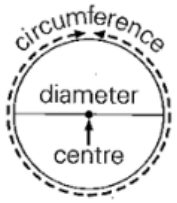
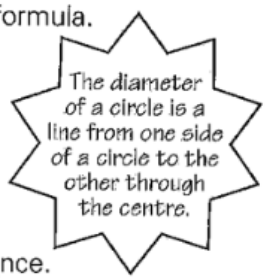
Geometry/Measurement: Perimeters of circles

The **perimeter** of a shape is the distance around the edge of the shape. The perimeter of a circle is called the **circumference**.

The circumference of a circle is related to the **diameter** by the following formula.

Circumference = $\pi \times$ diameter





where π (read as 'pi') is a number which is approximately $3\frac{1}{7}$ or 3.14.

Example: The circle shown above has diameter 2 cm. Find the circumference.

Circumference $= \pi \times 2$ using the formula

$= 3.14 \times 2$ approximately

$= 6.28$ cm

$= 6.3$ cm (using 1 decimal place)

Note: The answer has the same unit of measurement (centimetres) as the diameter since perimeter measures length.

Practising perimeters of circles

1. Find the circumference of circular objects with these diameters. Use $\pi = 3.14$ (include one decimal place in your answers). You may wish to use a calculator to help you.

   a. A lid has diameter 5 cm

   Circumference =

   =

   b. A circular pool has diameter 8 m

   Circumference =

   =

   c. A plate has diameter 20 cm

   Circumference =

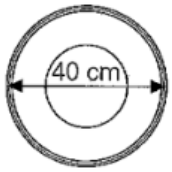
   =

   d. A circular zone has diameter 70 km

   Circumference =

   =

2. Mabel wants to put braid around the edge of her sun hat which has a diameter of 40 cm.



   a. Using the fact that the circumference of a circle is a bit more than 3 times the diameter, write down an estimate for the length of braid Mabel should buy. _____

   b. Calculate the length to 1 decimal place, using the formula. _____

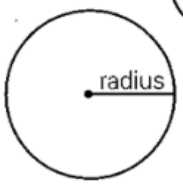
3. Tane needs to put a fence around a circular pond in his garden. The pond has diameter 3 m.

   a. Estimate the length of fencing Tane needs. _____

   b. Use the formula to work out the length of fencing Tane needs, to 1 decimal place. _____

Geometry/Measurement: Circumference

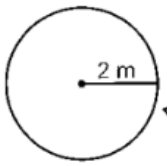
Sometimes the **radius** of a circle is given instead of the diameter. Since the diameter is 2 times the radius, the formula is then



$$\text{Circumference} = 2 \times \pi \times \text{radius}$$

Example: A circular pool of radius 2 m is to have a railing put around its circumference.

How long is the railing (use $\pi = 3.14$)?



Another way to find the circumference is to find the diameter (which is double the radius) then use the formula circumference $= \pi \times$ diameter.

Circumference $= 2 \times \pi \times 2$ using $C = 2 \times \pi \times \text{radius}$

$= 2 \times 3.14 \times 2$ approximately

$= 12.56$ m

So the length of the railing = 12.56 m (to 2 decimal places).

Calculator note: Some calculators have a π key, which gives π to nine or ten decimal places. If no approximate value is given for π, you can use this key for π. Remember to round off your answer sensibly.

Practising circumference

1. Find the circumference (C) of these circles whose radius is given. (Use $\pi = 3.14$ and give answers with one decimal place.) Remember to include the unit (cm or m).

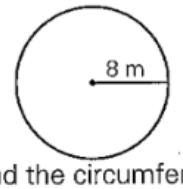
a. radius = 12 cm C =

=

b. radius = 4 m C =

=

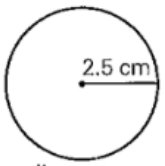
c.



C =

=

d.



C =

=

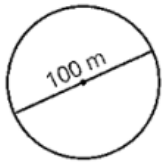
2. Find the circumference (C) of these circles whose diameter or radius is given. (Remember to use the correct formula and to include the unit in your answer.) Use your calculator to help you. Round to 1 dp where necessary.

a.

C =

=

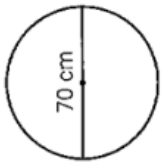
b.



C =

=

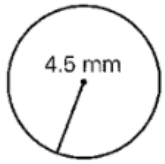
c.



C =

=

d.



C =

=

3. Tilly pipes a line of icing around the edge of a cake of diameter 22 cm.

a. How long is the line, to the nearest cm? _____

b. Tilly decides to pipe a second circle of icing 1 cm inside the first line of icing. How long is this line, to the nearest cm?