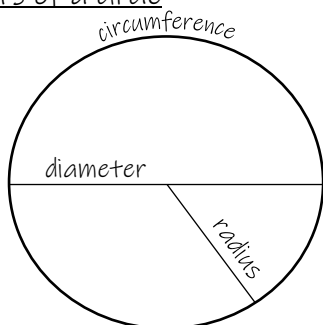


## Y8 Maths Knowledge Organiser Topic 10: Circles

What must I be able to do?	Key vocabulary
<b>New content:</b> <ul style="list-style-type: none"> <li>Be able to name the key parts of a circle                             <ul style="list-style-type: none"> <li>➤ <a href="#">Mathswatch G2</a></li> </ul> </li> <li>Use the formula to calculate the circumference of a circle                             <ul style="list-style-type: none"> <li>➤ <a href="#">Mathswatch G22a</a></li> </ul> </li> <li>Use the formula to calculate the area of a circle                             <ul style="list-style-type: none"> <li>➤ <a href="#">Mathswatch G22b</a></li> </ul> </li> <li>Find the area and perimeter of fractions of a circle, including a semicircle and a quarter circle</li> </ul>	<b>Circumference</b> The <u>distance</u> around the <u>outside</u> of a circle. <b>Radius</b> The <u>distance</u> from the <u>centre</u> of a circle <u>to the circumference</u> . <b>Diameter</b> The <u>distance across</u> a circle, going <u>through the centre</u> . <b>Semicircle</b> <u>Half</u> of a full <u>circle</u> . <b><math>\pi</math></b> The Greek letter pi. Used to represent the never ending number 3.141592654..... Most calculators will have a $\pi$ button.

### Parts of a circle



The diameter is equal to twice the length of the radius:

$$d = 2r$$

### Circumference of a circle

The circumference of a circle is equal to  $\pi$  multiplied by the diameter:

$$C = \pi d$$

Rearranging this gives us:

$$d = C \div \pi$$

As  $d = 2r$  the circumference can also be written as:

$$C = 2\pi r$$

### Area of a circle

The area of a circle is equal to  $\pi$  multiplied by the radius squared:

$$A = \pi r^2$$

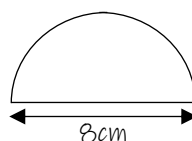
Note that just the  $r$  is squared, not  $\pi$

Rearranging this gives us:

$$r = \sqrt{\frac{A}{\pi}}$$

### Working with parts of circles

e.g.



Area of a semicircle:

The semicircle has a diameter of 8cm, so the radius is 4cm.

The area of a full circle:  $\pi r^2 = \pi \times 4^2 = 50.265482.....$

So area of the semicircle =  $50.265482..... \div 2 = 25.13 \text{ cm}^2$  (2d.p.)

Perimeter of a semicircle:

The circumference of a full circle:  $\pi d = \pi \times 8 = 25.13274.....$

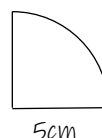
Circumference of the semicircle (curved edge only)

$$= 25.13274... \div 2 = 12.566....$$

Total perimeter =  $12.566.... + 8 = 20.57 \text{ cm}$  (2d.p.)

Perimeter includes the straight edge of the semicircle

e.g.



Area of a quarter circle:

The area of a full circle:  $\pi r^2 = \pi \times 5^2 = 78.5398.....$

So area of a quarter is =  $78.5398..... \div 4 = 19.63 \text{ cm}^2$  (2d.p.)

Perimeter of a quarter circle:

The circumference of a full circle:  $\pi d = \pi \times 10 = 31.4159.....$

Circumference of the quarter circle (curved edge only)

$$= 31.4159... \div 4 = 7.8539....$$

Total perimeter =  $7.8539.... + 5 + 5 = 17.85 \text{ cm}$  (2d.p.)

The diagram shows the radius so  $d = 2 \times 5 = 10\text{cm}$

Plus the 2 straight sides