IGCSE · Cambridge (CIE) · Maths

37 mins 11 questions

Non-Calculator Questions

Congruence & Similarity

Congruence / Similarity / Similar Lengths / Similar Areas & Volumes

Medium (5 questions)	/14
Hard (3 questions)	/8
Very Hard (3 questions)	/15
Total Marks	**/37**

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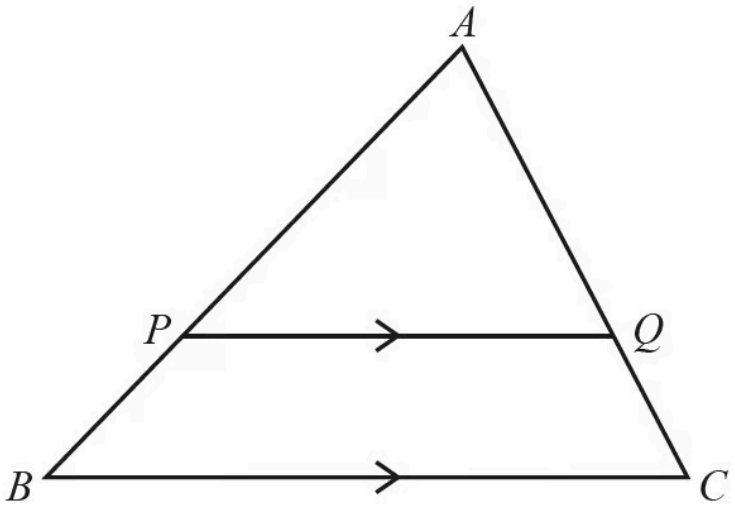
Medium Questions

1



NOT TO SCALE

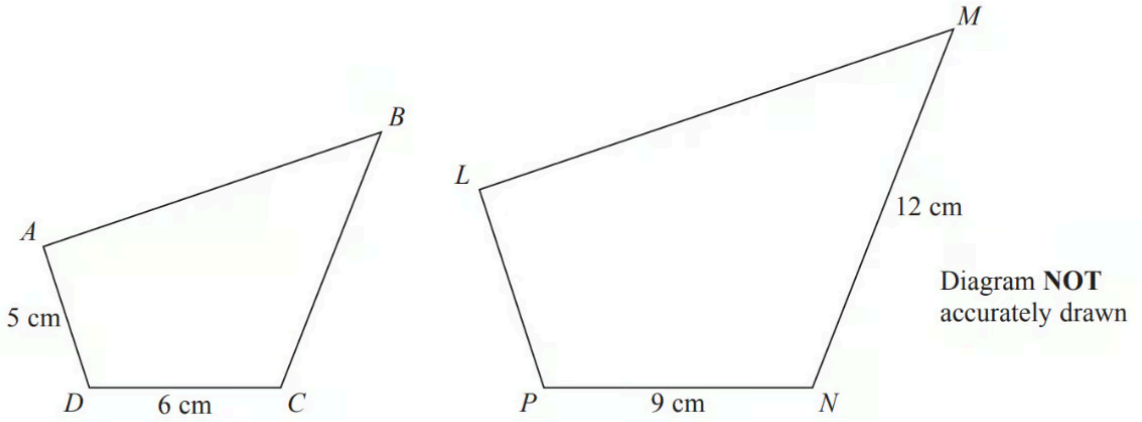
In the diagram, PQ is parallel to BC.
APB and AQC are straight lines.
PQ = 8 cm, BC = 10 cm and AB = 9cm.

Calculate PB.

PB = ... cm

(2 marks)

2 (a)



Quadrilaterals *ABCD* and *LMNP* are mathematically similar.

Angle *A* = angle *L*
Angle *B* = angle *M*
Angle *C* = angle *N*
Angle *D* = angle *P*

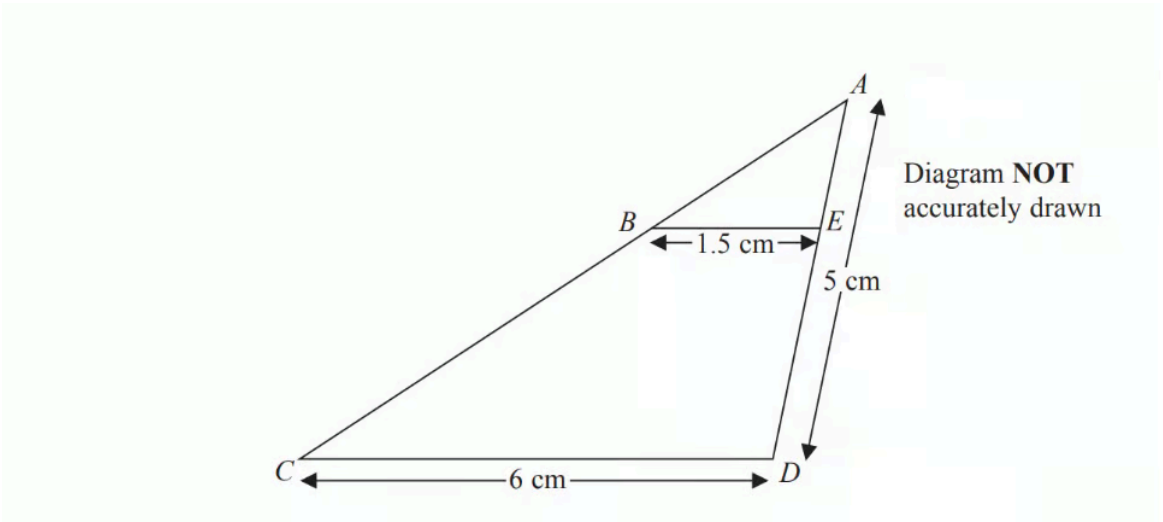
Work out the length of *LP*.

(2 marks)

(b) Work out the length of *BC*.

(2 marks)

3

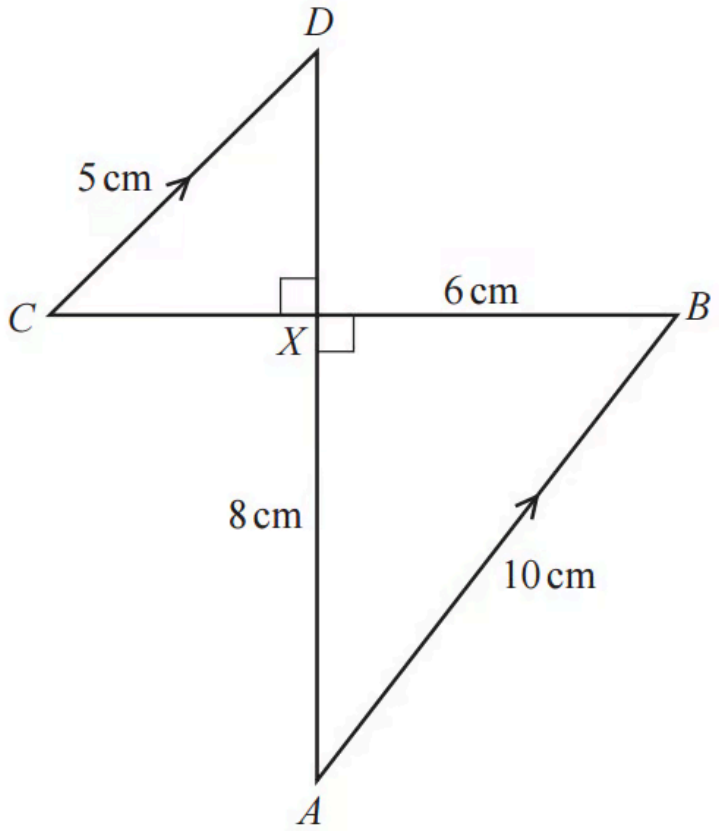


ABC and AED are straight lines. BE and CD are parallel.
$BE = 1.5$ cm.
$CD = 6$ cm.
$AD = 5$ cm.

Calculate the length of ED.

(3 marks)

4



NOT TO SCALE

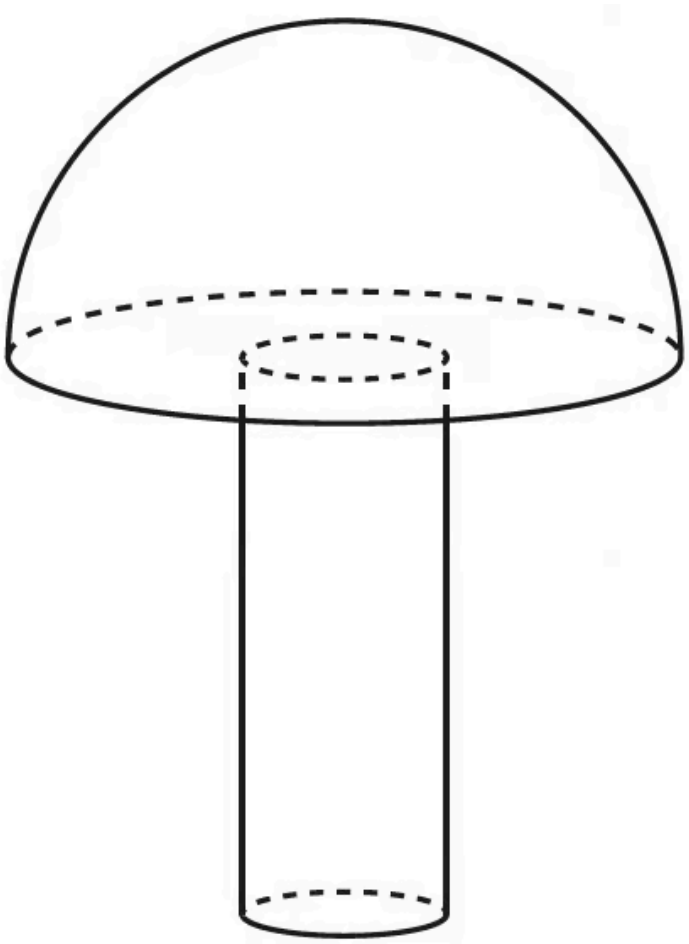
In the diagram, *AB* and *CD* are parallel.
AD and *BC* intersect at right angles at the point *X*.
AB = 10 cm, *CD* = 5 cm, *AX* = 8 cm and *BX* = 6 cm.

Use similar triangles to calculate *DX*.

DX = ... cm

(2 marks)

5 A solid cylinder with radius 1.6 cm is attached to the hemisphere to make a toy.



NOT TO SCALE

The total volume of the toy is 300 cm^3.

A mathematically similar toy has volume 19 200 cm^3.

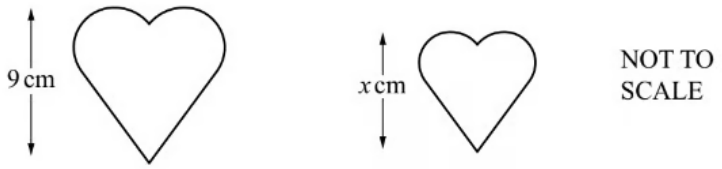
Calculate the radius of the cylinder for this toy.

..... cm

(3 marks)

Hard Questions

1



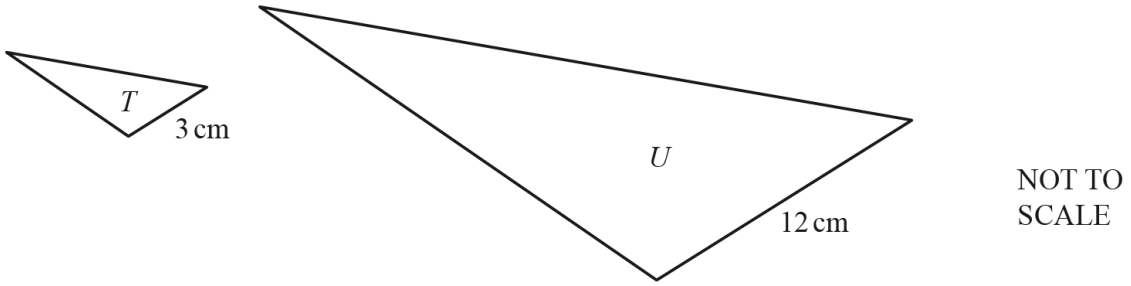
The two shapes are mathematically similar.
The area of the larger shape is 36 cm^2 and the area of the smaller shape is 25 cm^2.
The height of the larger shape is 9 cm and the height of the smaller shape is x cm.

Find the value of x.

x = ...

(3 marks)

2



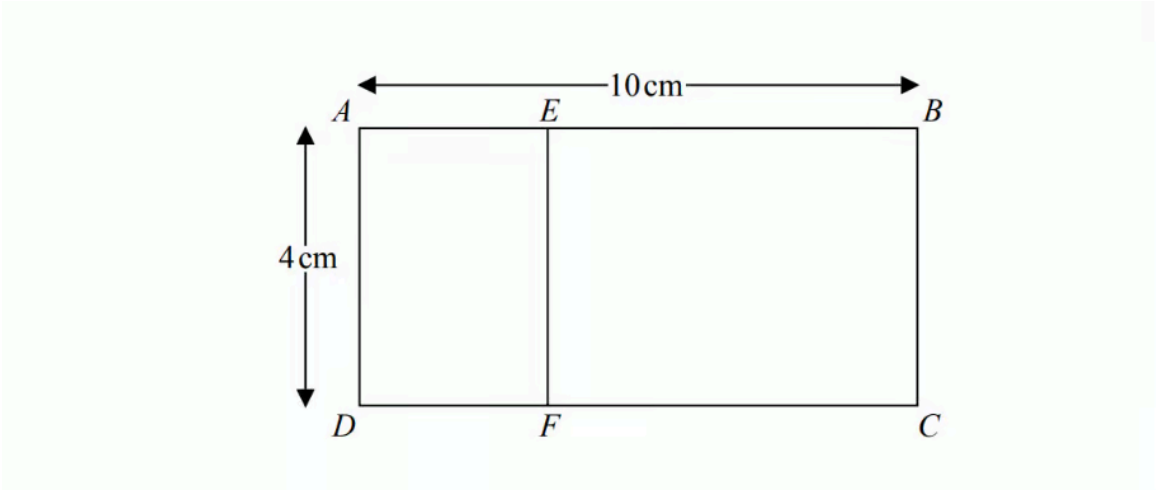
The diagram shows two mathematically similar triangles, *T* and *U*.
Two corresponding side lengths are 3 cm and 12 cm. The area of triangle *T* is 5 cm^2.

Find the area of triangle *U*.

..... cm^2

(2 marks)

3 Rectangle $ABCD$ is mathematically similar to rectangle $DAEF$.



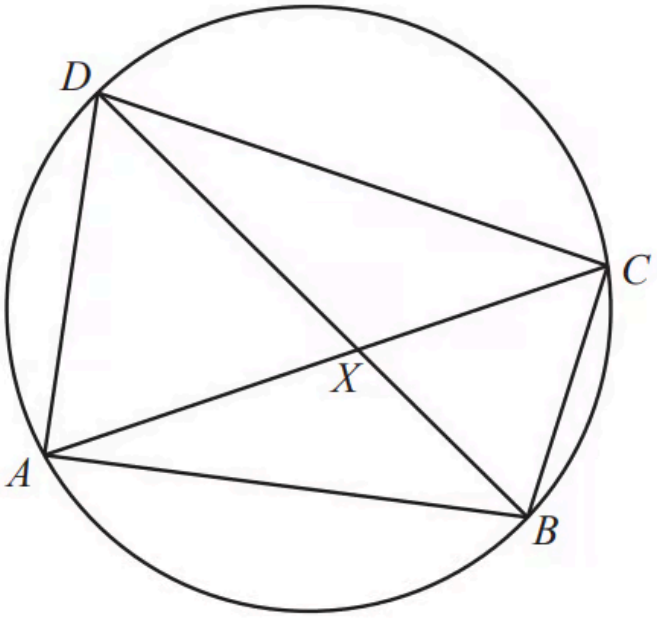
$AB = 10$ cm.
$AD = 4$ cm.

Work out the area of rectangle $DAEF$.

(3 marks)

Very Hard Questions

1 (a)



NOT TO SCALE

The diagonals of the cyclic quadrilateral *ABCD* intersect at *X*.

Explain why triangle *ADX* is similar to triangle *BCX*. Give a reason for each statement you make.

(3 marks)

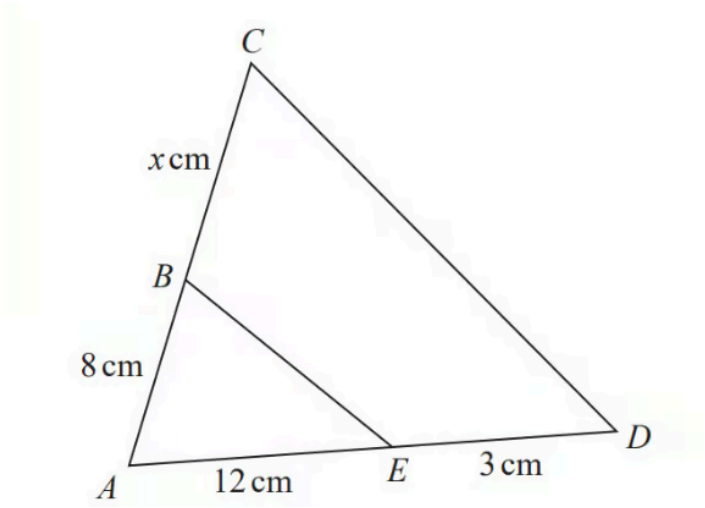
(b) *AD* = 10 cm, *BC* = 8 cm, *BX* = 5 cm, *CX* = 7 cm.

Calculate *DX*.

DX = ... cm

(2 marks)

2 The two triangles in the diagram are similar.

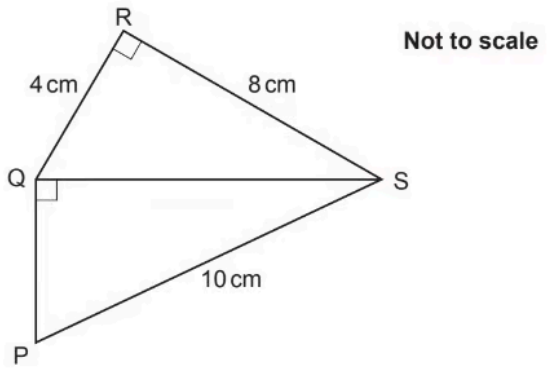


There are two possible values of x.

Work out each of these values.
State any assumptions you make in your working.

(5 marks)

3 The diagram below shows two right-angled triangles.



Prove that triangles PQS and QRS are similar.

(5 marks)