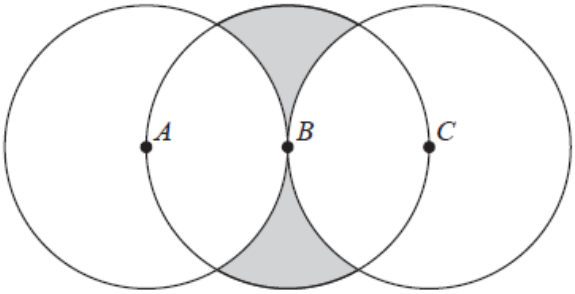
Mixed Exercise 6

1.

The diagram shows three circles, each of radius 4 cm.

The centres of the circles are A, B and C such that ABC is a straight line and $AB = BC = 4$ cm.



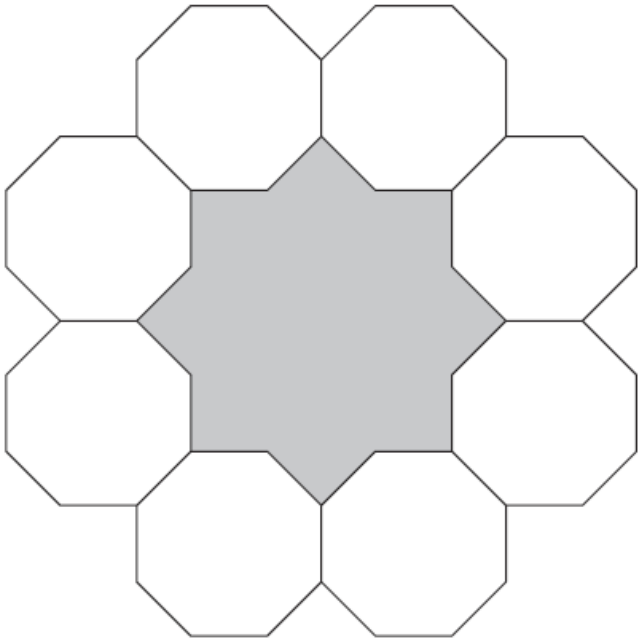
Work out the total area of the two shaded regions.
Give your answer in terms of π

..... cm^2

(5)

2.

The diagram shows 8 identical regular octagons joined to enclose a shaded shape.



Each octagon has sides of length a.

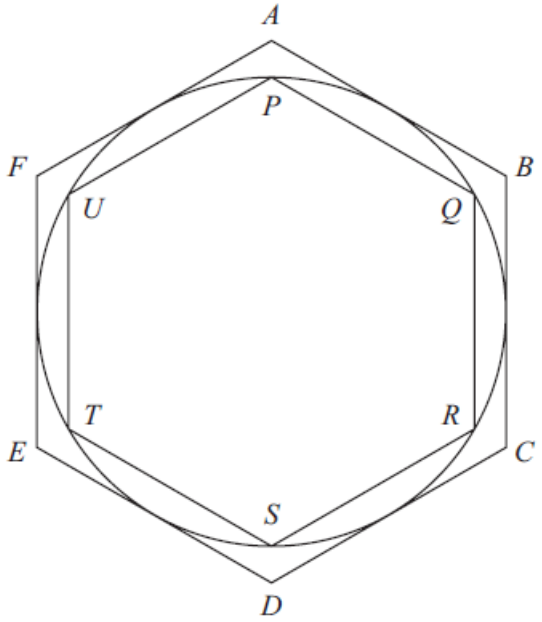
Find, in terms of a, an expression for the area of the shaded shape.
Give your answer in the form $p\left(2+\sqrt{2}\right)a^2$ where p is an integer.
You must show all your working.

.....

(5)

3.

The diagram shows a circle, radius r cm and two regular hexagons.



Each side of the larger hexagon $ABCDEF$ is a tangent to the circle.
Each side of the smaller hexagon $PQRSTU$ is a chord of the circle.

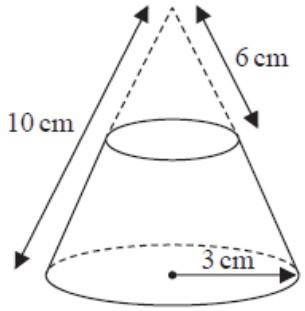
By considering perimeters, show that

$$3 < \pi < 2\sqrt{3}$$

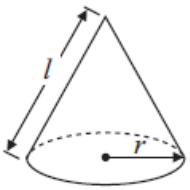
(4)

4.

A solid frustum is made by removing a small cone from a large cone as shown in the diagram.



Curved surface area of cone = πrl



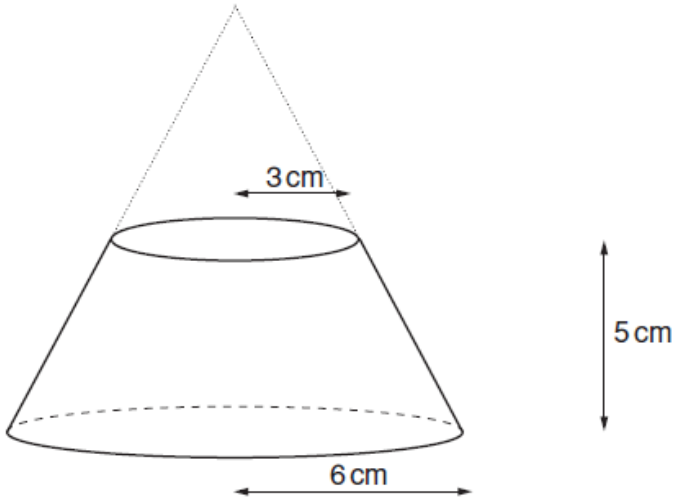
The slant height of the small cone is 6 cm.
The slant height of the large cone is 10 cm.
The radius of the base of the large cone is 3 cm.

Calculate the total surface area of the frustum.
Give your answer correct to 3 significant figures.

..... cm^2

(5)

5.



The diagram shows a frustum of a cone.
The radius of the base is 6 cm.
The radius of the top is 3 cm.
The height of the frustum is 5 cm.

Calculate the volume of the frustum. Leave your answer as a multiple of π.
Give the units of your answer.

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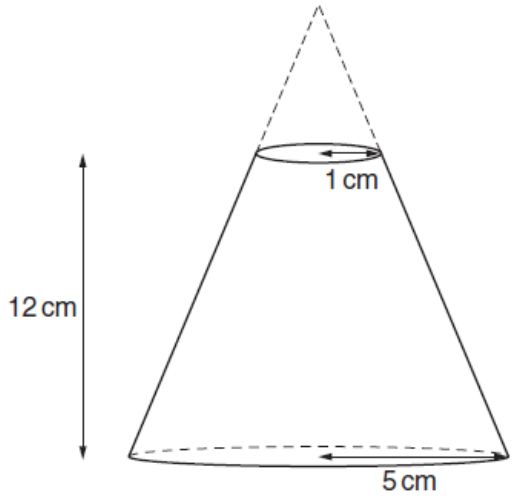
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[5]

6.

The diagram shows a frustum of a cone.

It is made by removing a cone of radius 1 cm from a cone of radius 5 cm.
The height of the frustum is 12 cm.



Calculate the volume of the frustum.

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_____ cm³ [6]

7.

Here is a frustum of a cone.
The frustum is made by removing a small cone from a similar large cone.

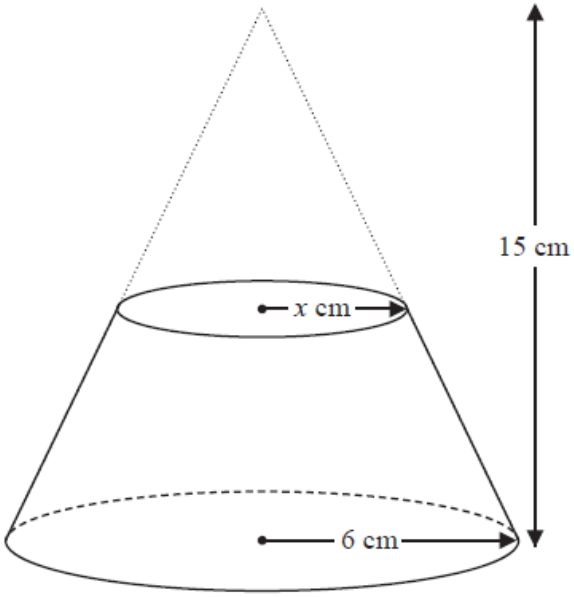


Diagram **NOT** accurately drawn

The height of the large cone is 15 cm.

The radius of the base of the large cone is 6 cm.
The radius of the base of the small cone is x cm.

Given that the volume of the frustum is $\frac{4212}{25}\pi$ cm^3

work out the value of x
Show clear algebraic working.

$x =$ .....

(5)