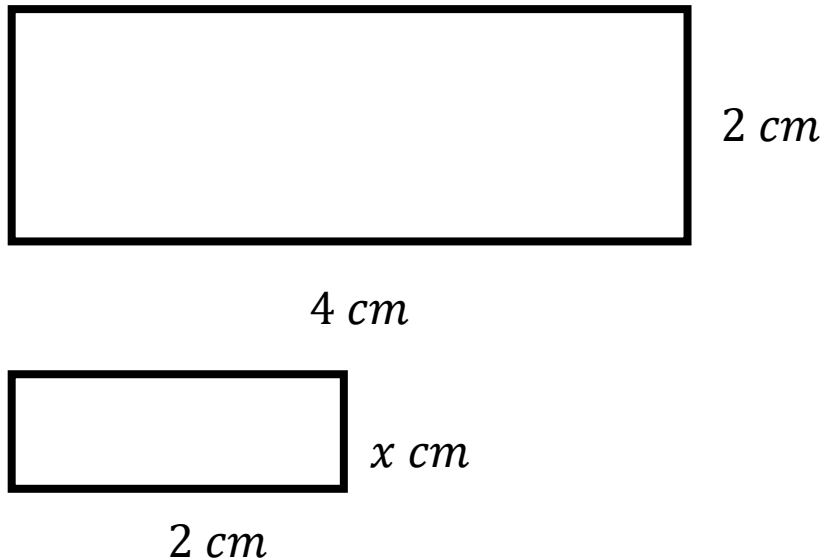


Similarity and congruence

CONTENTS

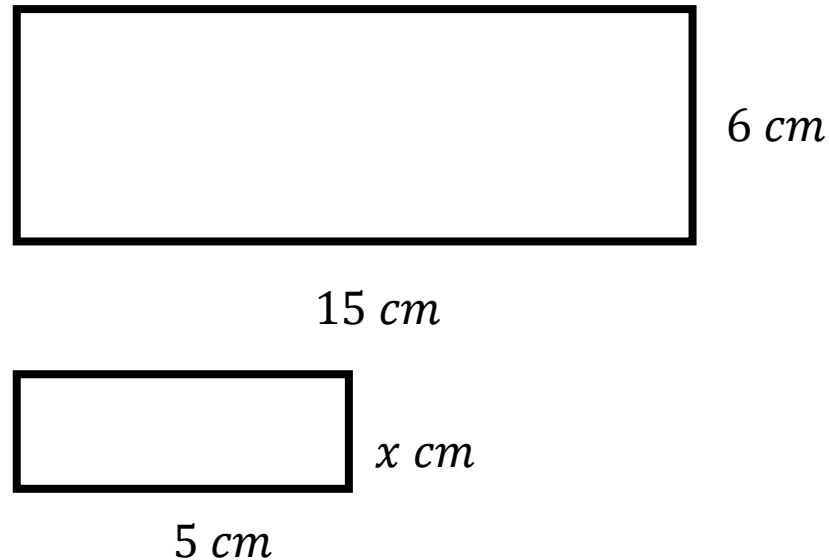
Worked example

The two shapes are similar. Find x



Your turn

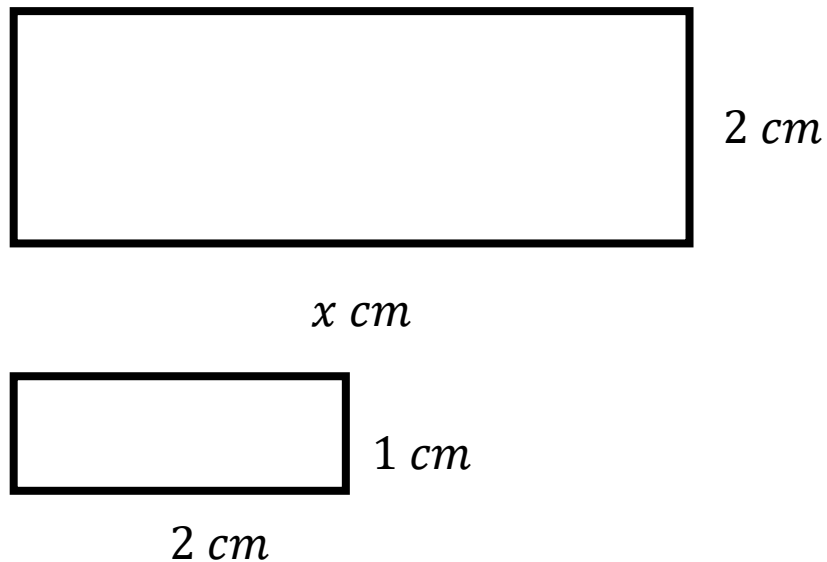
The two shapes are similar. Find x



$$x = 2$$

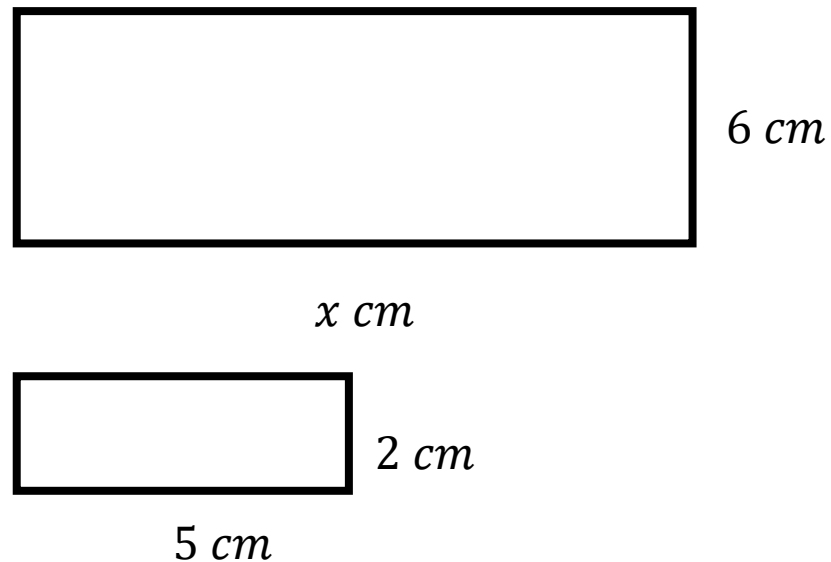
Worked example

The two shapes are similar. Find x



Your turn

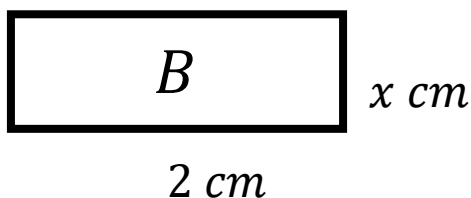
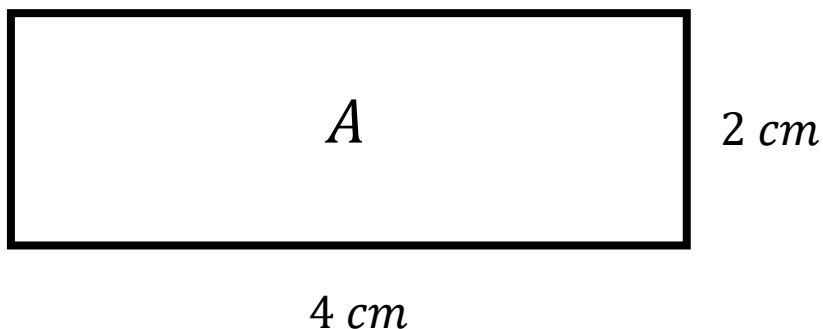
The two shapes are similar. Find x



$$x = 15$$

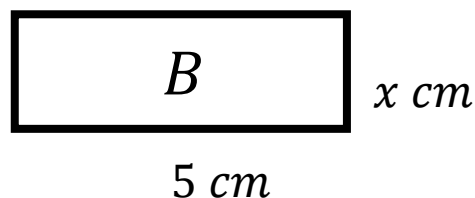
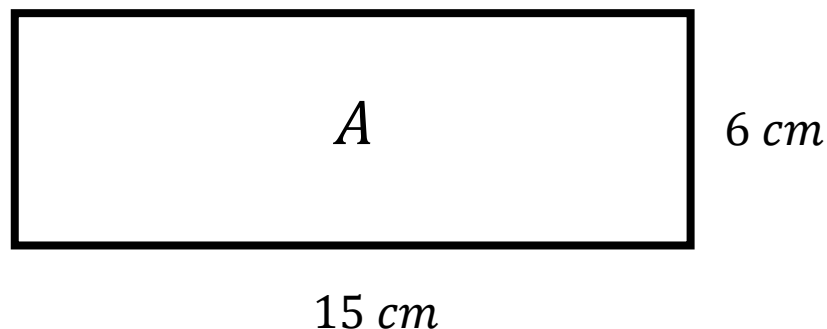
Worked example

The two shapes are similar.
Write the linear scale factor from
 B to A .
Find x



Your turn

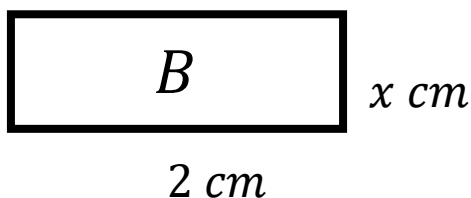
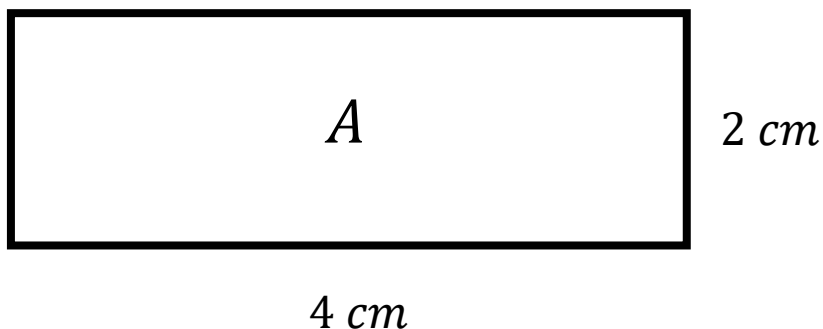
The two shapes are similar.
Write the linear scale factor from
 B to A .
Find x



3

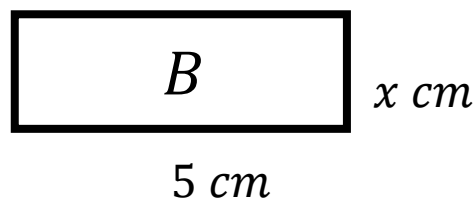
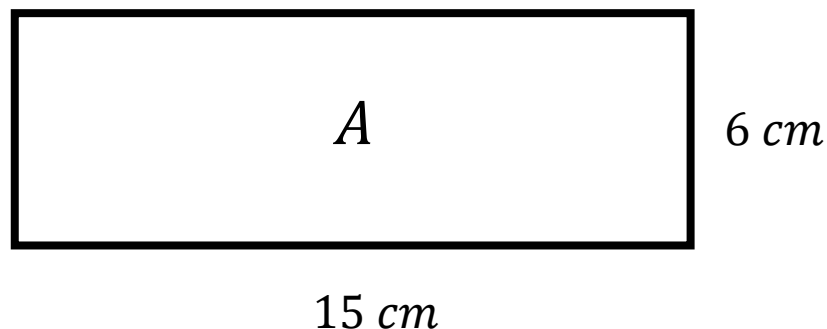
Worked example

The two shapes are similar.
Write the linear scale factor from
 A to B .
Find x



Your turn

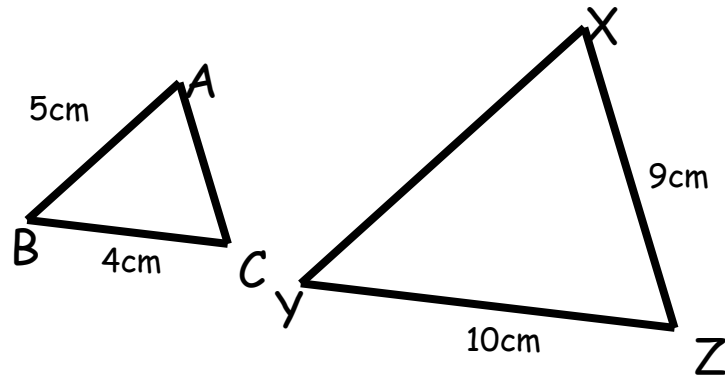
The two shapes are similar.
Write the linear scale factor from
 A to B .
Find x



$$\frac{1}{3}$$

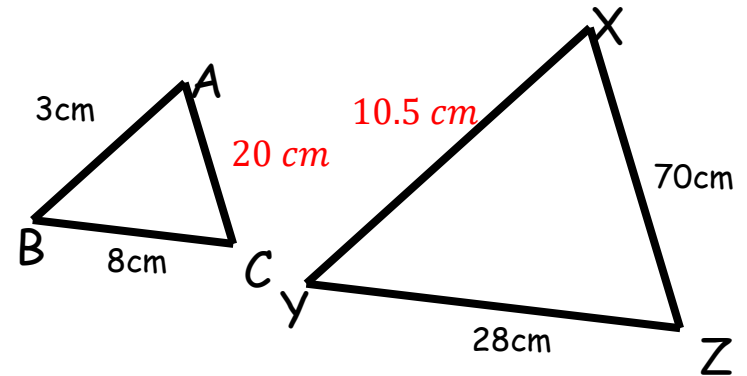
Worked example

These two shapes are similar. Find the missing lengths



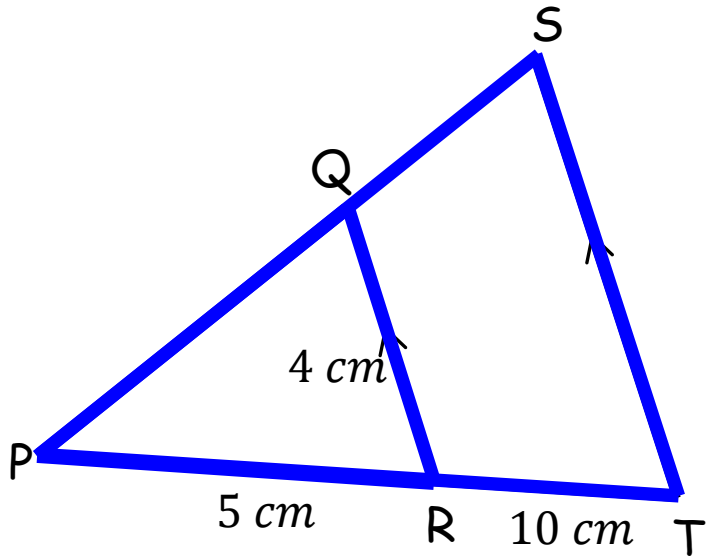
Your turn

These two shapes are similar. Find the missing lengths



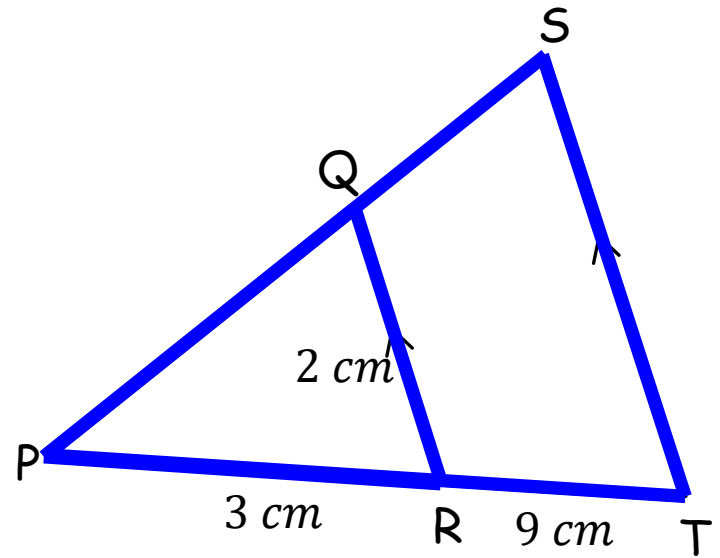
Worked example

Calculate length ST



Your turn

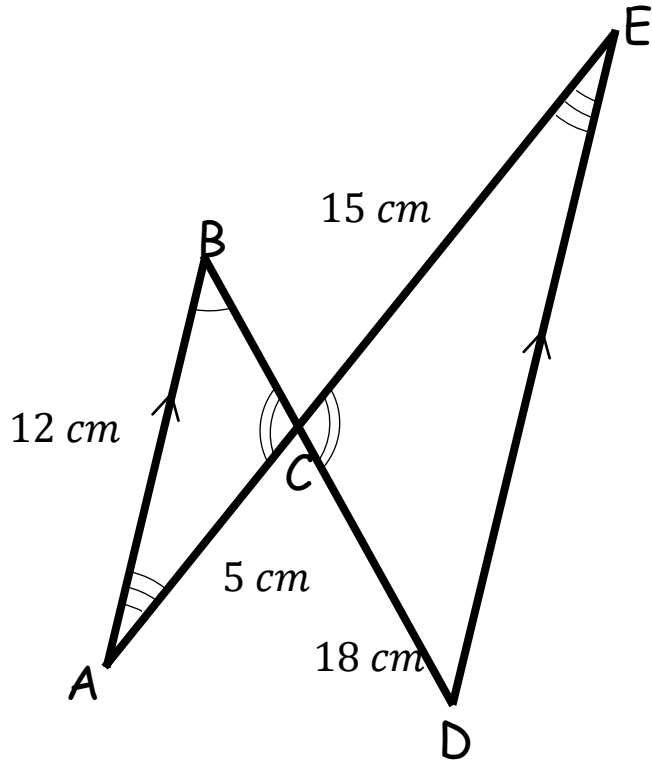
Calculate length ST



8 cm

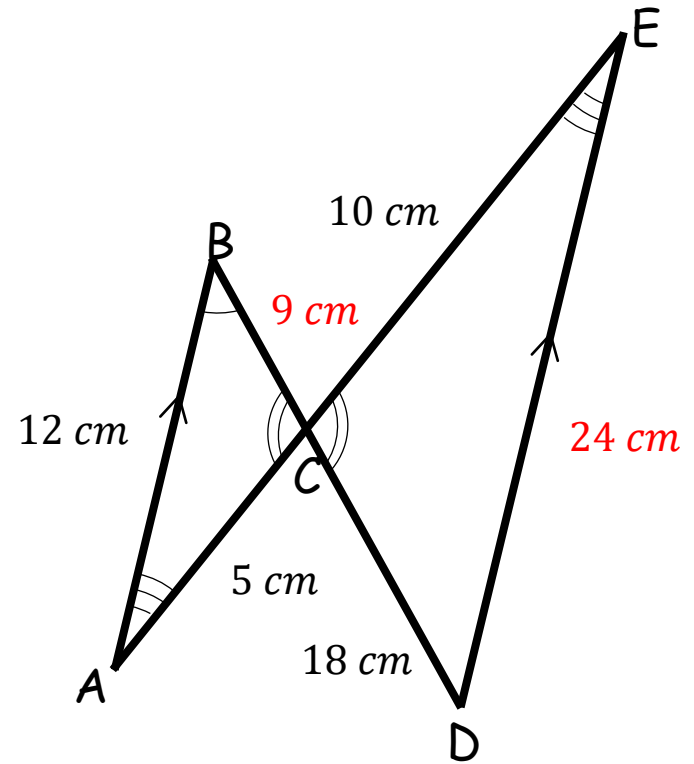
Worked example

Calculate the missing lengths



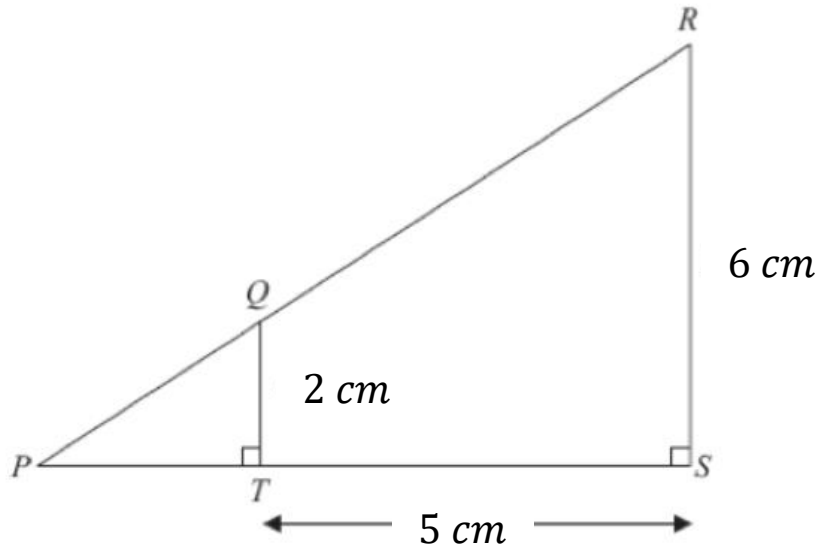
Your turn

Calculate the missing lengths



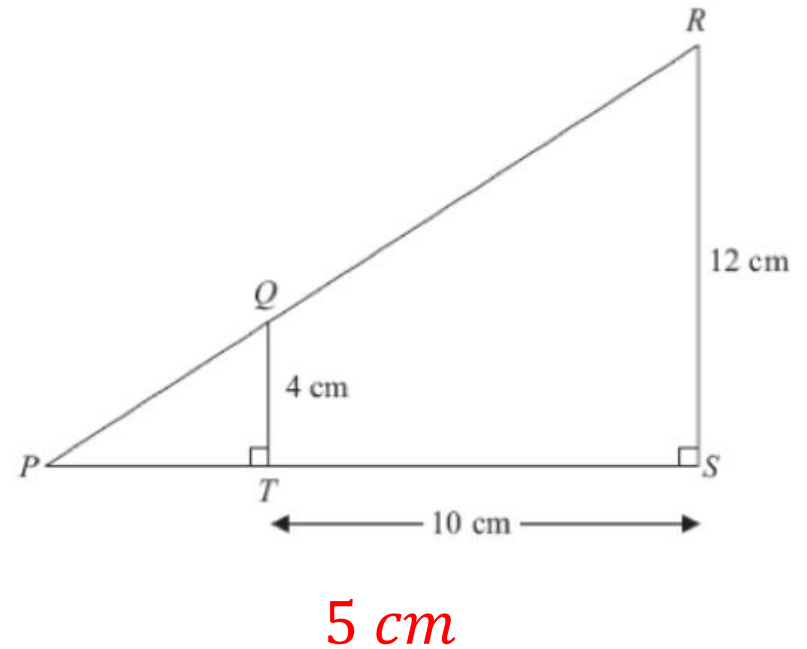
Worked example

Calculate the length of PT



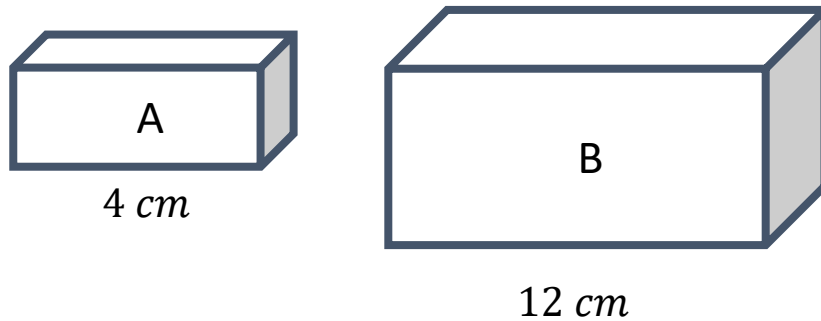
Your turn

Calculate the length of PT



Worked example

Cuboids A and B are similar.



Write down the scale factor for:

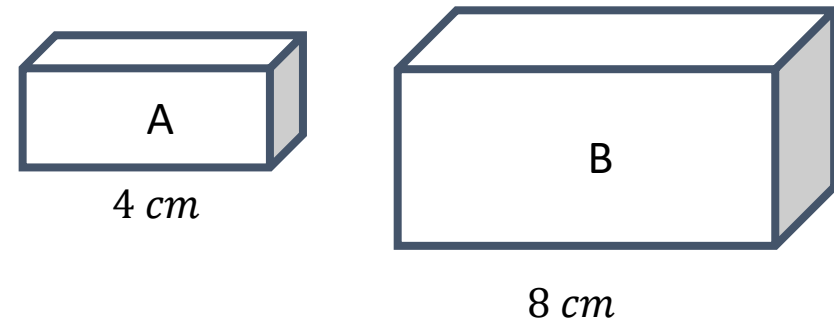
(Linear) Side lengths of A $\rightarrow$ B

Surface area of A $\rightarrow$ B

Volume of A $\rightarrow$ B

Your turn

Cuboids A and B are similar.



Write down the scale factor for:

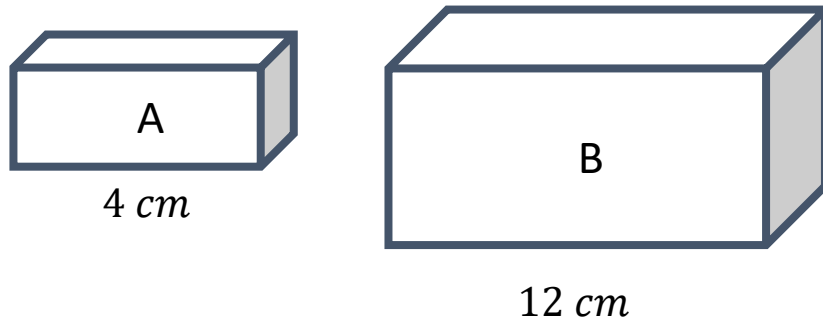
(Linear) Side lengths of A $\rightarrow$ B **2**

Surface area of A $\rightarrow$ B **$2^2 = 4$**

Volume of A $\rightarrow$ B **$2^3 = 8$**

Worked example

Cuboids A and B are similar.



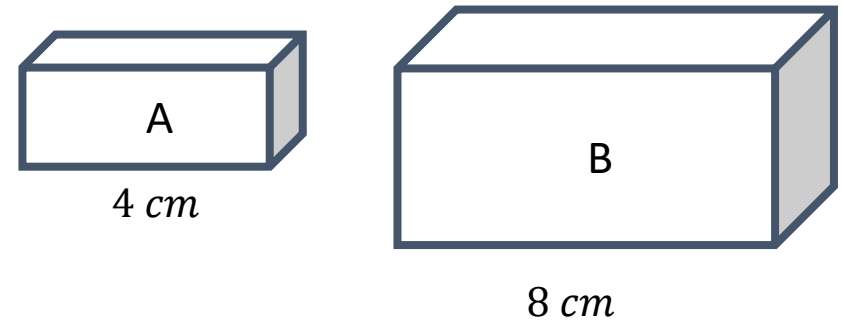
One side length of A is x .
Write the corresponding length
of B

The surface area of A is y
Write down the surface area of B

The volume of A is z
Write down the volume of B

Your turn

Cuboids A and B are similar.



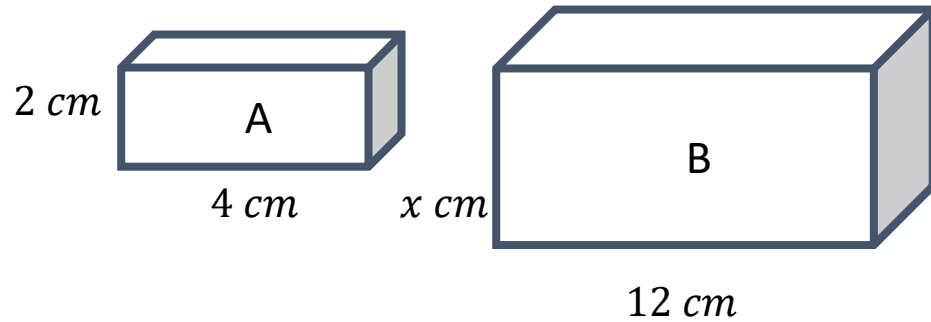
One side length of A is x .
Write the corresponding length
of B

The surface area of A is y
Write down the surface area of B

The volume of A is z
Write down the volume of B

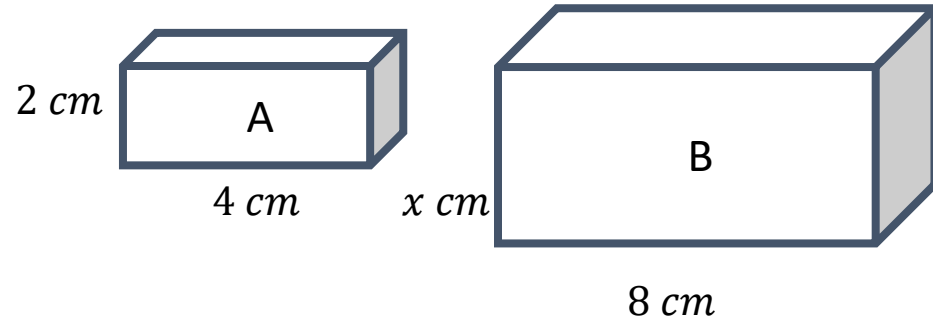
Worked example

Cuboids A and B are similar.
Find x



Your turn

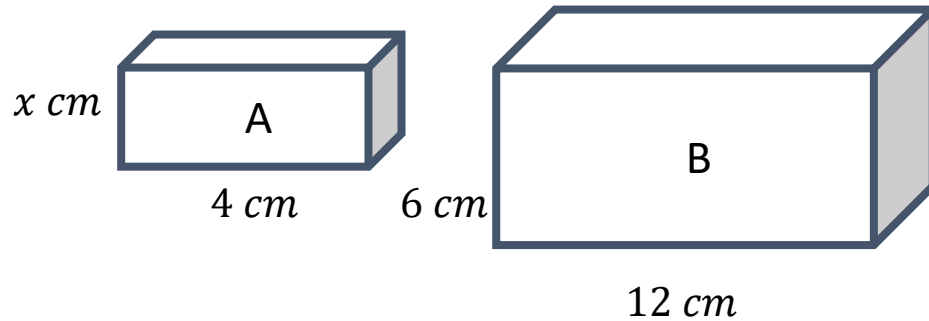
Cuboids A and B are similar.
Find x



$$x = 4$$

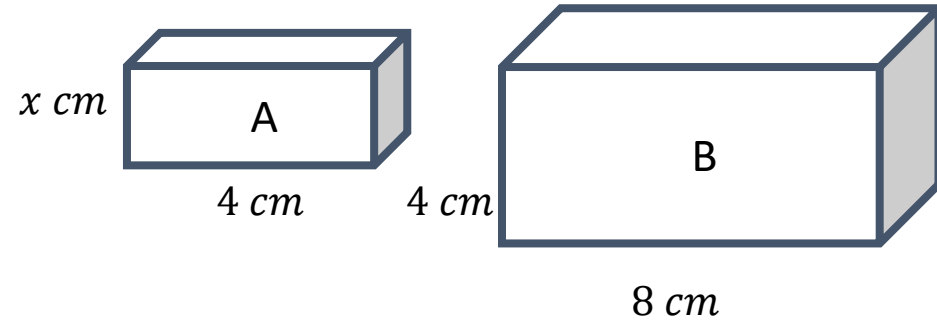
Worked example

Cuboids A and B are similar.
Find x



Your turn

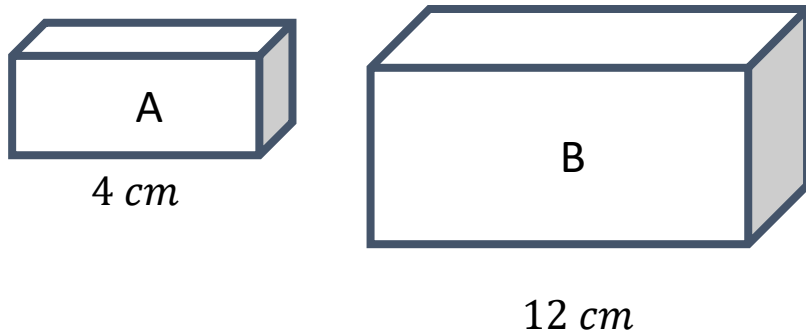
Cuboids A and B are similar.
Find x



$$x = 2$$

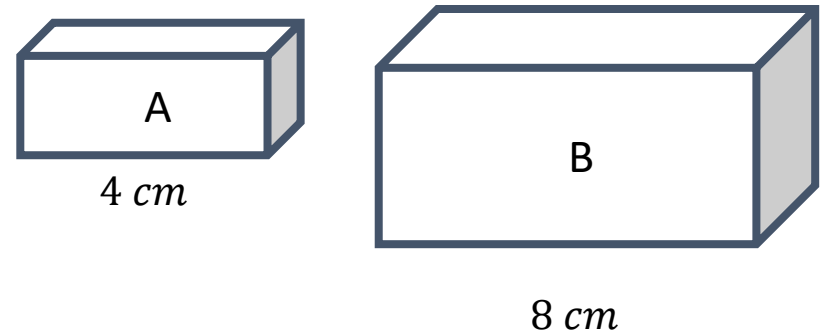
Worked example

Cuboids A and B are similar.
The surface area of cuboid A is 48 cm^2 .
What is the surface area of cuboid B?



Your turn

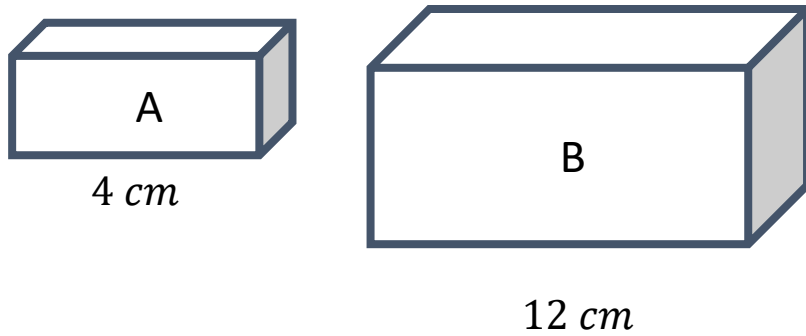
Cuboids A and B are similar.
The surface area of cuboid A is 48 cm^2 .
What is the surface area of cuboid B?



192 cm^2

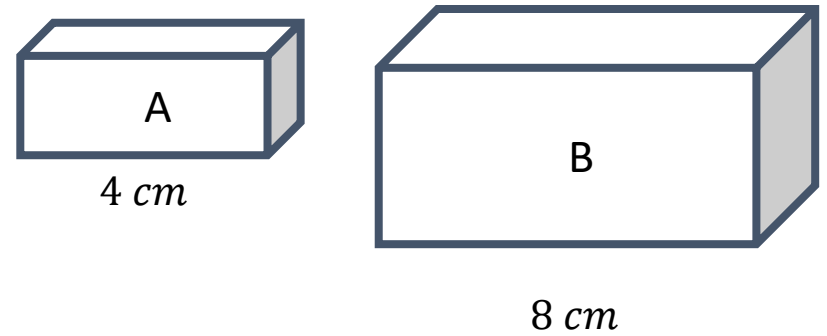
Worked example

Cuboids A and B are similar.
The surface area of cuboid B is 48 cm^2 .
What is the surface area of cuboid B?



Your turn

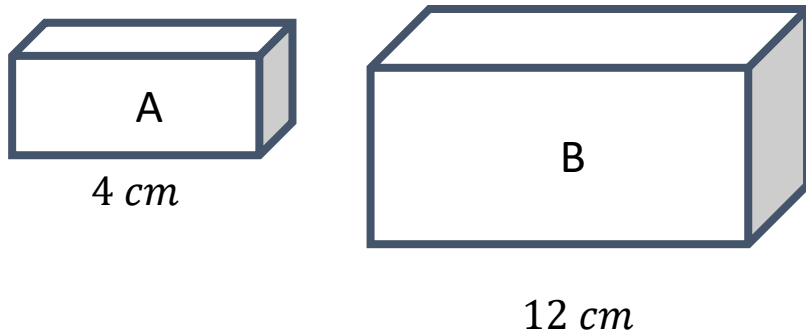
Cuboids A and B are similar.
The surface area of cuboid B is 48 cm^2 .
What is the surface area of cuboid B?



12 cm^2

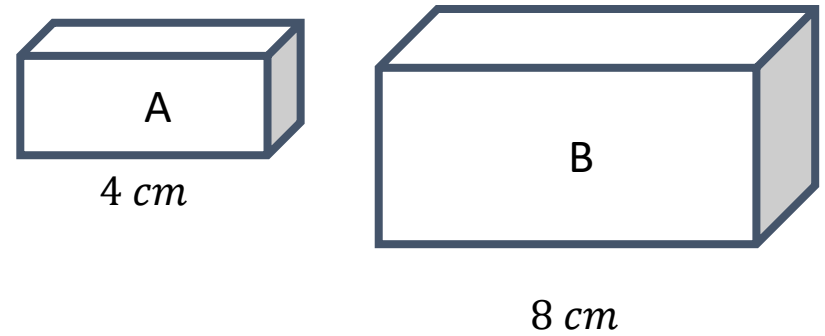
Worked example

Cuboids A and B are similar.
The volume of cuboid A is 48 cm^3 .
What is the volume of cuboid B?



Your turn

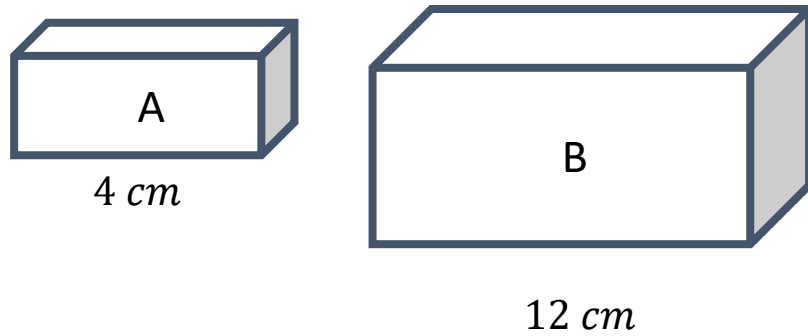
Cuboids A and B are similar.
The volume of cuboid A is 48 cm^3 .
What is the volume of cuboid B?



384 cm^3

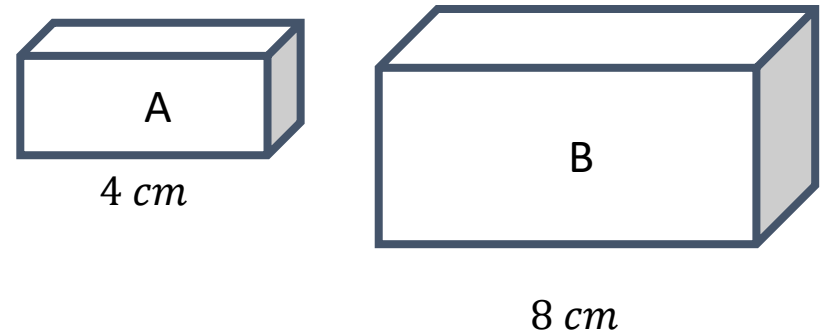
Worked example

Cuboids A and B are similar.
The volume of cuboid B is 48 cm^3 .
What is the volume of cuboid A?



Your turn

Cuboids A and B are similar.
The volume of cuboid B is 48 cm^3 .
What is the volume of cuboid A?



6 cm^3

Worked example

Cuboids A and B are similar and made from the same material.
The surface area of A is 48 cm^2
The surface area of B is 147 cm^2
The mass of A is 320 g
Calculate the mass of B

Your turn

Cuboids A and B are similar and made from the same material.
The surface area of A is 50 cm^2
The surface area of B is 18 cm^2
The mass of A is 500 g
Calculate the mass of B

108 g

Worked example

The volume of two mathematically similar solids are in the ratio 64: 343

The surface area of the smaller solid is 32 cm^2 .

Work out the surface area of the larger solid.

Your turn

The volume of two mathematically similar solids are in the ratio 27: 125.

The surface area of the smaller solid is 36 cm^2 .

Work out the surface area of the larger solid.

100 cm^2

Worked example

The surface area of two mathematically similar solids are in the ratio 16: 49
The volume of the smaller solid is 128 cm^3 .
Work out the volume of the larger solid.

Your turn

The surface area of two mathematically similar solids are in the ratio 9: 25.
The volume area of the smaller solid is 108 cm^2 .
Work out the volume of the larger solid.

500 cm^2

Worked example

A and B are mathematically similar solids.

The volume of A is 500 cm^3

The volume of B is 256 cm^3

Work out the ratio of the surface area of A to the surface area of B

Your turn

A and B are mathematically similar solids.

The volume of A is 120 cm^3

The volume of B is 960 cm^3

Work out the ratio of the surface area of A to the surface area of B

1:4

Worked example

A and B are mathematically similar solids.
The surface area of A is 100 cm^2
The surface area of B is 64 cm^2
Work out the ratio of the volume of A to the volume of B

Your turn

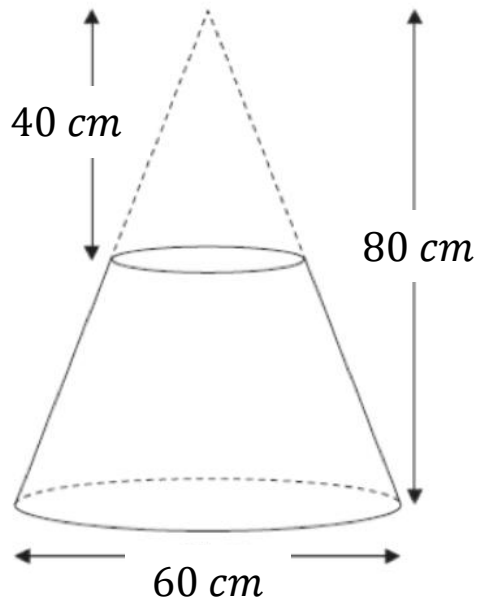
A and B are mathematically similar solids.
The surface area of A is 120 cm^2
The surface area of B is 480 cm^2
Work out the ratio of the volume of A to the volume of B

1:8

Worked example

A frustum is made by removing a small cone from a similar large one.

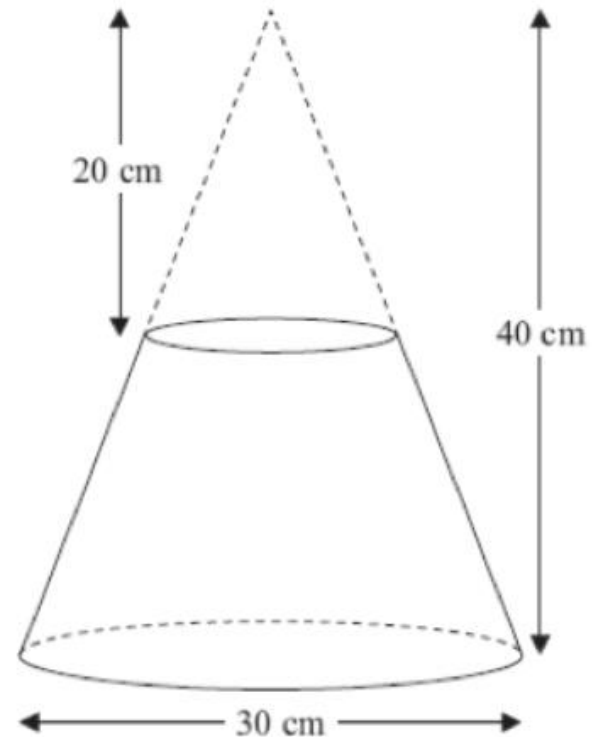
Work out the volume of the frustum.



Your turn

A frustum is made by removing a small cone from a similar large one.

Work out the volume of the frustum.



$$8246.68 \text{ cm}^3 \text{ (2 dp)}$$

Worked example

The linear scale factor is 2. Find the area and volume scale factors.

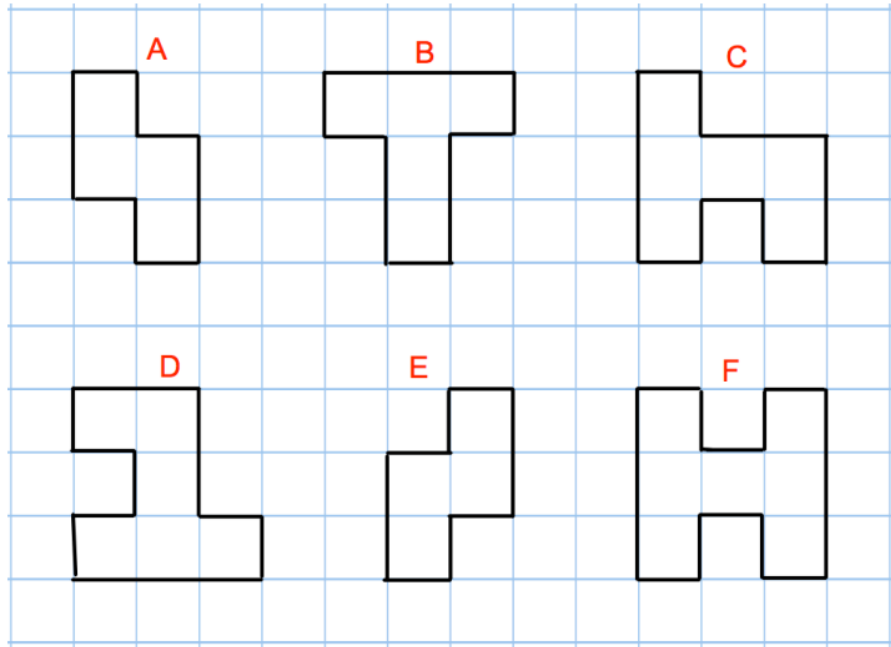
The linear scale factor is 3. Find the area and volume scale factors.

Your turn

The linear scale factor is 4. Find the area and volume scale factors.

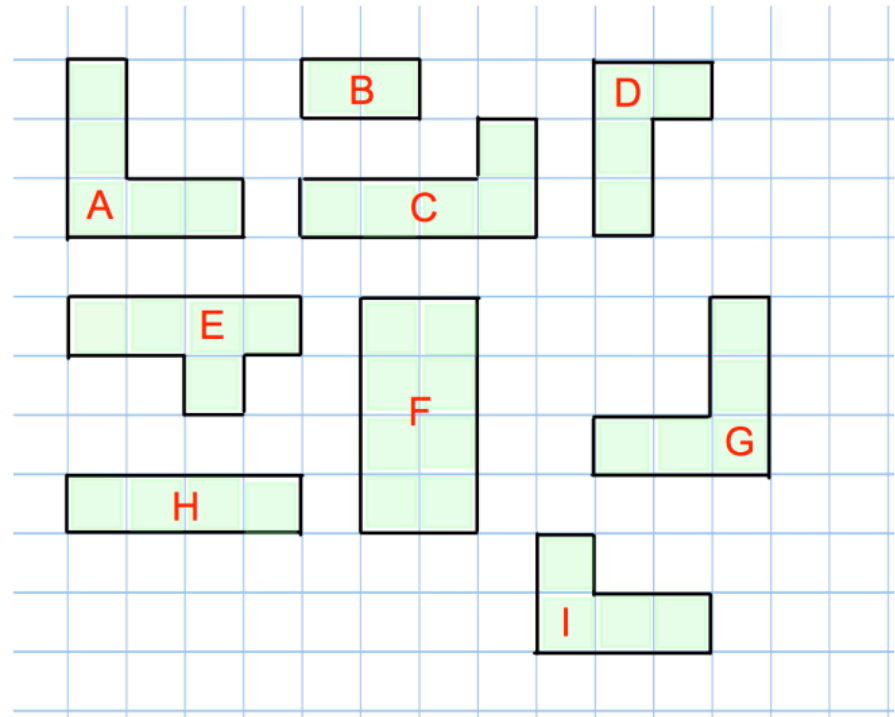
$$\text{Area SF} = 4^2 = 16$$
$$\text{Volume SF} = 4^3 = 64$$

Worked example



Which two shapes are congruent?

Your turn

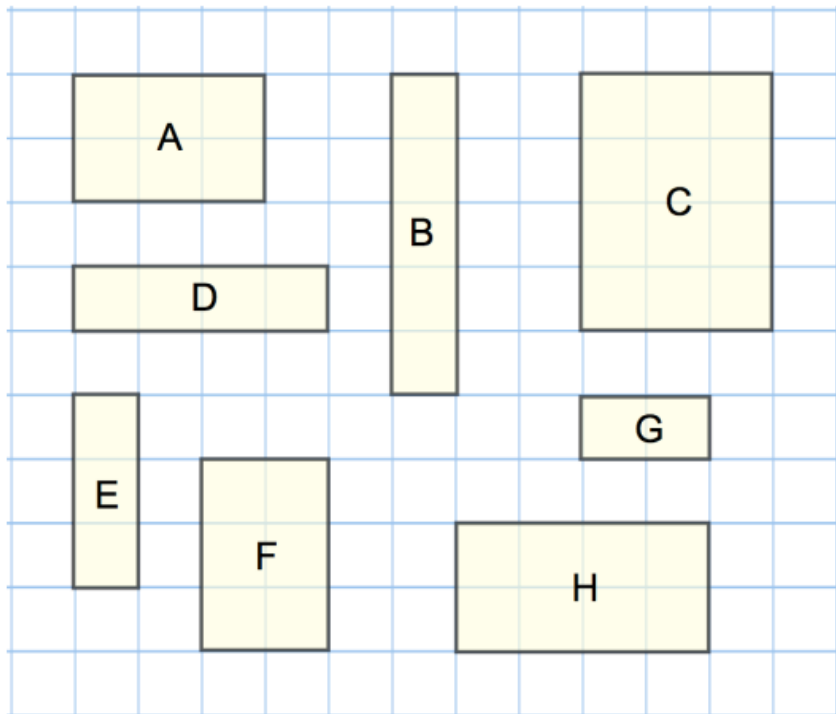


Which two shapes are congruent?

A and G

D and I

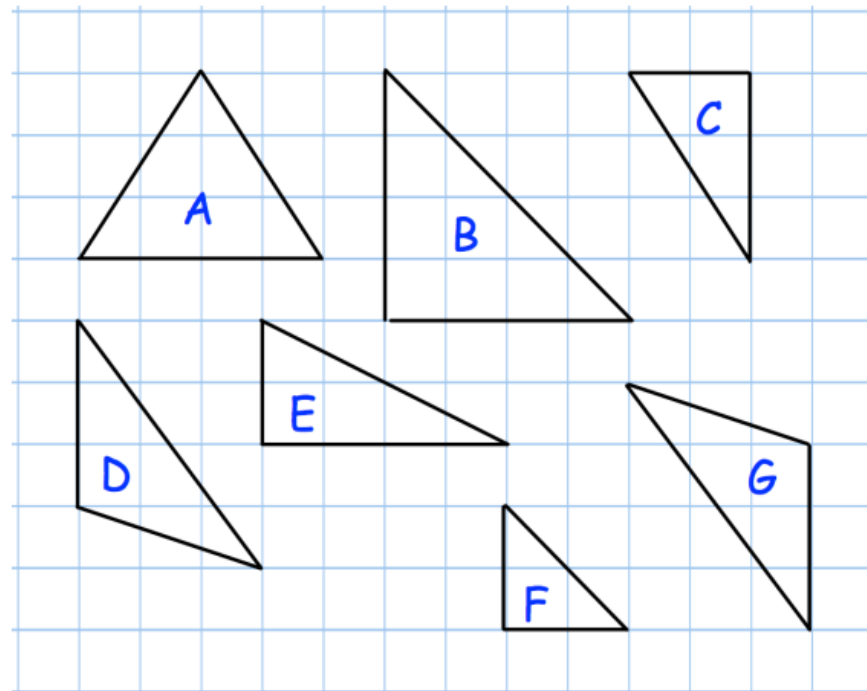
Worked example



Which two shapes are congruent?

Which two shapes are similar?

Your turn



Which two shapes are congruent?

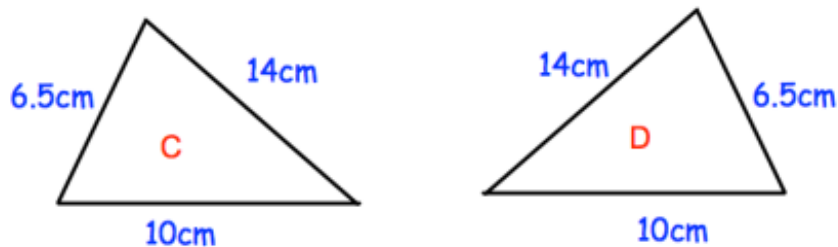
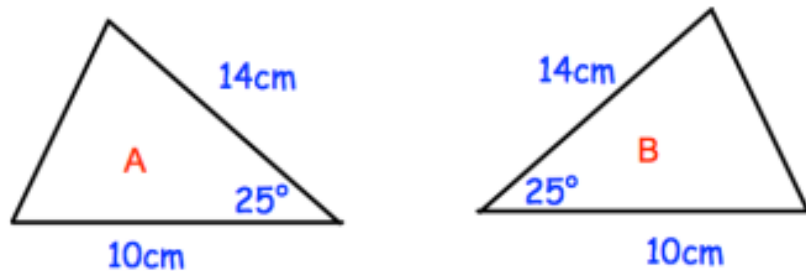
D and G

Which two shapes are similar?

B and F

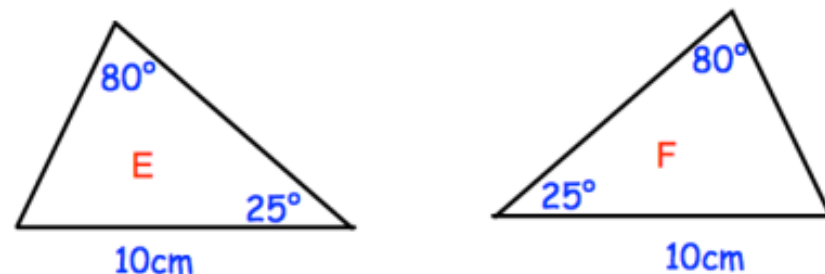
Worked example

State the condition why these two triangles are congruent:



Your turn

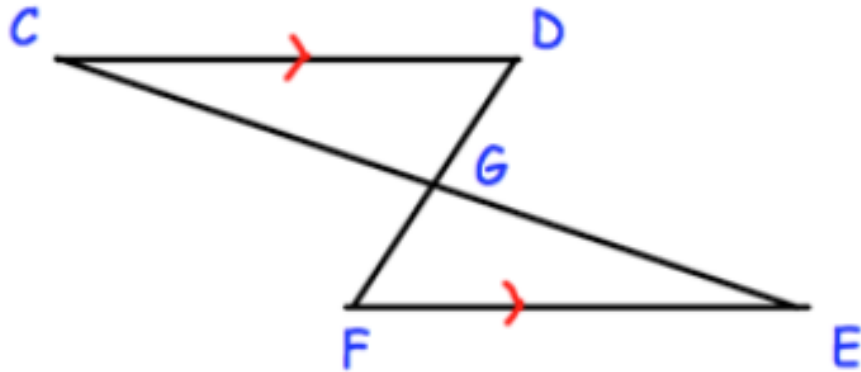
State the condition why these two triangles are congruent:



ASA / AAS (Angle side angle)

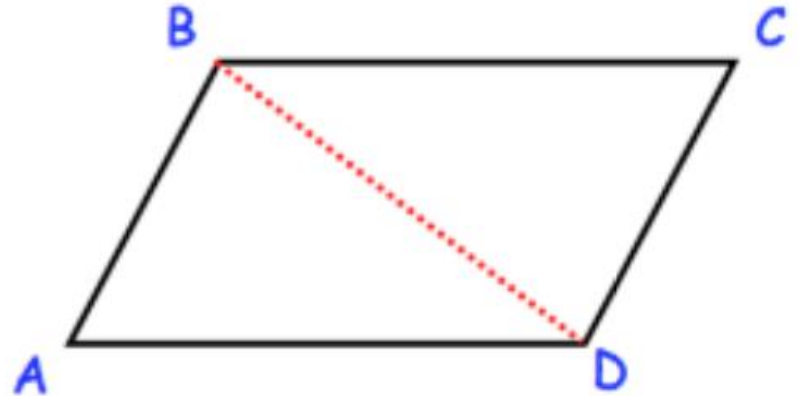
Worked example

CD and FE are parallel, and $CD = FE$. Prove that triangles CDG and EFG are congruent.



Your turn

ABCD is a parallelogram. Prove that triangles ABD and BCD are congruent.



BD is shared.

$AB = DC$ (opposite sides of a parallelogram are equal)

$BC = AD$ (opposite sides of a parallelogram are equal).

$\therefore$ ABD and BCD congruent due to side, side, side (SSS)