Congruence, Similarity & Geometrical Proof

Question Paper

Course	Edexcel IGCSE Maths
Section	4. Geometry & Trigonometry
Topic	Congruence, Similarity & Geometrical Proof
Difficulty	Very Hard

Time allowed: 40

Score: /31

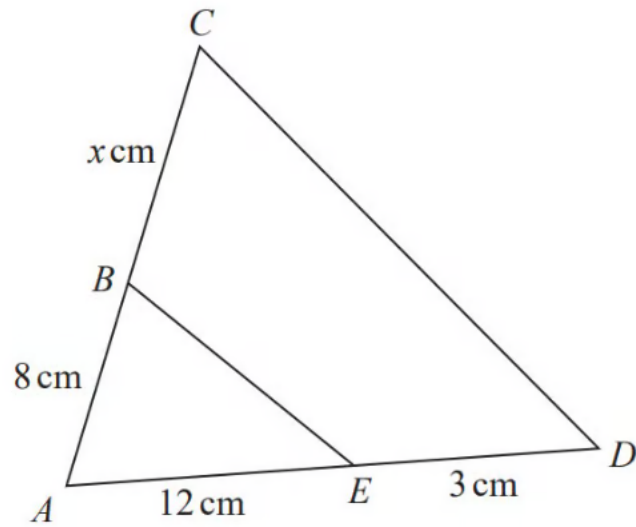**Percentage:** /100

Question 1
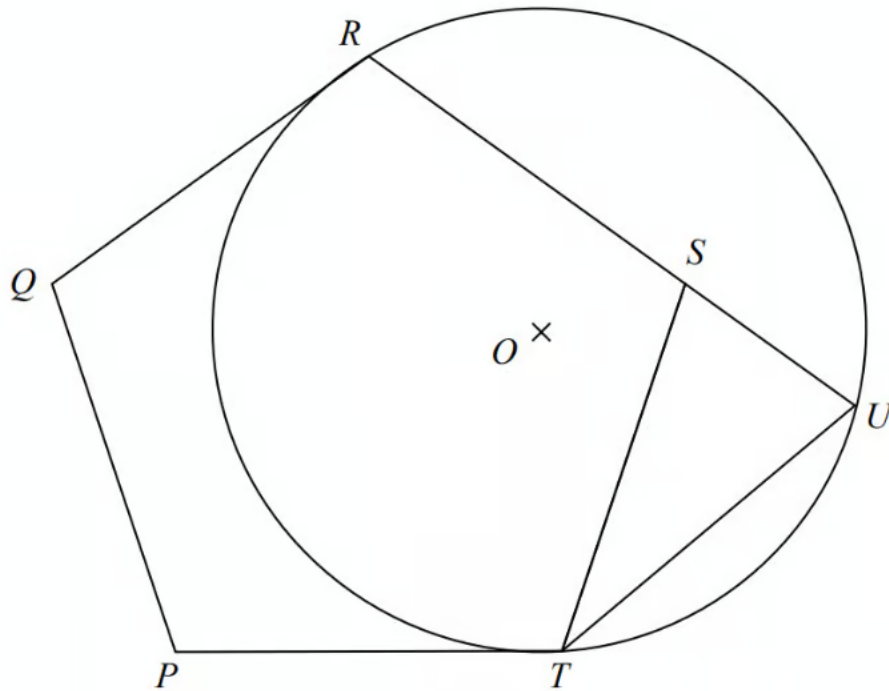
PQRST is a regular pentagon.
R, *U* and *T* are points on a circle, centre *O*.
QR and *PT* are tangents to the circle.
RSU is a straight line.

Prove that $ST = UT$.

[5 marks]

Question 2

The two triangles in the diagram are similar.

There are two possible values of x.

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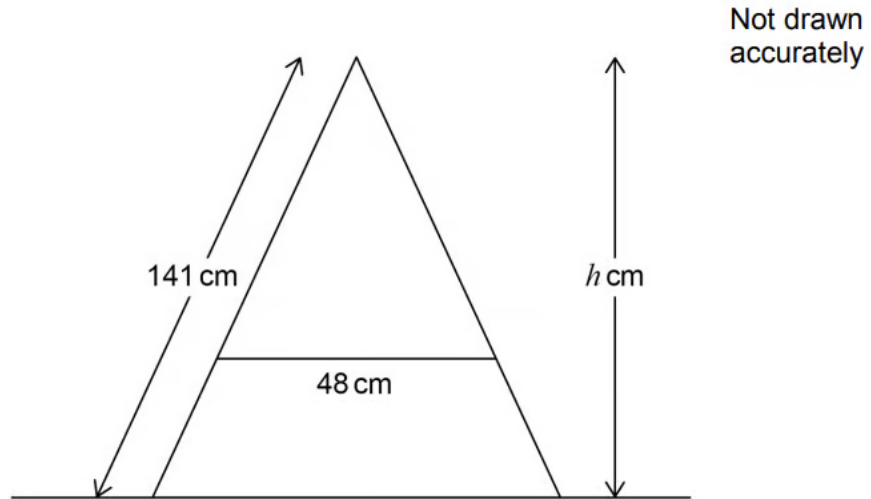State any assumptions you make in your working.

[5 marks]

Question 3

The diagram shows the side view of a step ladder with a horizontal strut of length 48 cm.

The strut is one third of the way up the ladder.

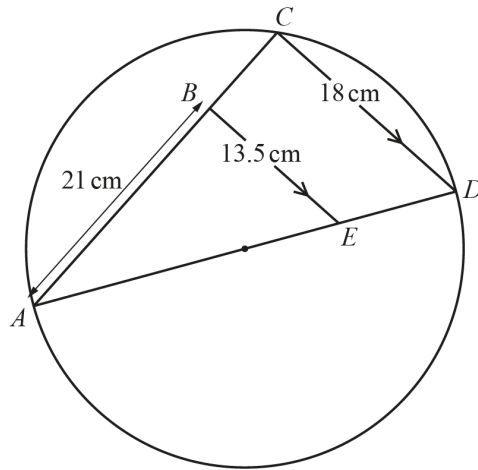The symmetrical cross section of the ladder shows two similar triangles.

Not drawn accurately

141 cm

h cm

48 cm

Work out the vertical height, h cm, of the ladder.

...........................cm

[5 marks]

Question 4

NOT TO SCALE

C lies on a circle with diameter AD.
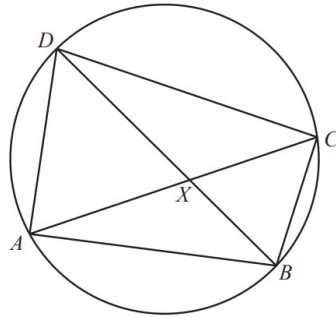B lies on AC and E lies on AD such that BE is parallel to CD.
AB = 21 cm, CD = 18 cm and BE = 13.5 cm.

Work out the radius of the circle.

....cm

[5 marks]

Question 5a

NOT TO SCALE

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

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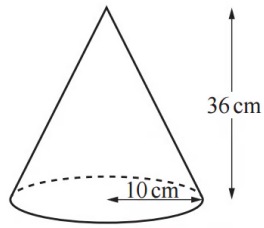Give a reason for each statement you make.

[3 marks]

Question 5b

$AD = 10$ cm, $BC = 8$ cm, $BX = 5$ cm, $CX = 7$ cm.

Calculate *DX*.

DX = ... cm

[2 marks]

Question 6a

36 cm

10 cm

NOT TO
SCALE

A solid metal cone has radius 10 cm and height 36 cm.
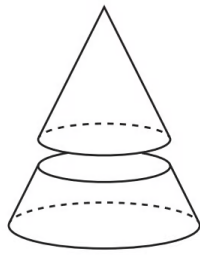
Calculate the volume of this cone.

[The volume, V, of a cone with radius r and height h is $V = \dfrac{1}{3}\pi r^2 h$.]

.... cm^3

[2 marks]

Question 6b

The cone is cut, parallel to its base, to give a smaller cone.

NOT TO
SCALE

The volume of the smaller cone is half the volume of the original cone.

The smaller cone is melted down to make two different spheres.

The ratio of the radii of these two spheres is 1 : 2.

Calculate the radius of the smaller sphere.

[The volume, V, of a sphere with radius r is $V = \dfrac{4}{3}\pi r^3$.]

.... cm

[4 marks]