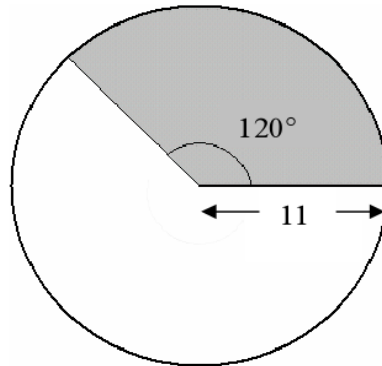


2005

Question 1

- Q1. (a) (i) Find, correct to the nearest  $\text{cm}^2$ ,  
the area of a disc of radius 11 cm.
- (ii) Find, correct to the nearest  $\text{cm}^2$ ,  
the area of the shaded region in  
the diagram.

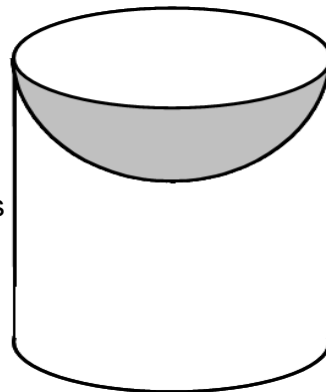


- (b) (i) A solid metal cylinder has height 20 cm  
and diameter 14 cm.

Find its curved surface area in  
terms of  $\pi$ .

- (ii) A hemisphere with diameter 14 cm is  
removed from the top of this cylinder, as  
shown.

Find the total surface area of the  
remaining solid in terms of  $\pi$ .



- (c) (i) A cone has radius  $x$  and height  $3x$ .

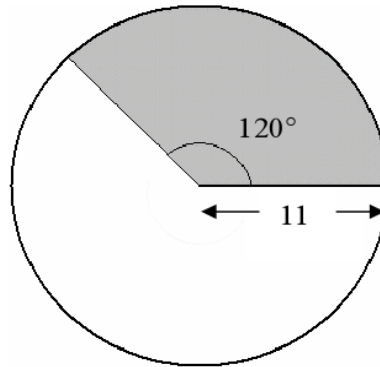
Find its volume terms of  $\pi$  and  $x$ .

- (ii) A second cone has twice the radius and half the height of the  
first cone.

Find the ratio of the volume of the second cone to the volume of  
the first.

**Solution**

- Q1. (a) (i) Find, correct to the nearest  $\text{cm}^2$ ,  
the area of a disc of radius 11 cm.
- (ii) Find, correct to the nearest  $\text{cm}^2$ ,  
the area of the shaded region in  
the diagram.



- (i)  $r = 11$ ,  $\pi = 3.14$  find A

$$\begin{aligned} \text{Area} &= \pi r^2 \\ &= 3.14(11^2) \text{ square first the multiply} \\ &= 3.14(121) \\ &= 379.94 \\ &= 380 \text{ cm}^2 \end{aligned}$$

- (ii) Shaded fraction is  $\frac{1}{3}$ . Area of shaded region is  $\frac{380}{3} = 126.66$

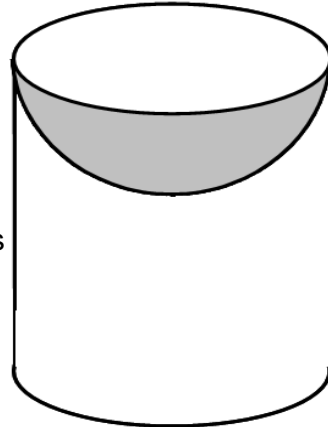
Shaded area is 127  $\text{cm}^2$ .

- (b) (i) A solid metal cylinder has height 20 cm and diameter 14 cm.

Find its curved surface area in terms of  $\pi$ .

- (ii) A hemisphere with diameter 14 cm is removed from the top of this cylinder, as shown.

Find the total surface area of the remaining solid in terms of  $\pi$ .



- (i)  $r = 7$  and  $h = 20$

$$A = 2\pi rh$$

$$A = 2\pi(7)(20)$$

$$A = 280\pi$$

- (ii) Hemisphere  $r = 7$

$$A = 2\pi r^2$$

$$A = 2\pi(7)^2$$

$$A = 98\pi$$

Circle  $r = 7$

$$A = \pi r^2$$

$$A = \pi(7)^2$$

$$A = 49\pi$$

Answer  $98\pi + 280\pi + 49\pi = 427\pi$

(c) (i) A cone has radius  $x$  and height  $3x$ .

Find its volume terms of  $\pi$  and  $x$ .

(ii) A second cone has twice the radius and half the height of the first cone.

Find the ratio of the volume of the second cone to the volume of the first.

(i)  $r = x$ ,  $h = 3x$  find  $V$

$$\begin{aligned}V &= \frac{1}{3}\pi(x)^2(3x) \\ &= \pi x^3\end{aligned}$$

(ii)  $r = 2x$ ,  $h = \frac{3x}{2}$  find  $V$

$$\begin{aligned}V &= \frac{1}{3}\pi(2x)^2\left(\frac{3x}{2}\right) \\ &= \frac{1}{3}\pi(4x^2)\left(\frac{3x}{2}\right) \\ &= 2\pi x^3\end{aligned}$$

Ratio volume of 2<sup>nd</sup> cone : volume of 1<sup>st</sup> cone

$$2\pi x^3 : \pi x^3$$

$$2 : 1$$