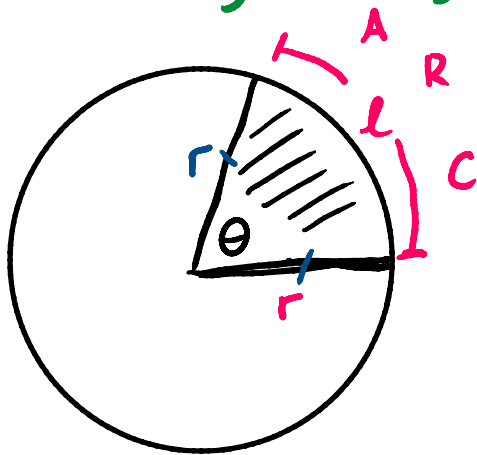


## Arc / Sector Pg 9 Log Tables



$r = \text{radius}$

$\theta = \text{theta}$  "Greek" Angle

$360^\circ$  in a circle

Only use formula for  $\theta$  in degrees

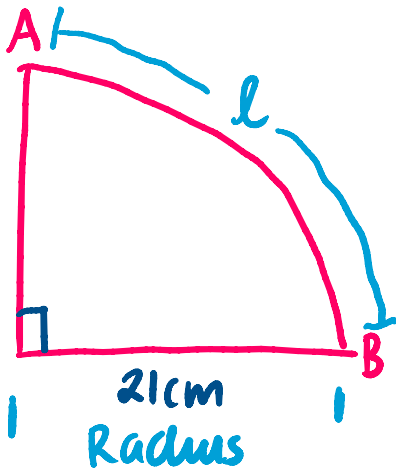
$$l = 2\pi r \left( \frac{\theta}{360} \right)$$

Circumference of the arc

$$A = \pi r^2 \left( \frac{\theta}{360} \right)$$

Area of the sector

Eg 1) Find the length of arc AB taking  $\pi$  as  $\frac{22}{7}$



$90^\circ$

$$l = 2 \times \frac{22}{7} \times 21 \times \frac{90}{360}$$

calculator

$$l = AB = 33 \text{ cm}$$

Find the Area of the sector

$$A = \frac{22}{7} \times (21)^2 \times \frac{90}{360} = 346.5 \text{ cm}^2$$

New Pg 119 Q5 (ii)  $\rightarrow$  (iv)

Q6 + 7

Q8

OLD Pg 96 Q 7 (ii)  $\rightarrow$  (iv)  
Q 8 + 9  
Q 10



T&T2 6.3  
Area &...



T&T2 6.3  
Area &...

## Perimeter – Area – Volume

chapter

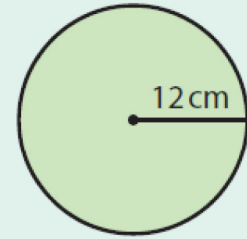
6

91

### Section 6.3 Area and circumference of a circle

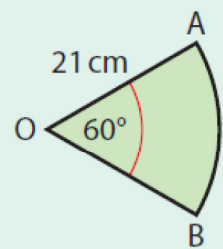
### Example 1

Find the length of the circumference of this circle using 3.142 as an approximation for  $\pi$ .



### Example 2

The diagram on the right shows a sector of a circle of radius 21 cm. Find the length of the perimeter of this figure. Use  $\frac{22}{7}$  as an approximation for  $\pi$ .



### Example 3

The length of the circumference of a circle is 120 cm.

Find the length of the radius of the circle, correct to 1 decimal place.

### Example 4

(i) Find the area of a circle of radius 14 cm. (Take  $\pi = \frac{22}{7}$ )

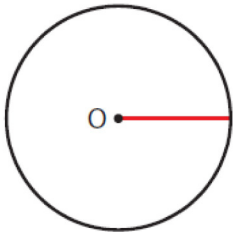
(ii) Find the radius of a circle of area 1386 cm<sup>2</sup>.

Use the  $\pi$  key on your calculator and give your answer correct to the nearest whole number.

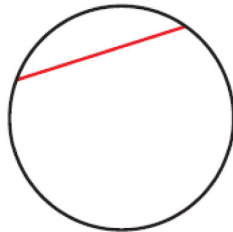
### Exercise 6.3

1. Name the feature shown, in red, on each circle.

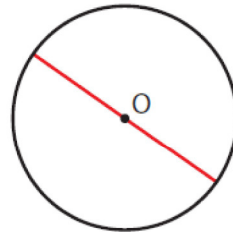
(i)



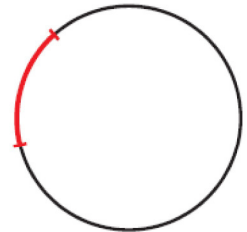
(ii)



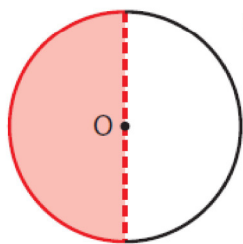
(iii)



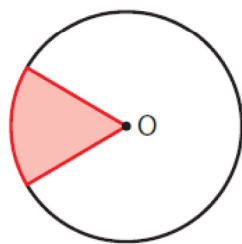
(iv)



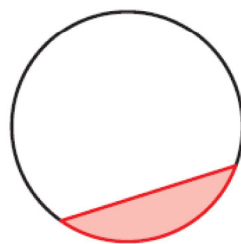
(v)



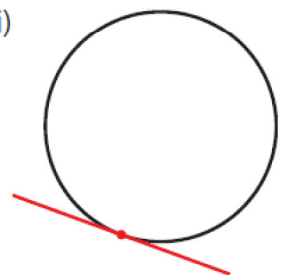
(vi)



(vii)

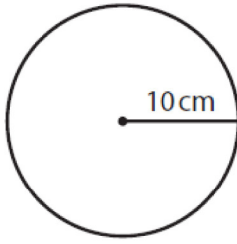


(viii)

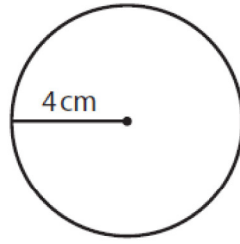


2. Calculate the circumference of each of these circles, using  $\pi = 3.14$ .

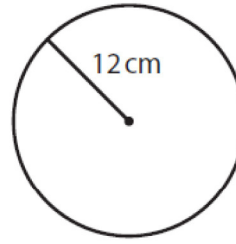
(i)



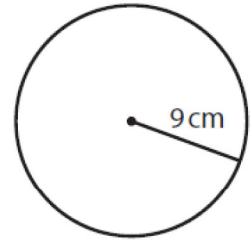
(ii)



(iii)

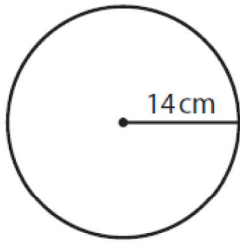


(iv)

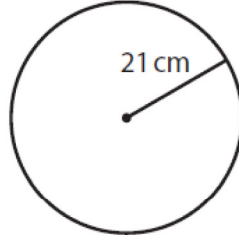


3. Using the approximation  $\pi = \frac{22}{7}$ , find the circumference of each circle:

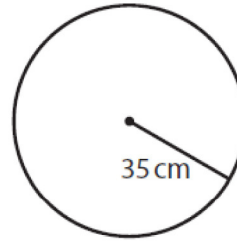
(i)



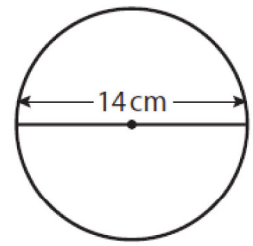
(ii)



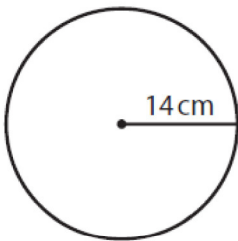
(iii)



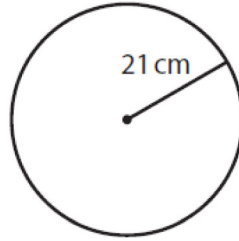
(iv)



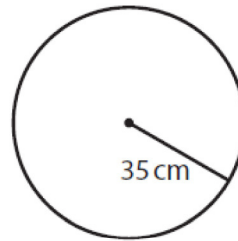
(i)



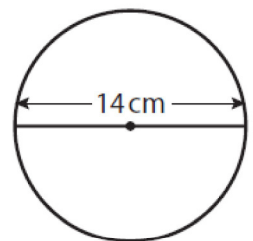
(ii)



(iii)



(iv)

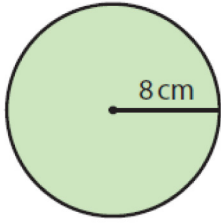


4. Using the approximation  $\pi = \frac{22}{7}$ , find the area of each circle in Question 3 above:

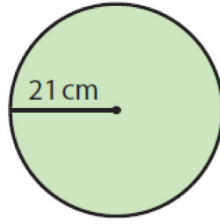
**5.** Use the  $\pi$  key on your calculator to find (a) the area and (b) the perimeter of each of these circles.

Give each answer correct to 1 decimal place.

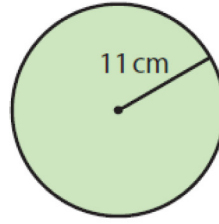
(i)



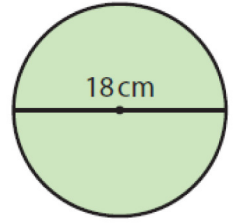
(ii)



(iii)



(iv)





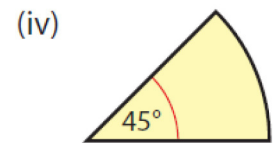
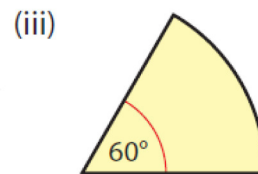
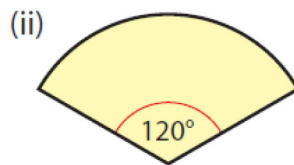
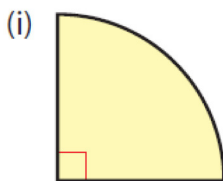
6. Using 3.14 as an approximate value for  $\pi$ , calculate the lengths of the circumferences of these circles.

(i) radius = 13 cm

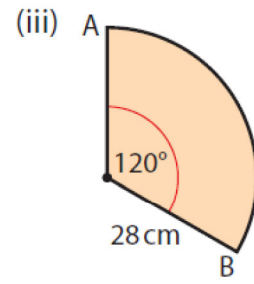
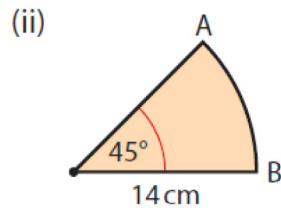
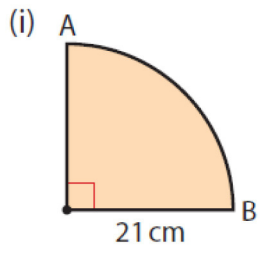
(ii) diameter = 30 cm

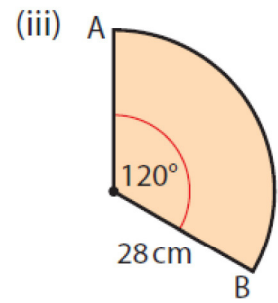
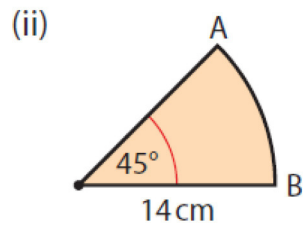
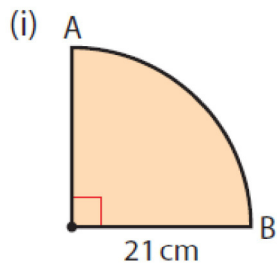
(iii) radius = 40 cm

7. What fraction of the area of a complete circle is each of these sectors?



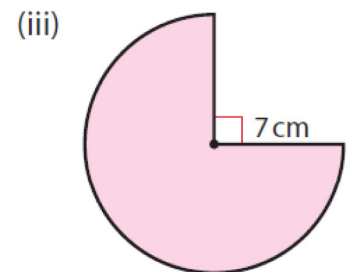
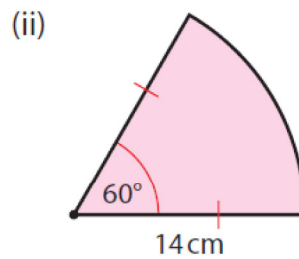
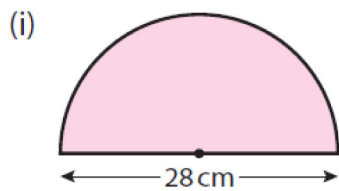
8. Find the length of the arc AB in each of these sectors, taking  $\pi = \frac{22}{7}$ .





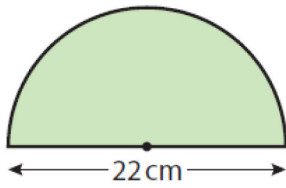
9. Using  $\pi = \frac{22}{7}$ , find the area of each of the sectors in Question 8 above:

10. Find the perimeter of these shapes, taking  $\pi = \frac{22}{7}$ .

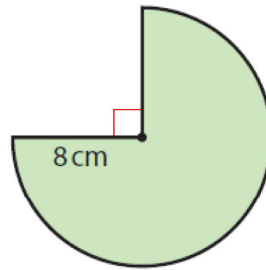


**11.** Using  $\pi = 3.14$ , find the area of each of these shapes.

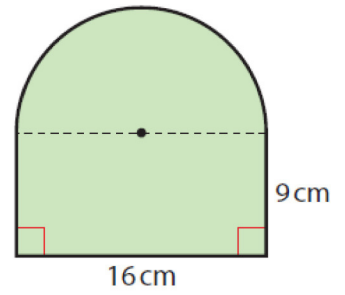
(i)



(ii)

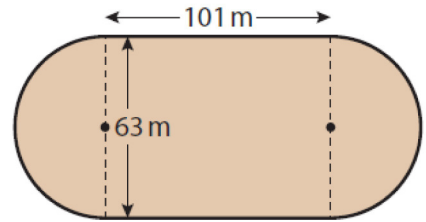


(iii)

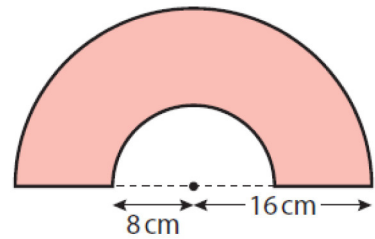


Give each answer correct to one place of decimals.

- 12.** A running track is in the shape of a rectangle with semicircular ends as shown on the right. Calculate the length of the track. Take  $\pi = \frac{22}{7}$ . How many laps would an athlete have to complete in a 10 000 metre race?

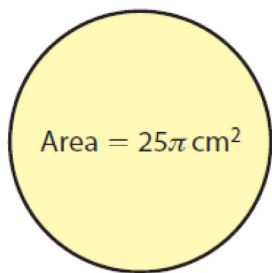


- 13.** Taking  $\pi = 3.14$ , find
- the perimeter
  - the area of the given coloured figure.
- Give each answer correct to one decimal place.

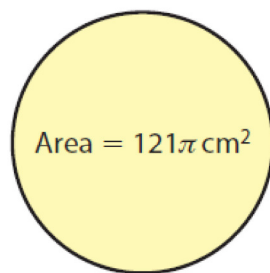


**14.** The area of each circle below is given in terms of  $\pi$ .  
Find the length of the radius of each circle.

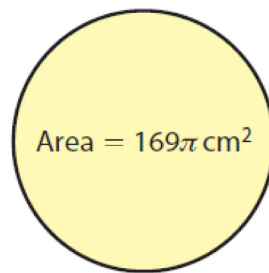
(i)



(ii)



(iii)



**15.** The area of a circle is  $154 \text{ cm}^2$ . Taking  $\pi = \frac{22}{7}$ , find

(i) the length of the radius

(ii) the length of the circumference

**16.** Stephen has a counter device on his bike.

It counts the number of revolutions his wheel has made.

His wheels are 40 cm in diameter.

(i) Stephen cycles to his grandmother's house.

The counter reads 1989.

How far away does his grandmother live?

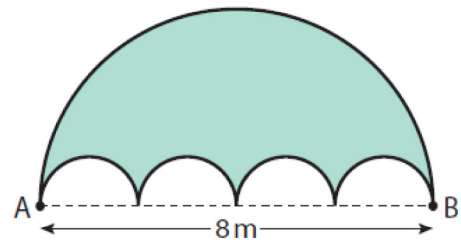
(ii) How many revolutions does his wheel have to make to travel 1 km?

Give each answer correct to the nearest whole number.



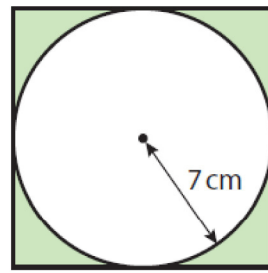
**17.** Which is the shorter path from A to B

- (i) along the 4 semicircles, or
- (ii) along the larger semicircle?



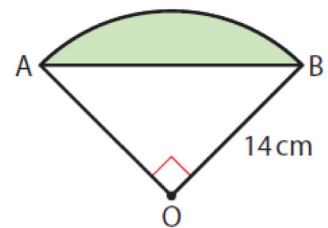


18. Taking  $\pi = \frac{22}{7}$ , find the area of the shaded portion of the given figure.

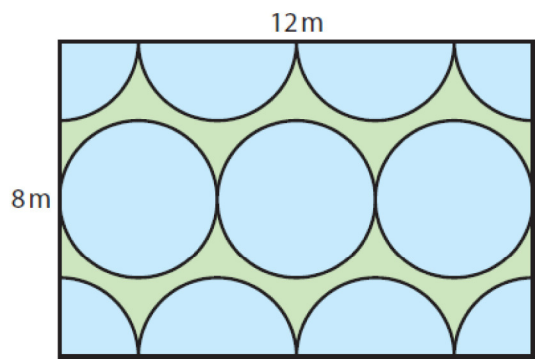


19. The quadrant shown is cut from a circle of centre O.

- (i) Find the area of  $\triangle OAB$ .  
(ii) Find the area of the shaded region, taking  $\pi = \frac{22}{7}$ .

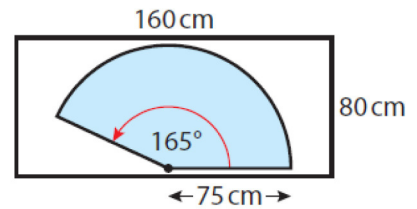


**20.** To water this rectangular field, a gardener uses eleven identical sprinklers, which cover the blue areas shown on the diagram. The three sprinklers in the middle of the field cover circular areas; the four sprinklers on the sides cover semi-circular areas; and the four sprinklers at the corners cover quadrant areas.

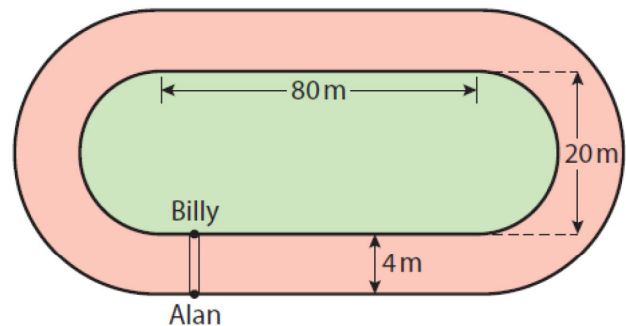


- (i) What is the radius of each circle?
- (ii) What is the total (blue) area watered by the sprinklers?
- (iii) Find, correct to the nearest whole number, the percentage of the lawn that is watered.

- 21.** A car with a rectangular rear windscreen (160 cm long and 80 cm wide) has one large wiper of length 75 cm. The wiper covers the shaded area in the diagram on the right. What percentage of the windscreen area is **not** cleaned by the wiper? Give your answer to the nearest whole number.



- 22.** Alan and Billy raced each other around this athletic track. Alan ran along the outside perimeter while Billy ran along the inside perimeter. After one lap of the track, who had run the longer distance, and by how much? Answer correct to the nearest metre.



# Answers

## Exercise 6.3

1. (i) radius (ii) chord  
(iii) diameter (iv) arc  
(v) semicircle (vi) sector  
(vii) segment (viii) tangent
2. (i) 62.8 cm (ii) 25.12 cm  
(iii) 75.36 cm (iv) 56.52 cm
3. (i) 88 cm (ii) 132 cm  
(iii) 220 cm (iv) 44 cm
4. (i)  $616 \text{ cm}^2$  (ii)  $1386 \text{ cm}^2$   
(iii)  $3850 \text{ cm}^2$  (iv)  $154 \text{ cm}^2$
5. (i) (a)  $201.1 \text{ cm}^2$  (b) 50.3 cm  
(ii) (a)  $1385.4 \text{ cm}^2$  (b) 131.9 cm  
(iii) (a)  $380.1 \text{ cm}^2$  (b) 69.1 cm  
(iv) (a) 254.5 cm (b) 56.5 cm
6. (i) 81.64 cm (ii) 94.2 cm (iii) 251.2 cm

## Answers

7. (i)  $\frac{1}{4}$  (ii)  $\frac{1}{3}$  (iii)  $\frac{1}{6}$  (iv)  $\frac{1}{8}$
8. (i) 33 cm (ii) 11 cm (iii)  $58\frac{2}{3}$  cm
9. (i)  $346.5 \text{ cm}^2$  (ii)  $77 \text{ cm}^2$  (iii)  $821\frac{1}{3} \text{ cm}^2$
10. (i) 72 cm (ii)  $42\frac{2}{3}$  cm (iii) 47 cm
11. (i)  $190 \text{ cm}^2$  (ii)  $150.8 \text{ cm}^2$  (iii)  $244.5 \text{ cm}^2$
12. 400 m; 25
13. (i) 91.4 cm (ii)  $301.6 \text{ cm}^2$
14. (i) 5 cm (ii) 11 cm (iii) 13 cm
15. (i) 7 cm (ii) 44 cm
16. (i) 2500 m (ii) 796
17. Both the same length
18.  $42 \text{ cm}^2$
19. (i)  $98 \text{ cm}^2$  (ii)  $56 \text{ cm}^2$
20. (i) 2 m (ii)  $75.4 \text{ m}^2$  (iii) 79%
21. 63%
22. Alan; 25 m