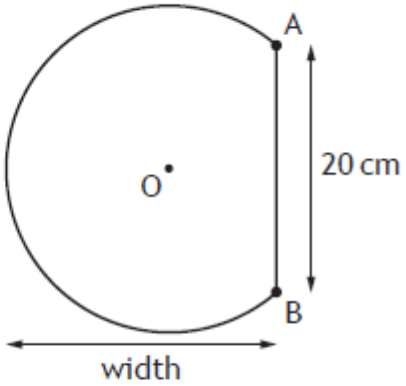
*2018 P2 Q12*

The shape below is part of a circle, centre O.




The circle has radius 13 centimetres.

AB is a chord of length 20 centimetres.

Calculate the width of the shape.

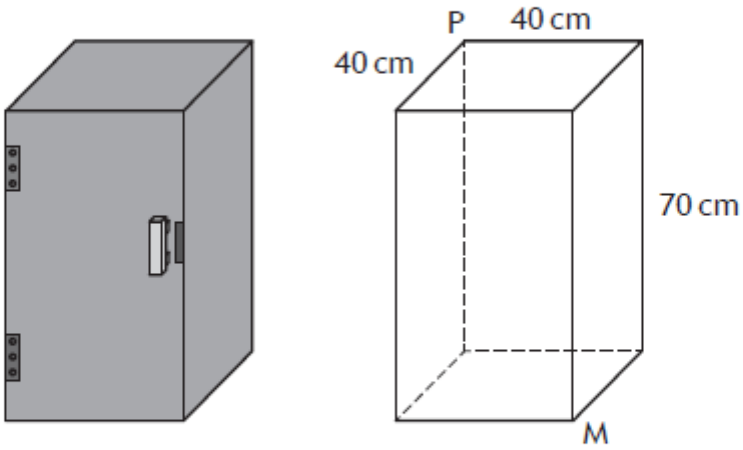
4

*Ans* *21·3 cm*

*2018 P2 Q16*

Chris wants to store his umbrella in a locker.

The locker is a cuboid with internal dimensions of length 40 centimetres, breadth 40 centimetres and height 70 centimetres.




The umbrella is 85 centimetres long.

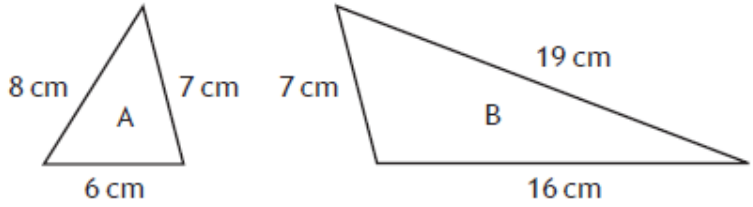
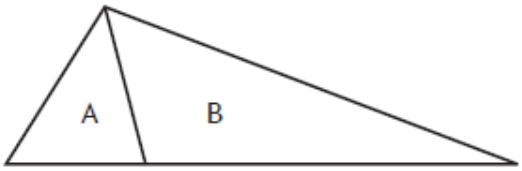
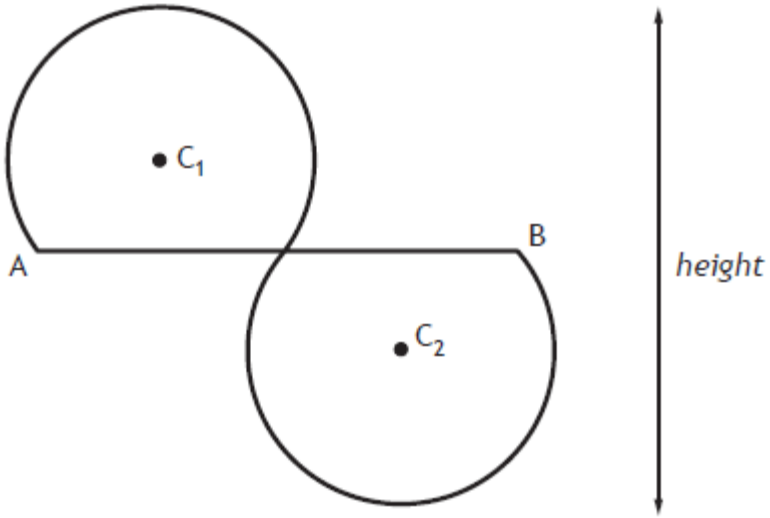
He thinks it will fit into the locker from corner P to corner M.

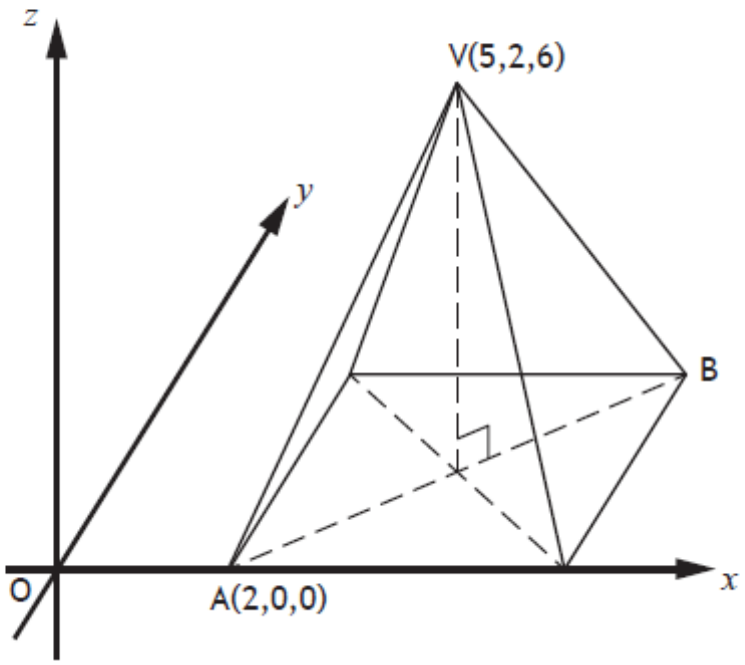
Is he correct?

**Justify your answer.**

4

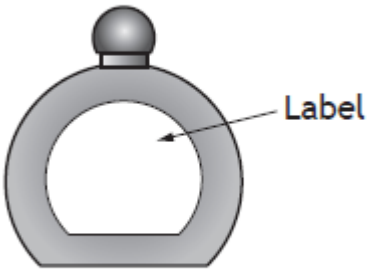
*Ans* *Yes he is correct since PM is 90 cm which is bigger than the 85 cm umbrella.*

| | | |
|---|---|---|
| *2017 P2 Q7* | Triangles A and B are shown below.<br>  <br><br>The triangles are placed together to form the larger triangle shown below.<br>  <br><br>Is this larger triangle right-angled?<br>**Justify your answer.** | 3 |
| *Ans* | *No, with valid reason and comparison.* | |
| *2017 P2 Q13* | Two identical shapes are used to form a logo.<br>Each shape is part of a circle.<br>  <br><br>• The circles have centres $C_1$ and $C_2$.<br>• The radius of each circle is 14 centimetres.<br>• The logo has half-turn symmetry about the mid-point of AB.<br>• AB is 48 centimetres long.<br>Calculate the height of the logo. | 4 |
| *Ans* | *42·4cm* | |

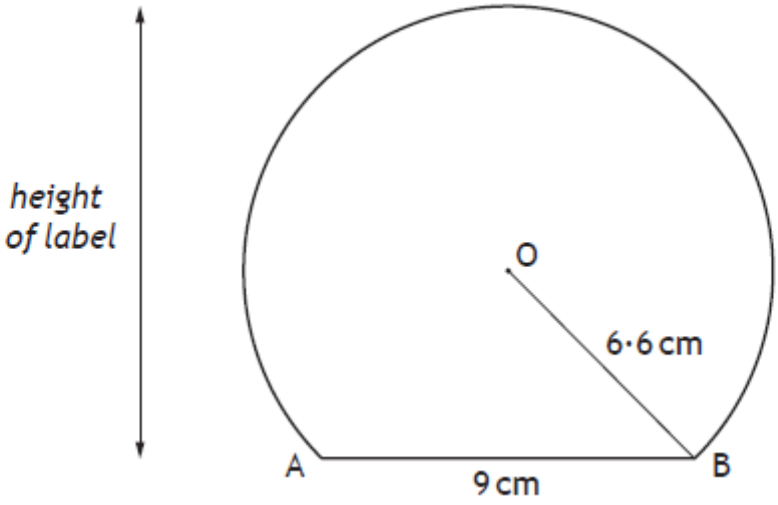
| | | |
|---|---|---|
| *2016 P1 Q7* | The diagram shows a rectangular based pyramid, relative to the coordinate axes.<br>  <br><br>• A is the point (2,0,0).<br>• V is the point (5,2,6).<br>(a) Write down the coordinates of B.<br>(b) Calculate the length of edge AV of the pyramid. | 1<br>3 |
| *Ans* | *(a) B(8,4,0) (b) 7* | |

*2016 P2 Q15*

This perfume bottle has a label in the shape of part of a circle.




A diagram of the label is shown below.

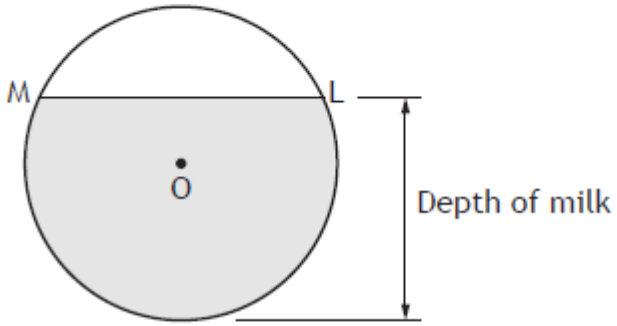
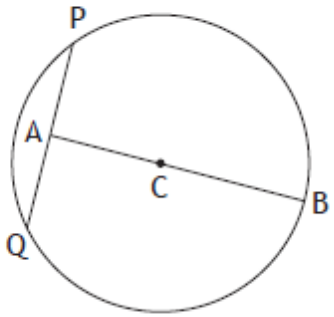



- The centre of the circle is O.
- The chord AB is 9 centimetres.
- The radius OB is 6·6 centimetres.

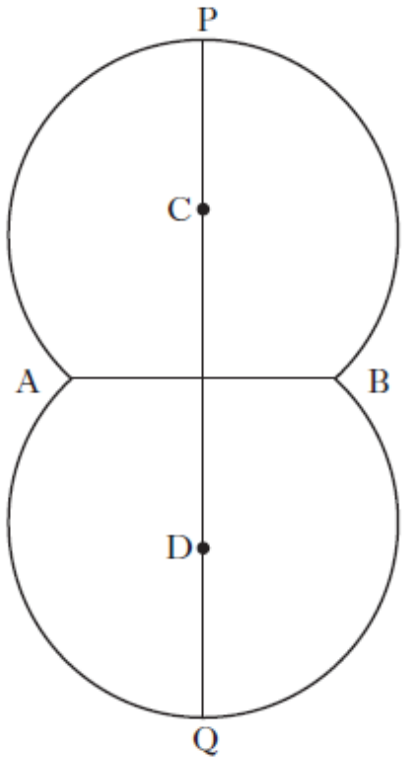
Find the height of the label.

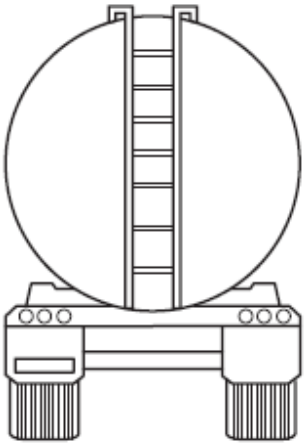
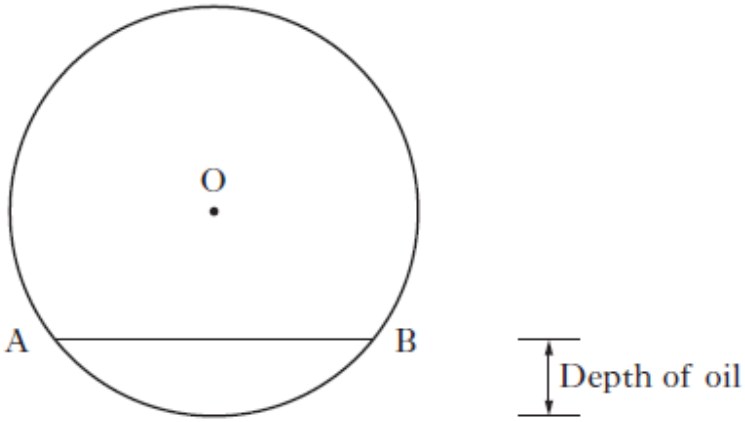
4

*Ans* *11.4cm*

| | | |
|---|---|---|
| *2015 P2 Q12* | The diagram below shows the circular cross-section of a milk tank.<br>  <br><br>The radius of the circle, centre O, is 1·2 metres.<br>The width of the surface of the milk in the tank, represented by ML in the diagram, is 1·8 metres.<br>Calculate the depth of the milk in the tank. | 4 |
| *Ans* | *1·99m* | |
| *2014 P1 Q12* | The diagram below shows a circle, centre C.<br>  <br><br>The radius of the circle is 15 centimetres.<br>A is the mid-point of chord PQ.<br>The length of AB is 27 centimetres.<br>Calculate the length of PQ. | 4 |
| *Ans* | *18cm* | |

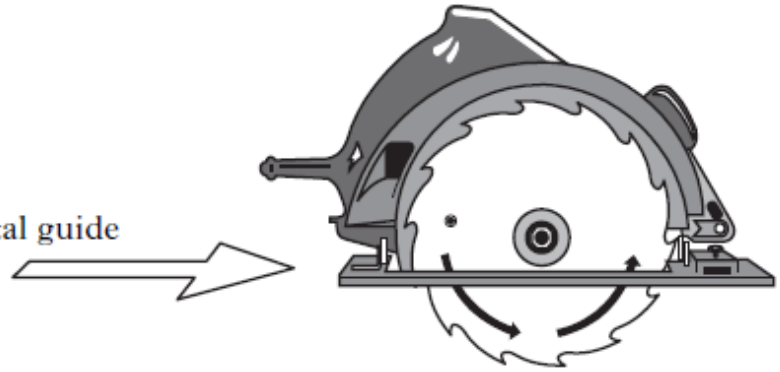
| | | |
|---|---|---|
| *2014 P2 Q6* | The diagram below shows the position of three towns.<br>Lowtown is due west of Midtown.<br>The distance from<br>• Lowtown to Midtown is 75 kilometres.<br>• Midtown to Hightown is 110 kilometres.<br>• Hightown to Lowtown is 85 kilometres.<br>  <br><br>Is Hightown directly north of Lowtown?<br>**Justify your answer.** | 4 |
| *Ans* | *No, since it is not right angled. Demonstrate that* $110^2 \neq 75^2 + 85^2$ | |

| | | |
|---|---|---|
| *2013 P2 Q12* | The shape below is used as a logo in an advertising campaign. It is made up from segments of two identical circles.<br>  <br><br>The points C and D are the centres of the circles and each circle has a radius of 24 centimetres.<br>AB is a common chord of length 30 centimetres.<br>Calculate the height of the logo, represented by the line PQ. | 5 |
| *Ans* | *85·5cm* | |

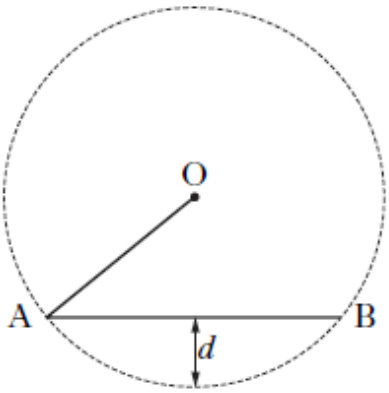
| | | |
|---|---|---|
| *2012 P2 Q10* | A tanker delivers oil to garages.<br>The tank has a circular cross-section as shown in the diagram below.<br>  <br>  <br><br>The radius of the circle, centre O, is 1·9 metres.<br>The width of the surface of the oil, represented by AB in the diagram, is 2·2 metres.<br>Calculate the depth of the oil in the tanker. | 4 |
| *Ans* | *0·4m* | |

2011 P2 Q13

A circular saw can be adjusted to change the depth of blade that is exposed below the horizontal guide.




The circle, centre O, below represents the blade and the line AB represents part of the horizontal guide.




This blade has a radius of 110 millimetres.

If AB has length 140 millimetres, calculate the depth, $d$ millimetres, of saw exposed.

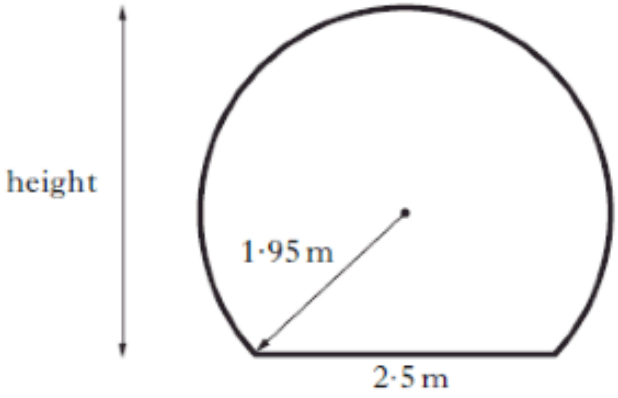
4

*Ans* *25·1mm*

*2010 P2 Q13*

Ocean World has an underwater viewing tunnel.

The diagram below shows the cross-section of the tunnel. It consists of part of a circle with a horizontal base.




The radius of the circle is 1·95 metres and the width of the base is 2·5 metres.

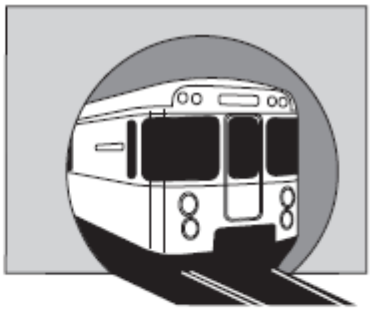
Calculate the height of the tunnel.

4

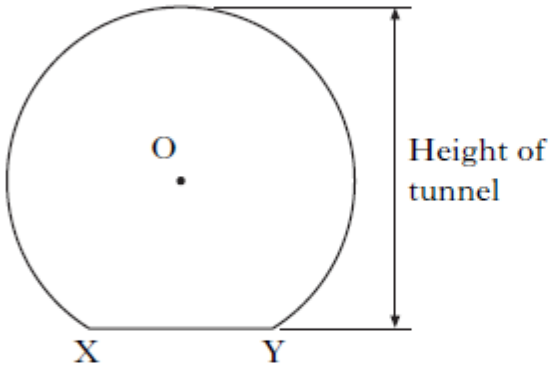
*Ans* *3·45m*

*2009 P2 Q14*

A railway goes through an underground tunnel.



The diagram below shows the cross-section of the tunnel. It consists of part of a circle with a horizontal base.



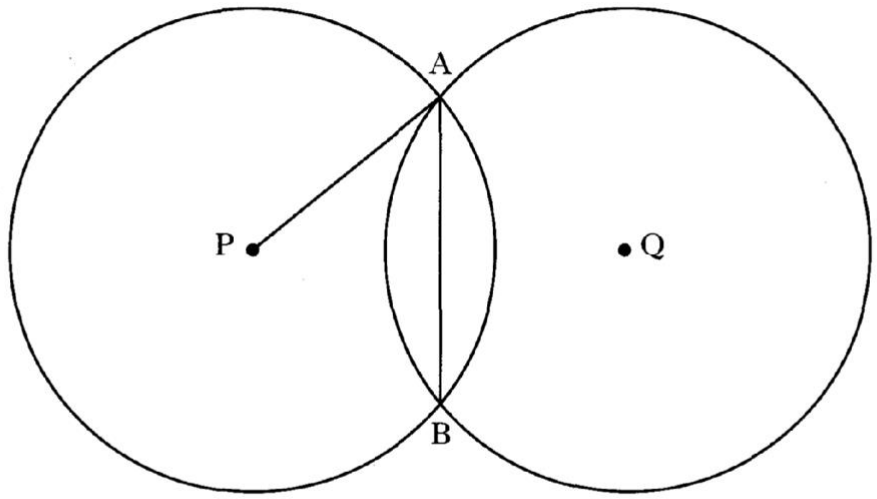

- The centre of the circle is O.
- XY is a chord of the circle.
- XY is 1·8 metres.
- The radius of the circle is 1·7 metres.

Find the height of the tunnel. 4

*Ans* *3·14metres*

*2008 P2 Q9*

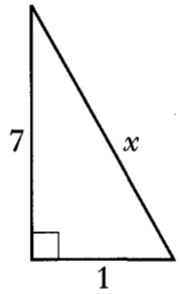
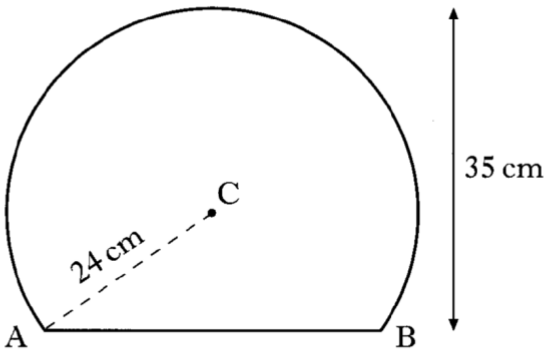
Two identical circles, with centres P and Q, intersect at A and B as shown in the diagram.




The radius of each circle is 10 centimetres.
The length of the common chord, AB, is 12 centimetres.

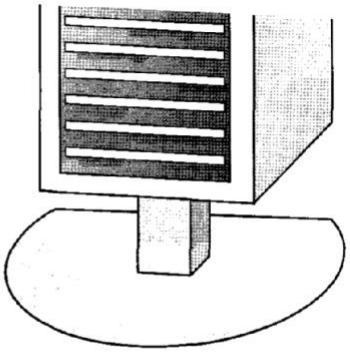
Calculate PQ, the distance between the centres of the two circles. 5

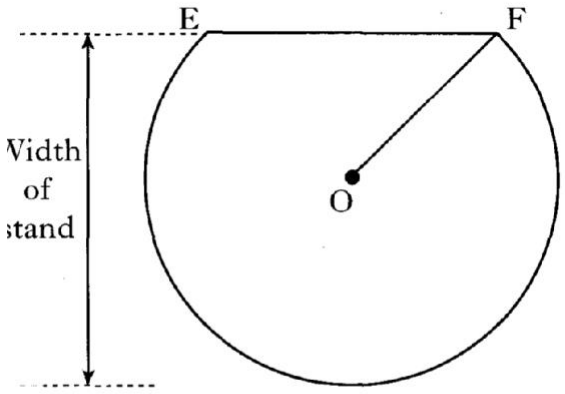
*Ans* *16cm*

| | | |
|---|---|---|
| *2007 P1 Q9* | A right-angled triangle is shown below.<br>  <br><br>Using Pythagoras' Theorem, find $x$.<br>Express your answer as a surd in its simplest form. | 3 |
| *Ans* | $5\sqrt{2}$ | |
| *2007 P2 Q14* | A mirror is shaped like part of a circle.<br>  <br><br>The radius of the circle, centre C, is 24 centimetres.<br>The height of the mirror is 35 centimetres.<br><br>Calculate the length of the base of the mirror, represented in the diagram by AB. | 3 |
| *Ans* | *42·7cm* | |

*2006 P2 Q4*

The diagram shows the base of a compact disc stand which has the shape of part of a circle.



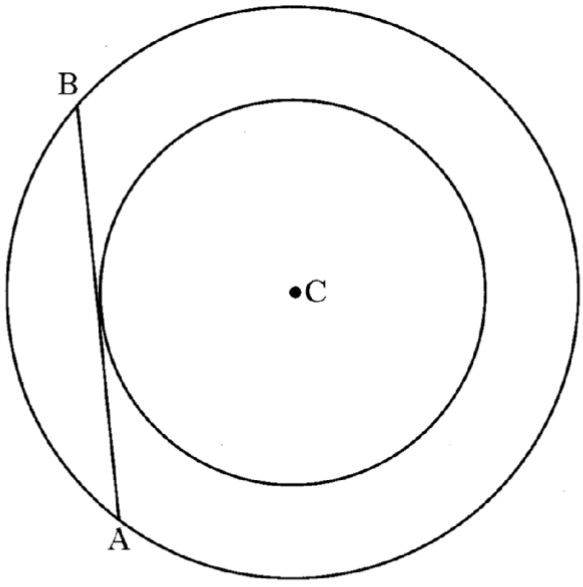



- The centre of the circle is O.
- EF is a chord of the circle.
- EF is 18 centimetres.
- The radius, OF, of the circle is 15 centimetres.

Find the width of the stand. 4

*Ans* *27cm*

*2003 P1 Q7*




C is the centre of two concentric circles.

AB is a tangent to the smaller circle and a chord of the larger circle.

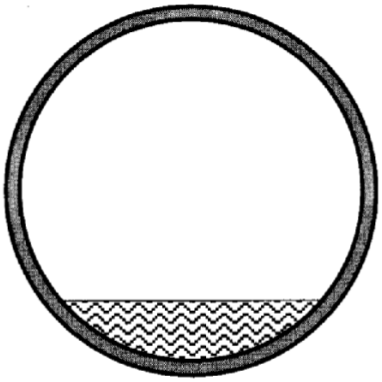
The radius of the smaller circle is 6 centimetres and the chord AB has length 16 centimetres.

Calculate the radius of the larger circle. 3

*Ans* *10cm*

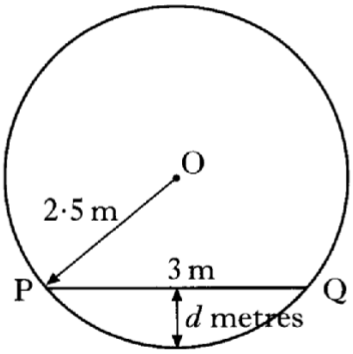
2002 P2 Q9

The diagram below shows a circular cross-section of a cylindrical oil tank.



In the figure below,

- O represents the centre of the circle
- PQ represents the surface of the oil in the tank
- PQ is 3 metres
- the radius OP is 2·5 metres.




Find the depth, *d* metres, of oil in the tank. 4

*Ans* *0·5 metres*