Formulae for Circumference and Area of a Circle

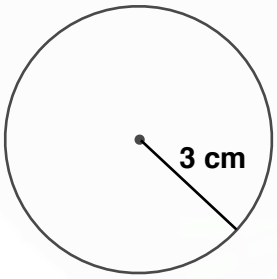
Starter

1. **(Review of last lesson)** Copy and complete these sentences.
   (a) The _____ is name for the perimeter of a circle.
   (b) A line connecting the centre of a circle to its perimeter is called a _____.
   (c) A _____ connects two points on the perimeter of a circle.
   (d) The longest line that can connect two points on the perimeter is called the _____.
   (e) The area of a circle between resembles a slice of pizza is called a _____.
   (f) The area between a chord and the perimeter of a circle is called a _____.

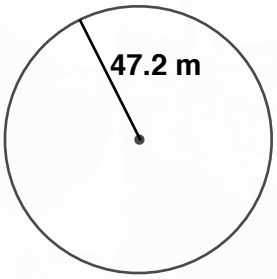
Working:
(a) Circumference
(b) Radius
(c) Chord
(d) Diameter
(e) Sector
(f) Segment

E.g. 1 Calculate the circumference of these circles, giving your answers to 3 s.f..

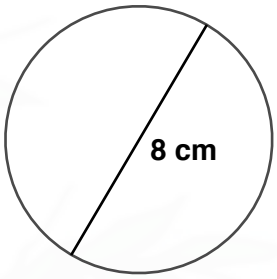
(a)



(b)



(c)



Working:
(a) Circumference, $C = 2\pi r = 2 \times \pi \times 3 = 6\pi = 18.8$ cm (3 s.f.)

(b) Circumference, $C = 2\pi r = 2 \times \pi \times 47.2 = 297$ cm (3 s.f.)

(c) Circumference, $C = \pi d = \pi \times 8 = 8\pi = 25.1$ cm (3 s.f.)

E.g. 2 The minute hand of a clock is 10 cm long. How far does the tip travel in 1 hour? Give your answer in terms of π.

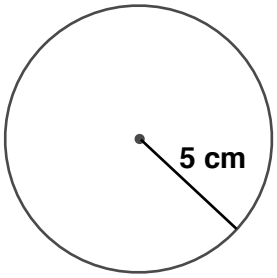
Working: In 1 hour the tip will travel a full circle so we need to find the circumference.
Distance travelled = Circumference
$= 2 \times \pi \times 10$
$= 20\pi$ cm

E.g. 3 The circumference of a circle is 100 cm long. Calculate the radius of the circle, giving your answer to 3 s.f..

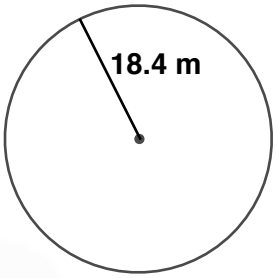
Working:
Substitute into $C = 2\pi r$: $2\pi r = 100$
Divide by 2π: $r = \dfrac{100}{2\pi}$
$r = 15.9$ (3 s.f.)
The radius of the circle is 15.9 cm (3 s.f.)

E.g. 4 Calculate the area of these circles, giving your answers to 3 s.f..

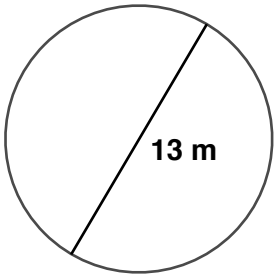
(a)



(b)



(c)



Working:

(a) Area, $A = \pi r^2 = \pi \times 5^2 = 25\pi = 78.5$ cm (3 s.f.)

(b) Area, $A = \pi r^2 = \pi \times 18.4^2 \approx 1063.6 = 1060$ cm (3 s.f.)

(c) Diameter $= 13$ so the radius $= 6.5$
Area, $A = \pi r^2 = \pi \times 6.5^2 = 133$ cm (3 s.f.)

E.g. 5 A circle has area 160 cm². Find its diameter to 3 s.f..

Working: ***Substitute into*** $A = \pi r^2$***:***

$$\pi r^2 = 160$$
$$r^2 = \frac{160}{\pi}$$
$$r = \sqrt{\frac{160}{\pi}}$$
$$r \approx 7.136$$
$$d = 2r = 14.3$$

The diameter of the circle is 14.3 cm.

Video: Circumference of a circle
Video: Area of a circle
Video: Perimeter of a semi-circle

Solutions to Starter and E.g.s

Exercise
p79 Ex 16.4 Qu 1-11

Textbook answers (only available during a lockdown)