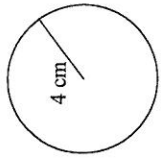


Circles

Past Paper Questions

- 1 a) Calculate the circumference of a circle with a radius of 20 cm, using 3.14 as the value of π .

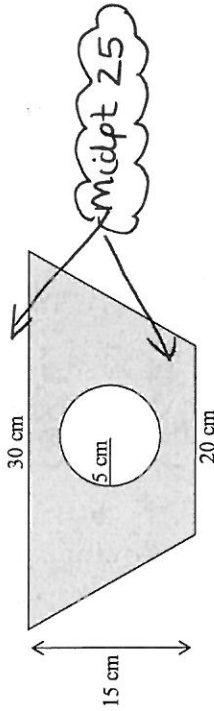
$$C = \pi \times d = \pi \times 40 = 3.14 \times 40 = \frac{125.6 \text{ cm}}{[2]}$$



- b) Calculate the area of the circle shown on the right, using 3.14 as the value of π .

$$\begin{aligned} \text{Area} &= \pi r^2 \\ &= \pi \times 4^2 \\ &= 3.14 \times 16 = 50.24 \text{ cm}^2 \end{aligned} \quad [2] \quad 2010$$

- 2 The following diagram shows a card in the shape of a trapezium, with a circular hole of radius 5 cm. The lengths of the parallel sides of the trapezium are 30 cm and 20 cm and the perpendicular distance between them is 15 cm.



Using the value of π as 3.14, calculate

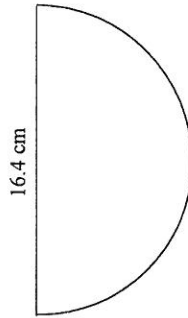
- (a) the circumference of the circle [2]

$$\begin{aligned} C &= \pi d \\ &= \pi \times 10 \\ &\Rightarrow 3.14 \times 10 \\ C &= 31.4 \text{ cm} \end{aligned}$$

- (b) the area of the shaded part of the card. [5]

$$\begin{aligned} \text{Trapezium} &= 25 \times 15 = 375 \text{ cm}^2 \\ \text{Circle} &= \pi r^2 = 3.14 \times 25 = 78.5 \text{ cm}^2 \\ \text{Shaded} &= 375 - 78.5 = 296.5 \text{ cm}^2 \end{aligned} \quad 2007$$

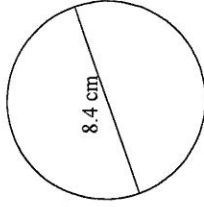
- 3 (a) Calculate the area of a semicircle with a diameter of 16.4 cm. [2]



$$\begin{aligned} \text{Circle Area} &= \pi r^2 \\ &= \pi \times 8.2^2 = 211.2 \\ \text{Semi Circle} &= 211.2 \div 2 = 105.6 \text{ cm}^2 \end{aligned} \quad 2006^*$$

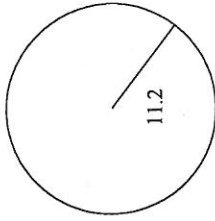
- 4 (a) Calculate the circumference of a circle with a diameter of 8.4 cm.

$$\begin{aligned} C &= \pi \times d \\ &= \pi \times 8.4 \\ &= 26.4 \text{ cm} \end{aligned}$$



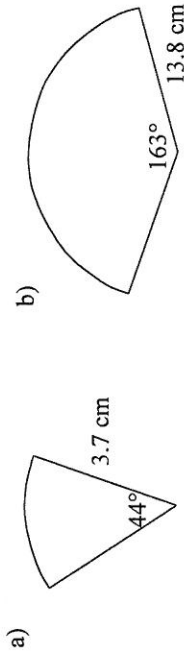
- (b) Calculate the area of a circle with a radius of 11.2 cm.

$$\begin{aligned} A &= \pi r^2 \\ &= \pi \times 11.2^2 \\ &= 394.1 \text{ cm}^2 \end{aligned}$$



2005*

- 1 Find the area of each of these sectors.



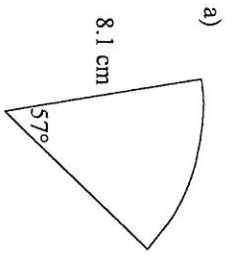
$$\text{Area of Sector} = \frac{\theta}{360} \times \pi r^2$$

$$\text{a) Area} = \frac{44}{360} \times \pi \times 3.7^2 = 5.26 \text{ cm}^2$$

$$\text{b) Area} = \frac{163}{360} \times \pi \times 13.8^2 = 270.9 \text{ cm}^2$$

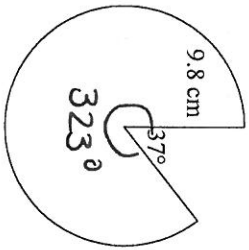
$$\text{Arc} = \frac{\theta}{360} \pi \times d$$

2 Find the perimeter for each of these sectors.



$$\begin{aligned} \text{Arc} &= \frac{57}{360} \times \pi \times 16.2 \\ &= 8.06 \text{ cm} \end{aligned}$$

$$\begin{aligned} P &= 8.1 + 8.1 + 8.06 \\ &= 24.26 \text{ cm} \end{aligned}$$

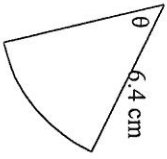


$$\text{Arc} = \frac{323}{360} \times \pi \times 9.8^2$$

$$\begin{aligned} &= \frac{323}{360} \times \pi \times 19.6 \\ &= 55.25 \text{ cm} \end{aligned}$$

$$\begin{aligned} P &= 9.8 + 9.8 + 55.25 \\ &= 74.8 \text{ cm} \end{aligned}$$

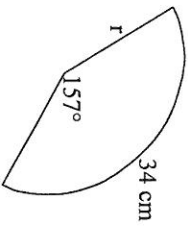
4 Find the radius of this



$$\frac{\theta}{360} \times \pi \times 6.4^2 = 25.2$$

$$\theta = \frac{25.2}{\pi \times 6.4^2} \times 360$$

$$= 70.5^\circ \text{ (1dp)}$$

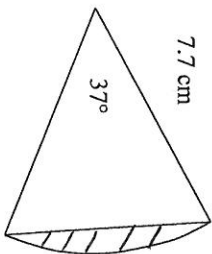


$$\frac{157}{360} \times \pi \times d = 34$$

$$d = \frac{34}{\frac{157}{360} \pi}$$

$$\begin{aligned} &= 24.8 \text{ cm} \\ r &= 12.4 \text{ cm} \end{aligned}$$

5 Find the area of the segment (the shaded area).



$$\text{Sector} = \frac{37}{360} \times \pi \times 7.7^2 = 19.14$$

$$\text{Triangle} = \frac{1}{2} \times 7.7^2 \times \sin(37) = 17.84$$

$$\begin{aligned} \text{Segment} &= \text{Sector} - \text{Triangle} \\ &= 19.14 - 17.84 \end{aligned}$$

$$\text{Segment} = 1.3 \text{ cm}^2$$

$$\text{Triangle} = \frac{1}{2} r^2 \sin \theta$$