

5.1 Congruent Shapes

Geometric figures with both the same *shape* and *size* are said to be **CONGRUENT**.

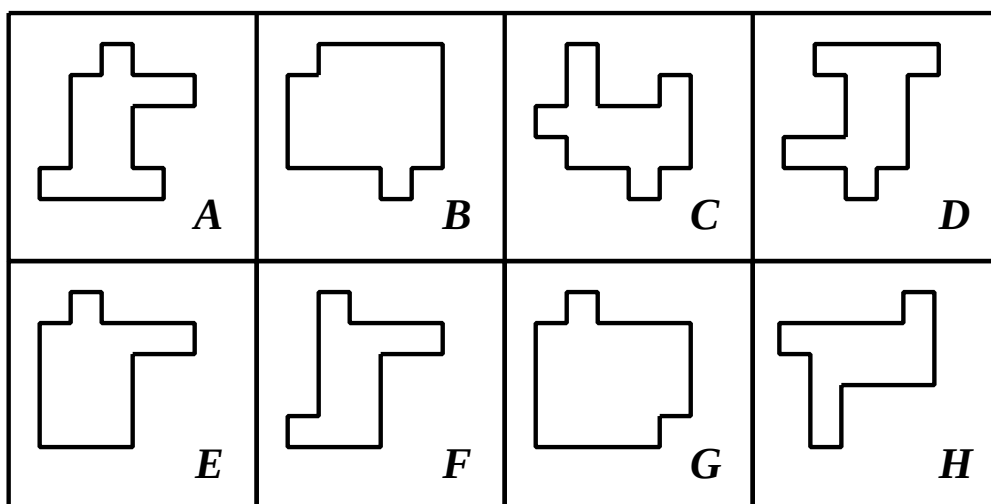
If two shapes are *congruent* then it will be possible to transform one on top of the other by means of translation, rotation and reflection.

If one copy of a shape can be translated (slid) across the page and then rotated as necessary to exactly cover another, the two shapes are **DIRECTLY congruent**.

If a reflection (or flip) has to be used, the two shapes are **INDIRECTLY congruent**.

Example

Consider the box of shapes.



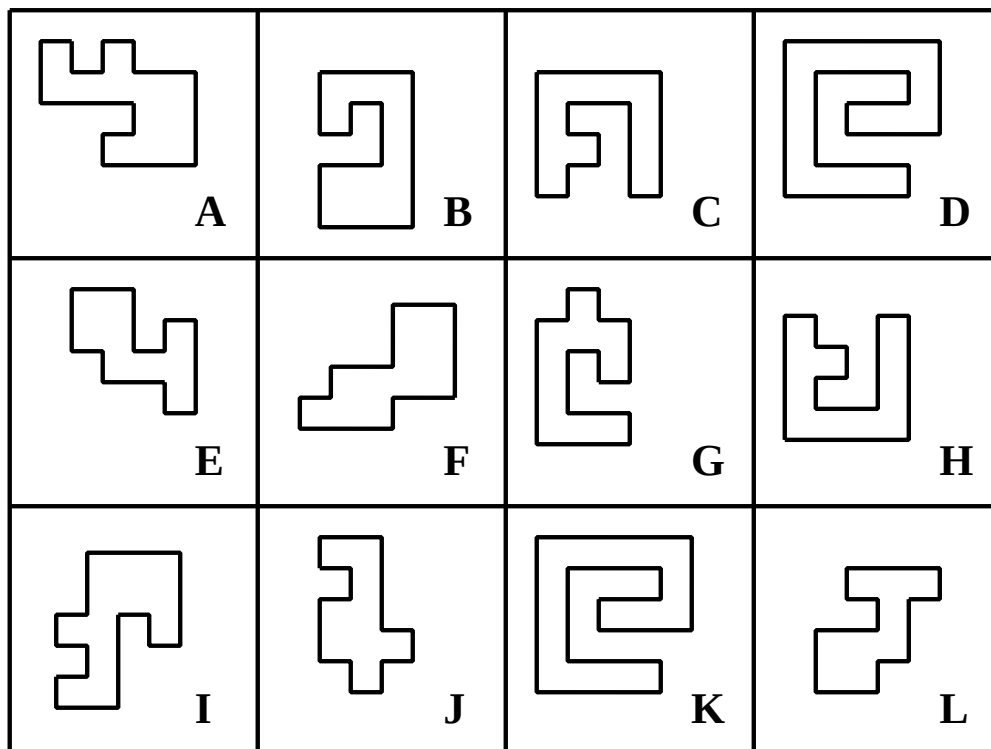
- (i) Which shape is *directly congruent* with *A* ?
Shade in this pair of shapes the same colour.
[2 marks]
- (ii) Which shape is *indirectly congruent* with *H* ?
Shade in this pair of shapes a different same colour.
[2 marks]
- (iii) Two other shapes are *directly congruent*. Which two ?
Shade in this pair of shapes, both in the same colour used in part (i).
[2 marks]

5.2 Exercise

Marks Available : 6

Question 1

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



[6 marks]

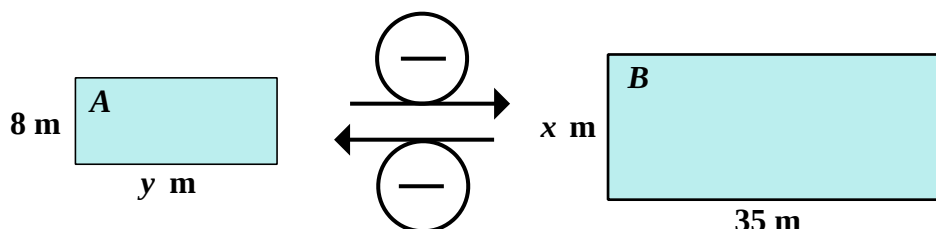
5.3 Exercise : Test Revision

Marks Available : 42

You may use a calculator

Question 1

For the similar rectangles A and B, shown below, find the lengths marked x and y given that the length scale factor (greater than 1) of the similarity is $\frac{7}{4}$



[2 marks]

Question 2

An elastic band of length 15 cm is stretched with length scale factor $\frac{9}{3}$.
What is the length of the stretched band ?

[2 marks]

Question 3

When made wet a 55 cm piece of string shrinks with length scale factor $\frac{3}{5}$.
What is the length of the shrunk string ?

[2 marks]

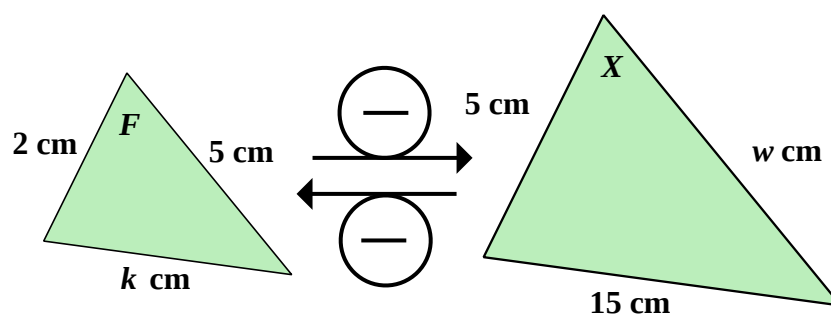
Question 4

Two rectangles are similar with length scale factor $\frac{13}{4}$.
The smaller measures 8 cm by 12 cm.
What are the measurements of the larger ?

[2 marks]

Question 5

For the similar triangles F and X , shown below, find the length scale factor (greater than 1) of the similarity and also the lengths marked w and k (Your answers may involve decimals !)



[3 marks]

Question 6

Cancel down these fractions as far as possible by repeated division of the numerator and denominator by 2, 3, 5 or 10.

(i)

$$\frac{14}{4}$$

(ii)

$$\frac{35}{15}$$

(iii)

$$\frac{21}{15}$$

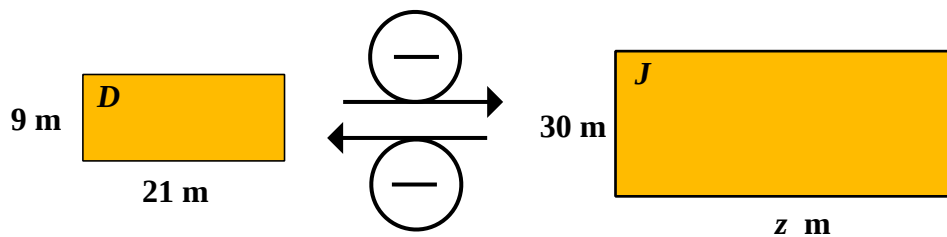
(iv)

$$\frac{28}{84}$$

[4 marks]

Question 7

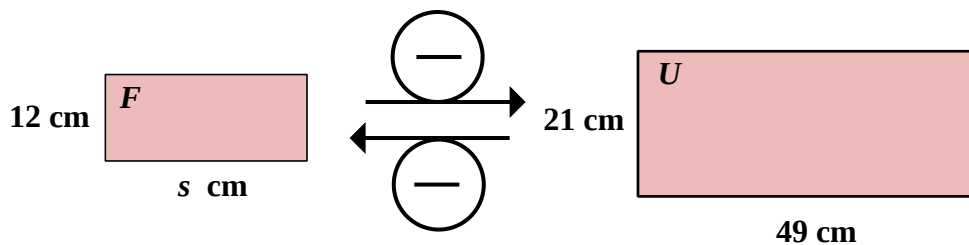
For the similar rectangles D and J , shown below, find the length scale factor (greater than 1) of the similarity (cancel down the fraction) and also the length marked z



[3 marks]

Question 8

For the similar rectangles F and U , shown below, find the length scale factor (greater than 1) of the similarity (cancel down the fraction) and also the length marked s



[3 marks]

Question 9

Simplify each of the following

(i)

$$\left(\frac{7}{5}\right)^2 = \text{---}$$

(ii)

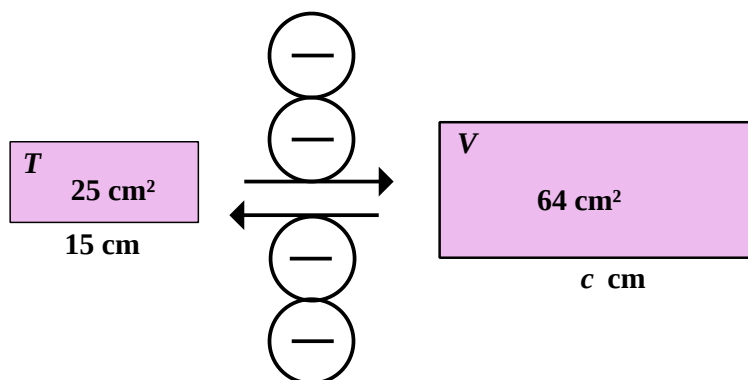
$$\sqrt{\frac{100}{49}} = \text{---}$$

(iii)

$$\left(\frac{9}{4}\right)^{0.5} = \text{---}$$

[3 marks]

Question 10

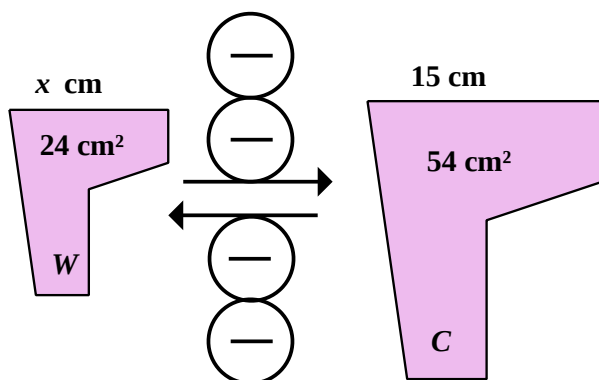


Rectangles T and V are similar.

Find the length marked c

[3 marks]

Question 11

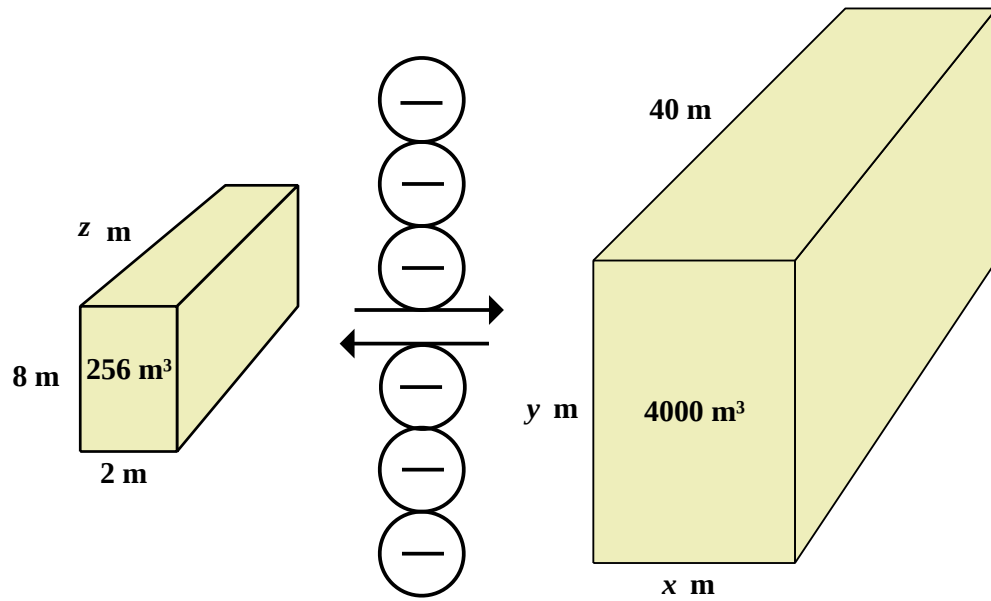


The shapes W and C are similar.

Find the length marked x

[3 marks]

Question 12



The above two similar cuboids are shown with the same orientation.

- (i) Find the lengths marked x , y and z .

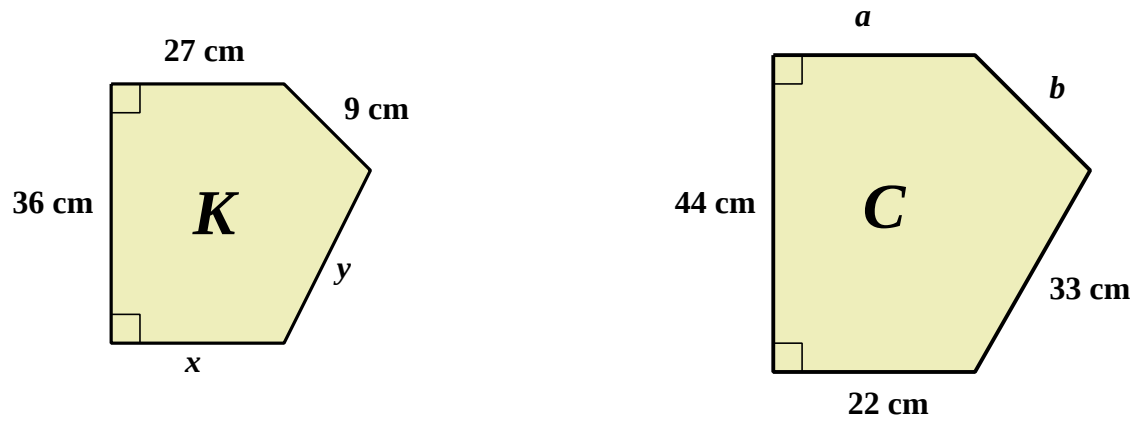
[3 marks]

- (ii) How many times more surface area has the larger cuboid than the smaller ?

[1 mark]

Question 13

Pentagon K is mathematically similar to pentagon C .
Calculate the lengths of the sides marked a , b , x , and y .

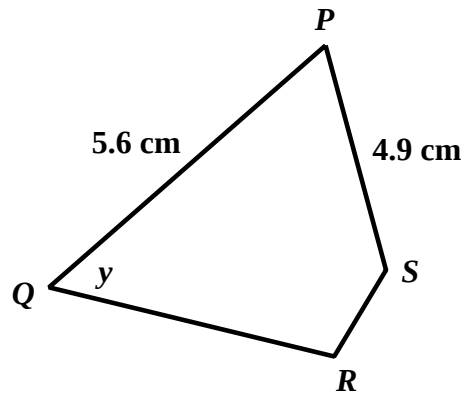
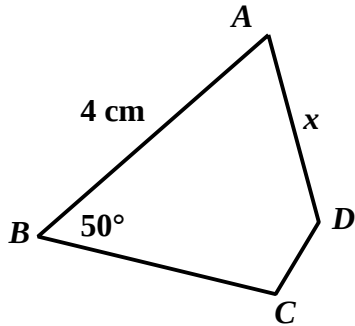


[4 marks]

Question 14

Quadrilaterals $ABCD$ and $PQRS$ are similar.

Diagram NOT accurately drawn



AB corresponds to PQ .

BC corresponds to QR .

CD corresponds to RS .

Find the value of

(a) x ,

(b) y ,

[3 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from MHHShrewsbury@Gmail.com