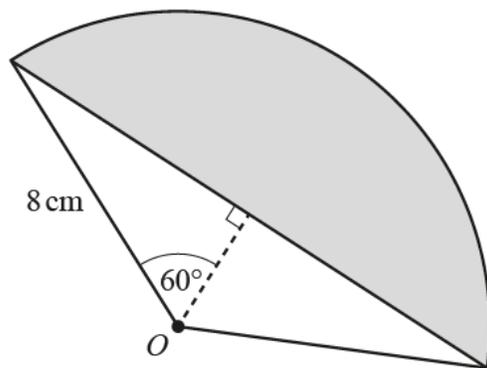


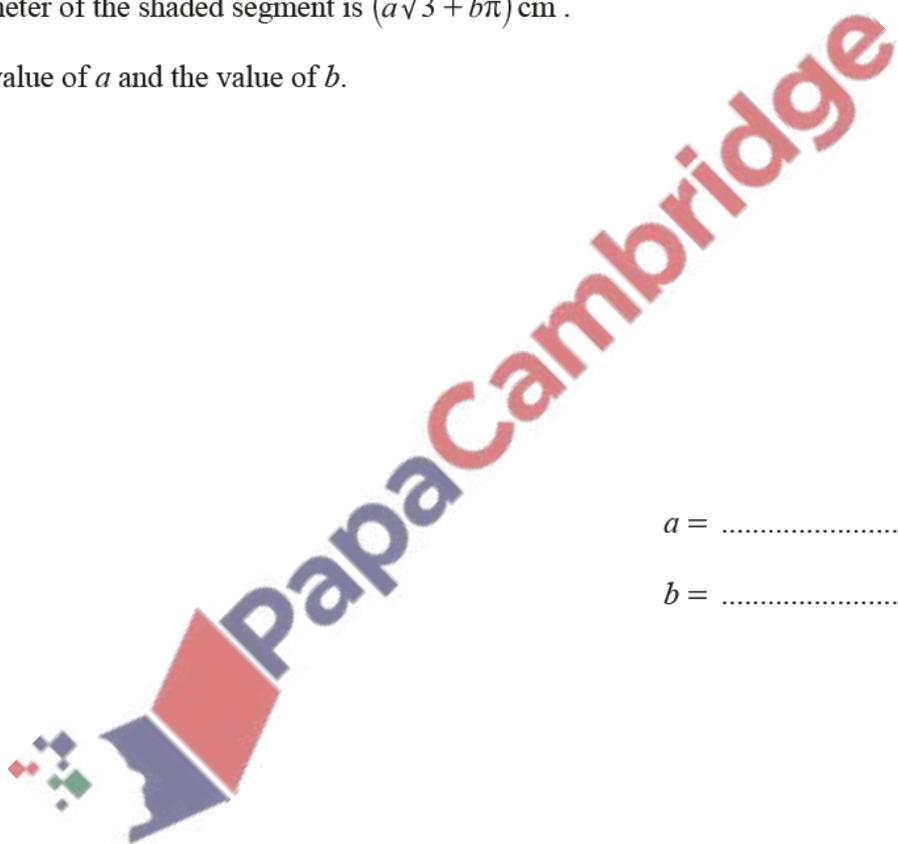
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NOT TO
SCALE

The diagram shows a sector of a circle, center O , radius 8 cm.
The perimeter of the shaded segment is $(a\sqrt{3} + b\pi)$ cm .

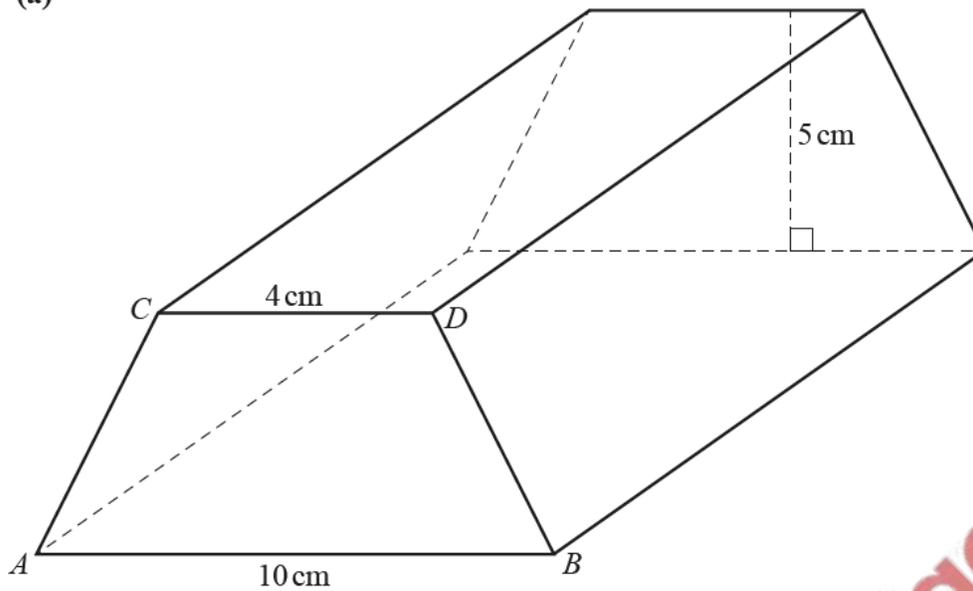
Find the value of a and the value of b .



$a = \dots\dots\dots$

$b = \dots\dots\dots$ [4]

(a)



NOT TO SCALE

The diagram shows a prism.

The cross-section of the prism is a trapezoid with CD parallel to AB and $AC = BD$.

$AB = 10$ cm, $CD = 4$ cm and the height of the trapezoid is 5 cm.

The volume of the prism is 525 cm³.

- (i) The prism is made of iron.
 1 cm³ of iron has a mass of 7.8 g.

Calculate the mass of the prism.
 Give your answer in kilograms.

..... kg [2]

- (ii) Calculate the length of the prism.

..... cm [3]

(iii) Calculate the total surface area of the prism.

..... cm^2 [6]

(iv) In a mathematically similar prism, the height of the trapezoid is 10 cm.

Calculate the volume of this prism.

..... cm^3 [3]

(b) A new town is built with a boundary that is a circle of radius R miles.

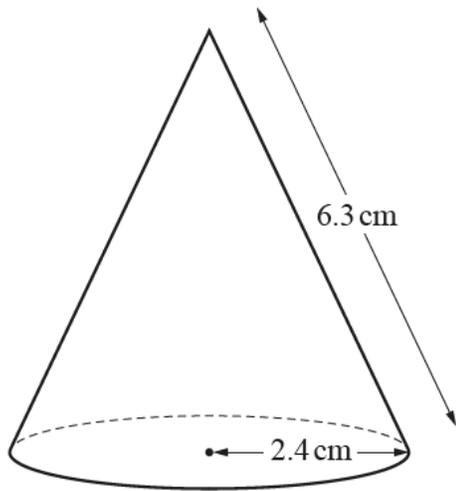
The population of the town is 50 000.

The population density is 3500 persons per square mile.

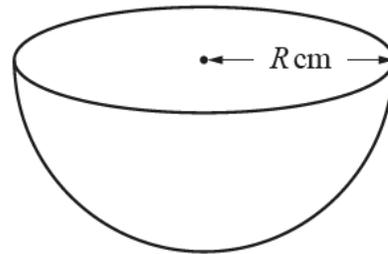
Calculate the value of R .

$R =$ [3]

(a)

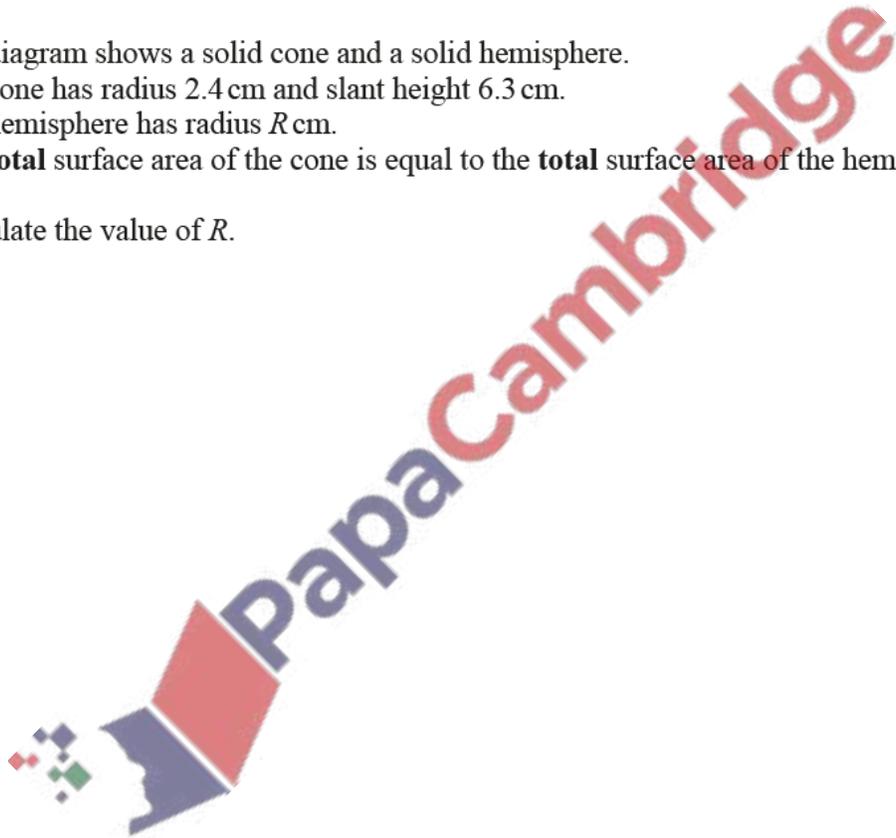


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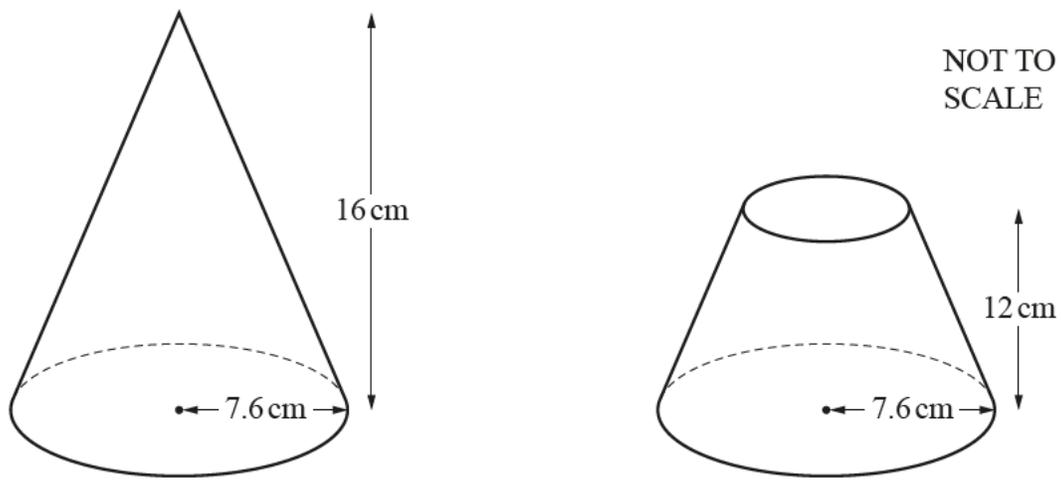
The diagram shows a solid cone and a solid hemisphere.
The cone has radius 2.4 cm and slant height 6.3 cm.
The hemisphere has radius R cm.
The **total** surface area of the cone is equal to the **total** surface area of the hemisphere.

Calculate the value of R .



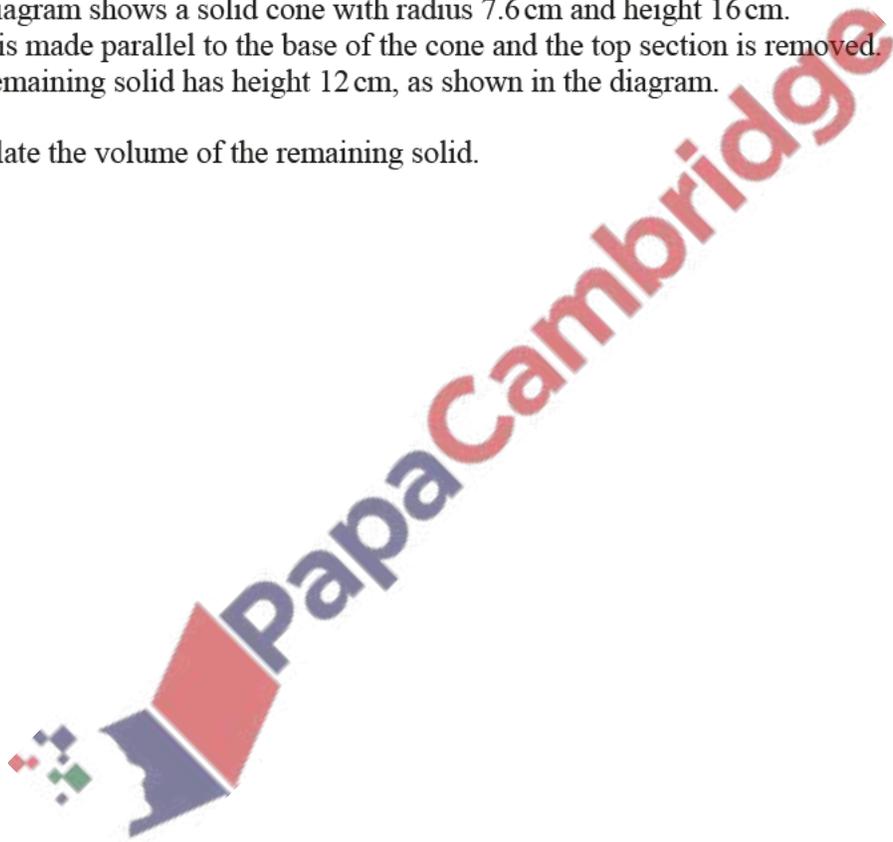
$R = \dots\dots\dots$ [4]

(b)



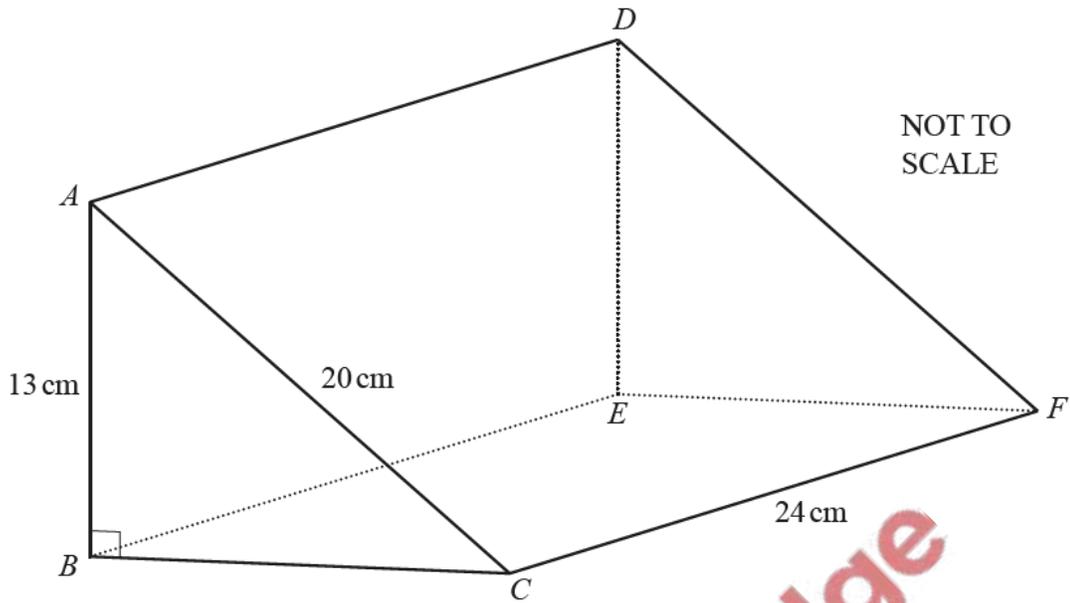
The diagram shows a solid cone with radius 7.6 cm and height 16 cm.
A cut is made parallel to the base of the cone and the top section is removed.
The remaining solid has height 12 cm, as shown in the diagram.

Calculate the volume of the remaining solid.



..... cm³ [4]

(a)



The diagram shows a prism, $ABCDEF$.
 $AB = 13$ cm, $AC = 20$ cm, $CF = 24$ cm, and angle $ABC = 90^\circ$.

(i) Calculate the total surface area of the prism.

..... cm^2 [6]

(ii) Calculate the volume of the prism.

..... cm^3 [1]

(b) A sector of a circle with radius 6 cm has a sector angle of 50° .

Calculate the perimeter of the sector.

..... cm [3]

