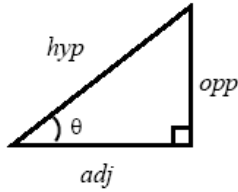
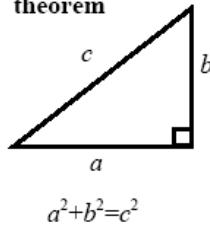


# IGCSE Mathematics Revision

## Session 2

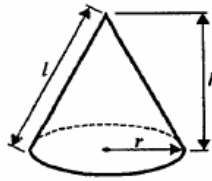
<p><b>4.6 Circle Properties</b></p>	<p>understand and use the internal and external intersecting chord properties</p> <p>recognise the term <i>cyclic quadrilateral</i></p> <p>understand and use angle properties of the circle including</p> <p style="padding-left: 40px;">angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the remaining part of the circumference</p> <p style="padding-left: 40px;">angle subtended at the circumference by a diameter is a right angle</p> <p style="padding-left: 40px;">angles in the same segment are equal</p> <p style="padding-left: 40px;">the sum of the opposite angles of a cyclic quadrilateral is <math>180^\circ</math></p> <p style="padding-left: 40px;">the alternate segment theorem</p>	<p>Formal proof of these theorems is not required</p>
<p><b>4.9 Mensuration</b></p>	<p>find perimeters and areas of sectors of circles</p> <p>find the surface area and/or volume of a sphere and a right circular cone using relevant formulae</p> <p>convert between volume measures</p>	<p>Radian measure is excluded</p> <p><math>m^3 \rightarrow cm^3</math> and vice versa</p>
<p><b>4.10 Similarity</b></p>	<p>understand that areas of similar figures are in the ratio of the square of corresponding sides</p> <p>understand that volumes of similar figures are in the ratio of the cube of corresponding sides</p> <p>use areas and volumes of similar figures in solving problems</p>	

**Pythagoras' theorem**



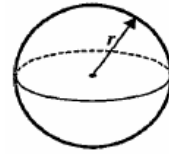
**Volume of cone** =  $\frac{1}{3} \pi r^2 h$

**Curved surface area of cone** =  $\pi r l$



**Volume of sphere** =  $\frac{4}{3} \pi r^3$

**Surface area of sphere** =  $4 \pi r^2$



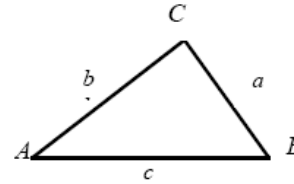
adj = hyp  $\times$  cos  $\theta$   
opp = hyp  $\times$  sin  $\theta$   
opp = adj  $\times$  tan  $\theta$

or  $\sin \theta = \frac{\text{opp}}{\text{hyp}}$

$\cos \theta = \frac{\text{adj}}{\text{hyp}}$

$\tan \theta = \frac{\text{opp}}{\text{adj}}$

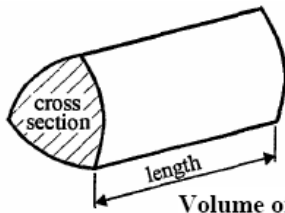
In any triangle ABC



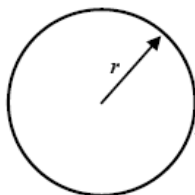
**Sine Rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** =  $\frac{1}{2} ab \sin C$



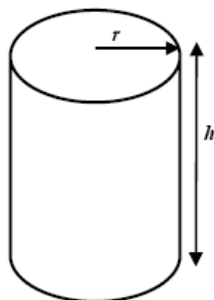
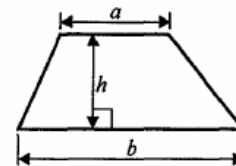
**Volume of prism** = area of cross section  $\times$  length



**Circumference of circle** =  $2\pi r$

**Area of circle** =  $\pi r^2$

**Area of trapezium** =  $\frac{1}{2}(a + b)h$



**Volume of cylinder** =  $\pi r^2 h$

**Curved surface area of cylinder** =  $2\pi r h$

**The quadratic equation**

The solutions of  $ax^2 + bx + c = 0$  where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

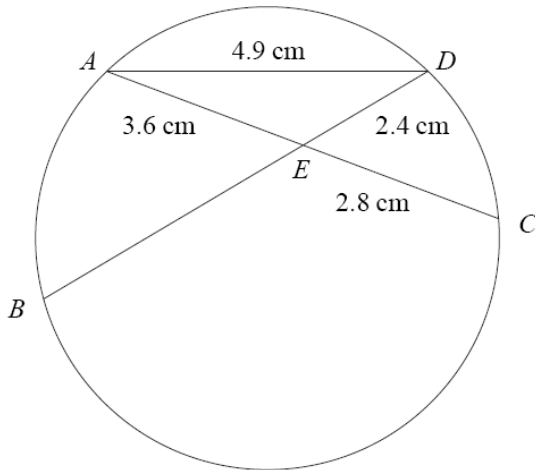
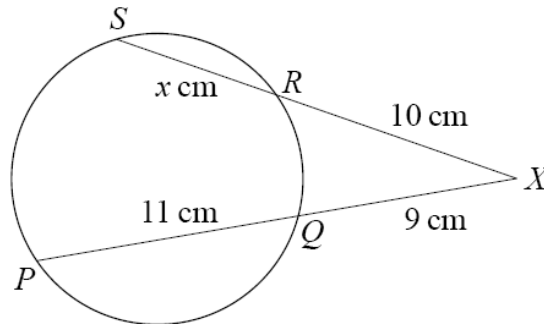


Diagram **NOT** accurately drawn

$A, B, C$  and  $D$  are four points on the circumference of a circle.  
 The chords  $AC$  and  $BD$  intersect at  $E$ .  
 $AE = 3.6$  cm,  $CE = 2.8$  cm,  $DE = 2.4$  cm and  $AD = 4.9$  cm.

(a) Calculate the length of  $BE$ .

..... cm  
**(3)**



The diagram shows a circle,  $PQRS$ .  
 $SRX$  and  $PQX$  are straight lines.  
 $PQ = 11$  cm.  $QX = 9$  cm.  $RX = 10$  cm.  $SR = x$  cm.

Find the value of  $x$ .

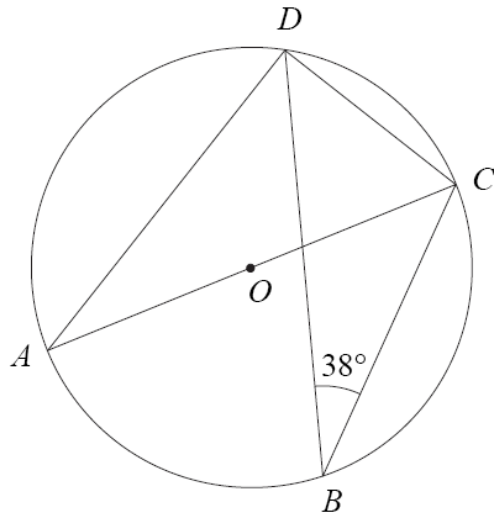


Diagram **NOT** accurately drawn

$A, B, C$  and  $D$  are points on a circle, centre  $O$ .  
 $AC$  is a diameter of the circle.  
 Angle  $CBD = 38^\circ$ .

(a) (i) Find the size of angle  $DAC$ .

o

.....

(ii) Give a reason for your answer.

.....

.....

**(2)**

(b) Find the size of angle  $ACD$ .

o

.....

**(2)**

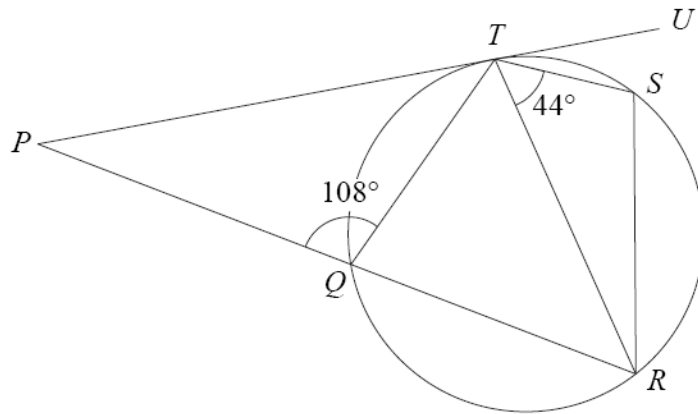


Diagram **NOT** accurately drawn

$Q, R, S$  and  $T$  are points on the circumference of a circle.  
 $PU$  is a tangent to the circle at  $T$ .  
 $PQR$  is a straight line.  
 Angle  $PQT = 108^\circ$ .  
 Angle  $STR = 44^\circ$ .

Work out the size of angle  $STU$ .  
 You must give a reason for each step in your working.

.....<sup>o</sup>

**(Total 5 marks)**

- (a) Calculate the area of an equilateral triangle of side 5 cm.  
Give your answer correct to 3 significant figures.

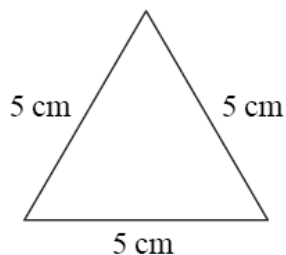


Diagram **NOT**  
accurately drawn

..... cm<sup>2</sup>  
(2)

- (b) The diagram shows two overlapping circles.  
The centre of each circle lies on the circumference of the other circle.  
The radius of each circle is 5 cm.  
The distance between the centres is 5 cm.

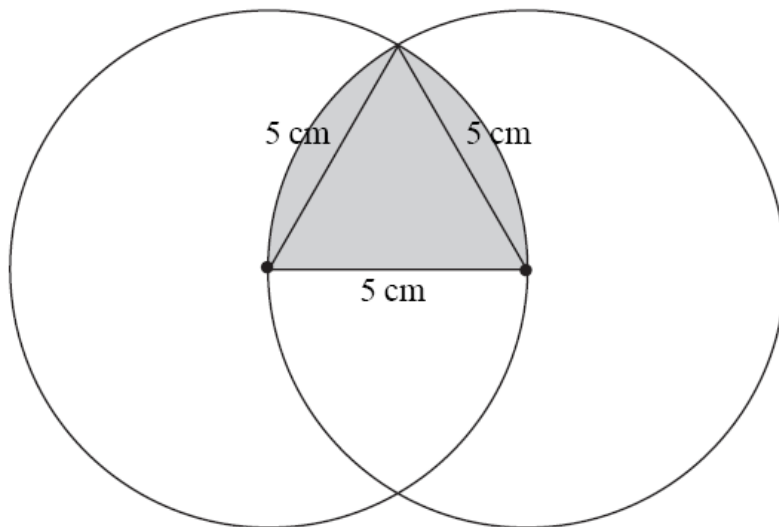


Diagram **NOT**  
accurately drawn

Calculate the area of the shaded region.  
Give your answer correct to 3 significant figures.

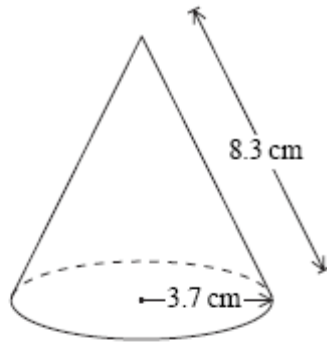


Diagram NOT  
accurately drawn

The diagram shows a solid cone.  
The radius of its base is 3.7 cm and the slant height is 8.3 cm.

- (a) Calculate the total surface area of the cone.  
Give your answer correct to 3 significant figures.

..... cm<sup>2</sup>  
(2)

- (b) Calculate the volume of the cone.  
Give your answer correct to 3 significant figures.

..... cm<sup>3</sup>  
(4)

**(Total 6 marks)**

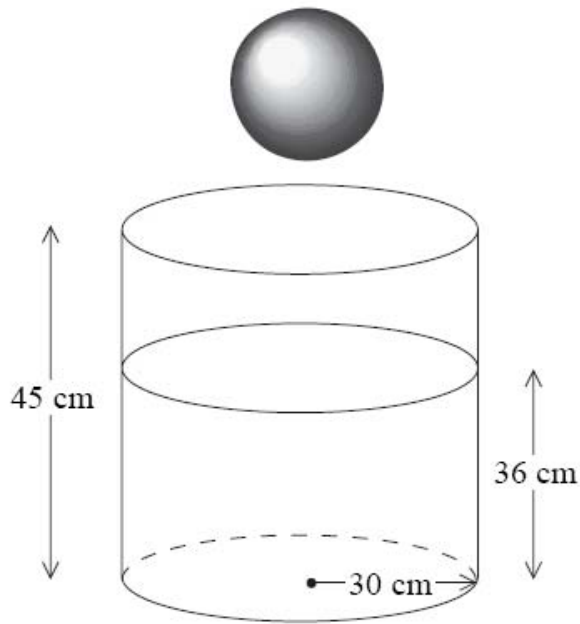


Diagram **NOT**  
accurately drawn

A cylindrical tank has a radius of 30 cm and a height of 45 cm.  
The tank contains water to a depth of 36 cm.

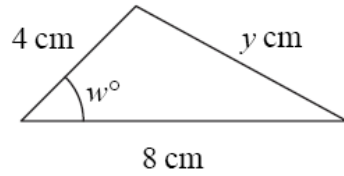
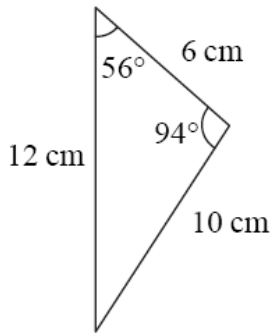
A metal sphere is dropped into the water and is completely covered.  
The water level rises by 5 cm.

Calculate the radius of the sphere.

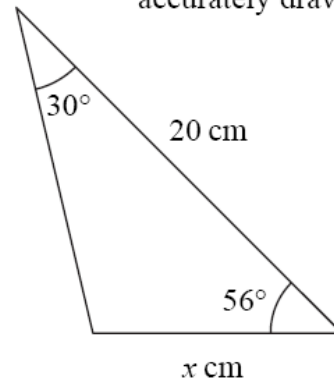
..... cm

**(Total 5 marks)**

Here are three similar triangles.



Diagrams **NOT** accurately drawn



Find the value of

(a)  $w$ ,

$$w = \dots\dots\dots (1)$$

(b)  $x$ ,

$$x = \dots\dots\dots (2)$$

(c)  $y$ .

$$y = \dots\dots\dots (2)$$

**(Total 5 marks)**

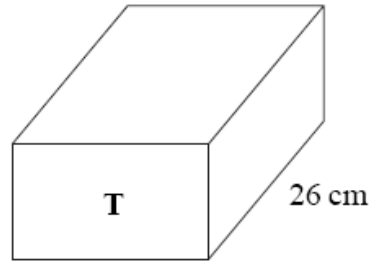
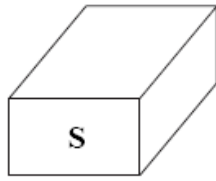


Diagram **NOT** accurately drawn

Two cuboids, **S** and **T**, are mathematically similar.  
The total surface area of cuboid **S** is  $157 \text{ cm}^2$  and the total surface area of cuboid **T** is  $2512 \text{ cm}^2$ .

- (a) The length of cuboid **T** is 26 cm.  
Calculate the length of cuboid **S**.

..... cm  
(3)

- (b) The volume of cuboid **S** is  $130 \text{ cm}^3$ .  
Calculate the volume of cuboid **T**.

.....  $\text{cm}^3$   
(2)

**(Total 5 marks)**

Answers

Page

3 4.2 12

4 38 degrees, angles in the same segment. 52 degrees

5 28 degrees

6 10.8 15.4

7 139 319

8 15

9 5 10  $6\frac{2}{3}$

10 6.5 8320