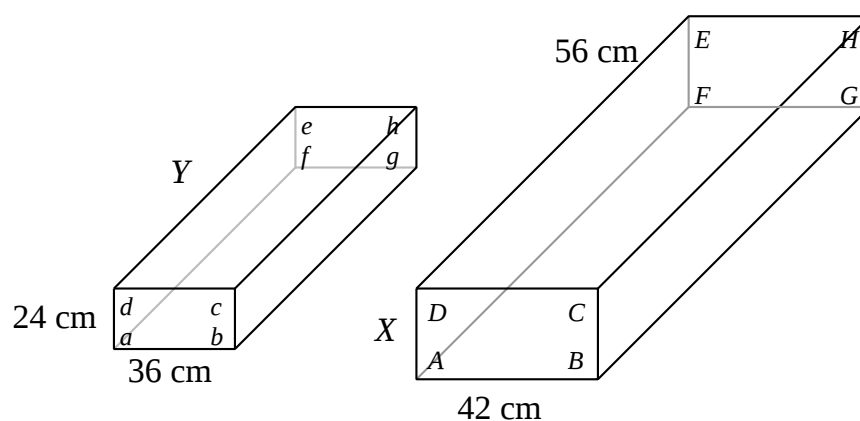
( iii ) All pyramids are similar.

[ 1 mark ]

### Question 4

The two cuboids shown below are similar.

The edges of  $abcdefgh$  match up with  $ABCDEFGH$  in the obvious way.



( i ) What is the *length* scale factor, greater than 1, of the similarity ?

[ 1 mark ]

( ii ) Show how your part ( i ) answer may be used to find the length of the side marked X ?

[ 1 mark ]

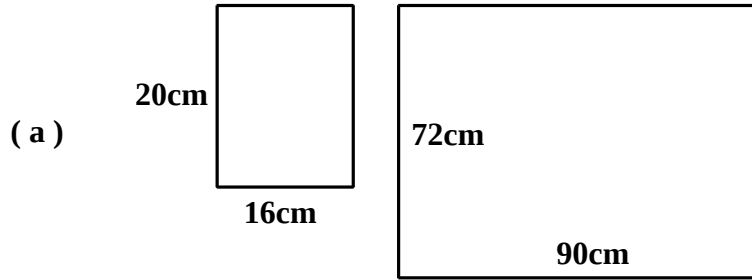
( iii ) What is the *length* scale factor, less than 1, of the similarity ?

[ 1 mark ]

( iv ) Show how your part ( iii ) answer may be used to find the length of the side marked Y ?

[ 1 mark ]

### Question 5



The two rectangles are similar.

What is the **length** scale factor, greater than 1, between them ?

[ 2 marks ]

( b ) Cuboid A measures 12 m by 8 m by 32 m.

Cuboid B measures 48 cm by 12 m by 18 m.

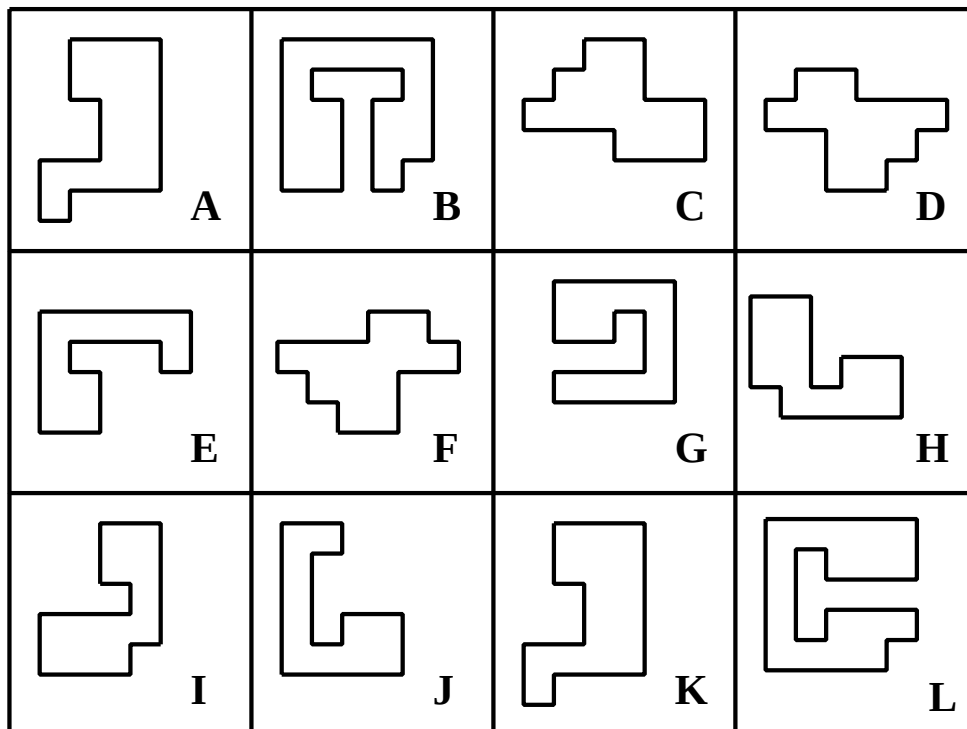
What is the length scale factor, less than 1, between them ?

[ 2 marks ]

### Question 6

For the following shapes, shade in those that are **directly congruent** in one colour and, in a different colour, those that are **indirectly congruent**.

Provide a key to explain what the colours used represent.



[ 6 marks ]

### Question 7

GCSE Examination Question from January 2012. Paper 3H, Q12 (Edexcel)

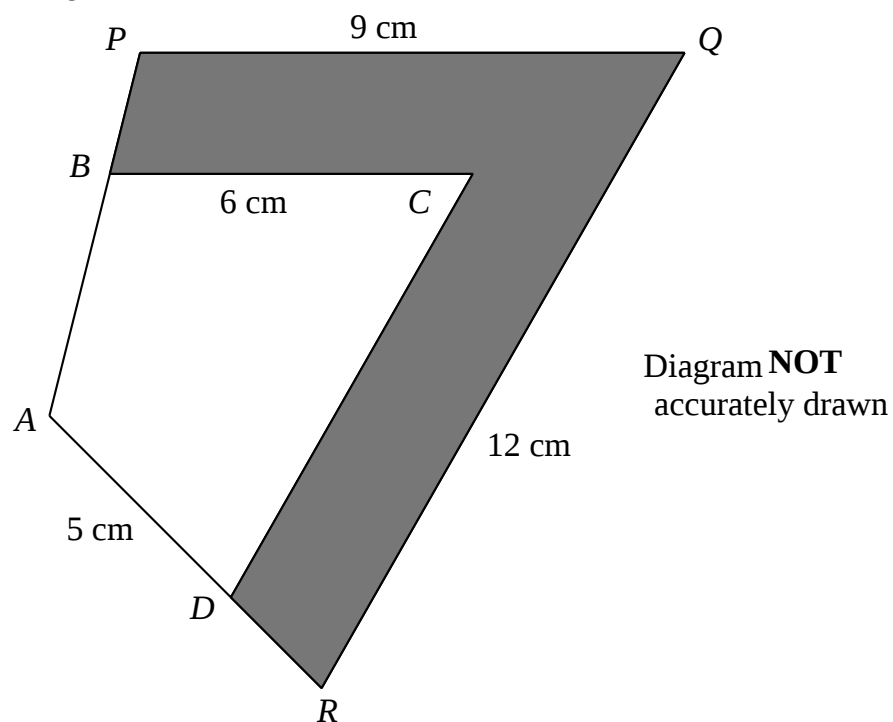
$ABCD$  and  $APQR$  are two similar quadrilaterals.

$$PQ = 9 \text{ cm}$$

$$BC = 6 \text{ cm}$$

$$AD = 5 \text{ cm}$$

$$QR = 12 \text{ cm}$$



(a) Find the length of  $DC$ .

[ 2 marks ]

(b) Find the length of  $AR$ .

[ 2 marks ]

The area of the quadrilateral  $ABCD$  is  $32 \text{ cm}^2$

(c) Calculate the area of the shaded region.

[ 4 marks ]

### Question 8

GCSE Examination Question from June 2011. Paper 3H, Q12 (Edexcel)

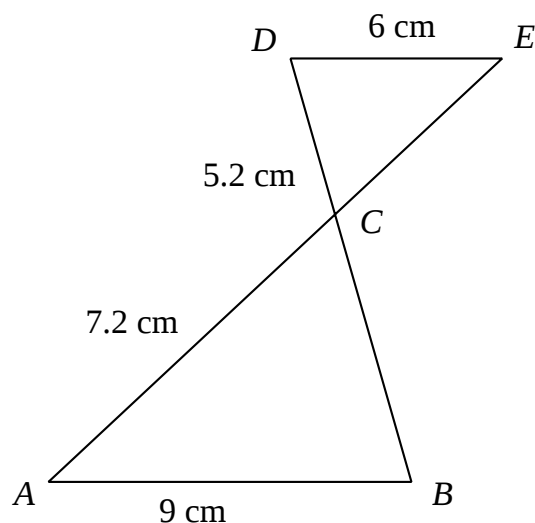


Diagram **NOT**  
accurately drawn

$AB$  is parallel to  $DE$ .

$ACE$  and  $BCD$  are straight lines.

$AB = 9\text{ cm}$ .

$AC = 7.2\text{ cm}$ .

$CD = 5.2\text{ cm}$ .

$DE = 6\text{ cm}$ .

( a ) Calculate the length of  $BC$ .

[ 2 marks ]

( b ) Calculate the length of  $CE$ .

[ 2 marks ]

### Question 9

A mini-doughnut has a diameter of 3.2 cm.

A jumbo-doughnut, similar to the mini-doughnut, has a diameter of 7.2 cm.

How many mini-doughnuts would Mr Bloat have to eat to have consumed the same amount of doughnut material as Mr Pucké, who's just eaten 5 jumbo-doughnuts ?

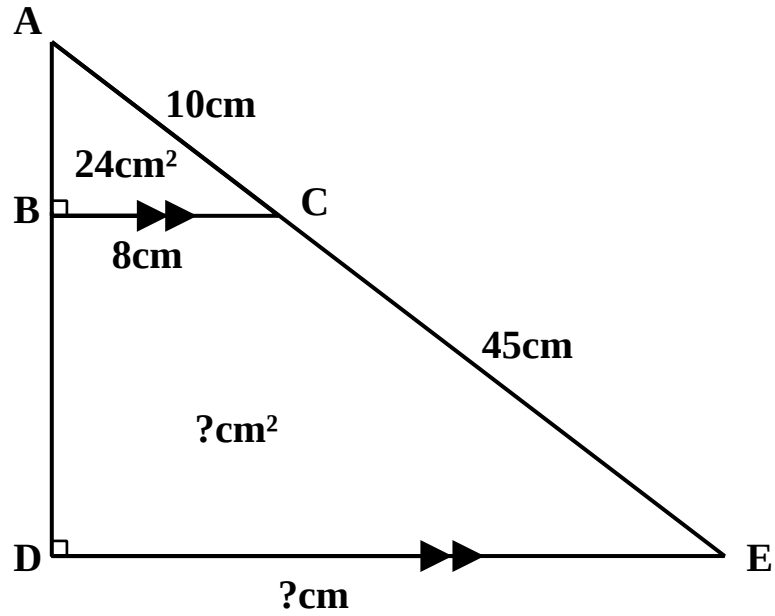
[ 4 marks ]

**Question 10**

In the diagram below,  $AC = 10\text{ cm}$ ,  $BC = 8\text{ cm}$  and  $CE = 45\text{ cm}$

The area of  $\triangle ABC$ , which is right angled, is  $24\text{ cm}^2$

$BC$  is parallel to  $DE$



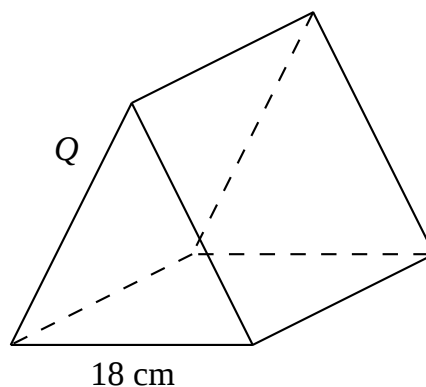
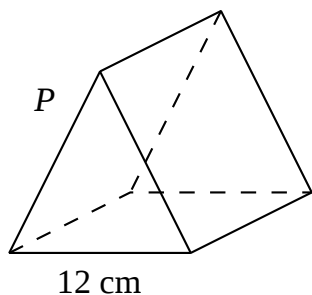
Find the length of  $DE$  and the area of the trapezium  $BCED$ .

[ 6 marks ]

### Question 11

GCSE Examination Question from June 2010. Paper 3H, Q17.

Diagram **NOT**  
accurately drawn



Two prisms, *P* and *Q* are similar.

The cross-section of prism *P* is a triangle with a base of length 12 cm.

The cross-section of prism *Q* is a triangle with a base of length 18 cm.

The total surface area of prism *P* is  $544 \text{ cm}^2$ .

Calculate the total surface area of prism *Q*.

[ 4 marks ]

### Question 12

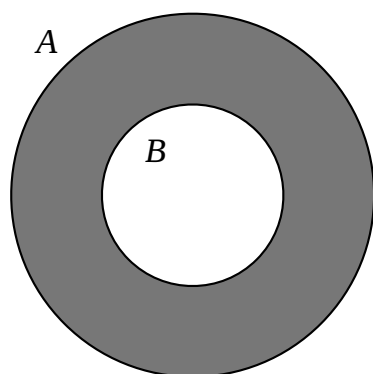


Diagram **NOT**  
accurately drawn

The diagram shows a circle *A* with a circle *B* removed.

The area of the large circle, *A*, is  $75 \text{ cm}^2$ .

The radius of circle *A*, is two and a half times the radius of circle *B*.

Work out the area shown shaded.

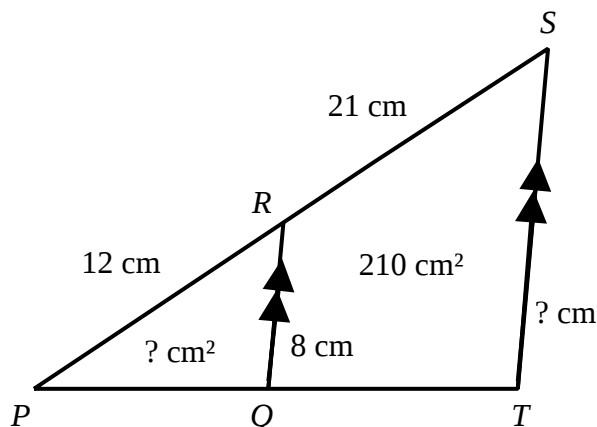
[ 4 marks ]

**Question 13**

In the diagram  $PR = 12$  cm,  $RS = 21$  cm and  $QR = 8$  cm.

The area of the trapezium  $RSTQ$  is  $210$  cm<sup>2</sup>.

$QR$  is parallel to  $TS$ .



- ( i ) Find the length of  $TS$ .

[ 2 marks ]

- ( ii ) Find the area of  $\triangle PQR$ .

[ 3 marks ]

- ( iii ) Find the area of  $\triangle PST$ .

[ 2 marks ]

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