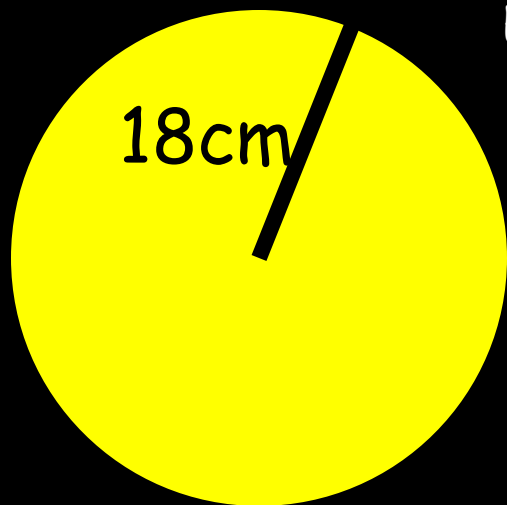# 11.5

Area & Circumference of Circles

Circumference of a Circle: <u>outside/ perimeter of a circle.</u>

Formula: <u>C = 2πr</u>

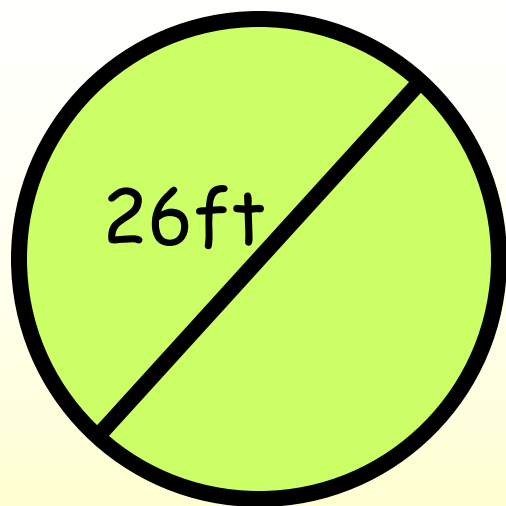r = <u>radius</u>

Example 1

18cm

$C = 2πr$

$C = 2(π)(18)$

$C = 36π$ cm

113.04 cm

Example 2

26ft

d = 26 ft

r = 13 ft

$C = 2(13)(\pi)$

$C = 26\pi$ ft

Example 3

$C = 16\pi$ m

Find the radius.
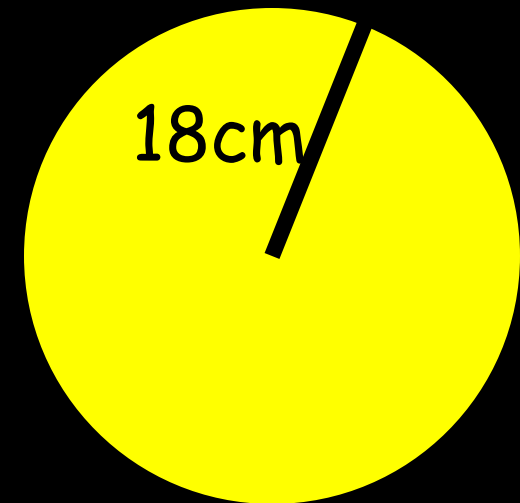
$C = 2(\pi)r$

$16\pi = 2(\pi)r$

π cancels out.

r = 8m

Area of a Circle – <u>remember to label with units²</u>.
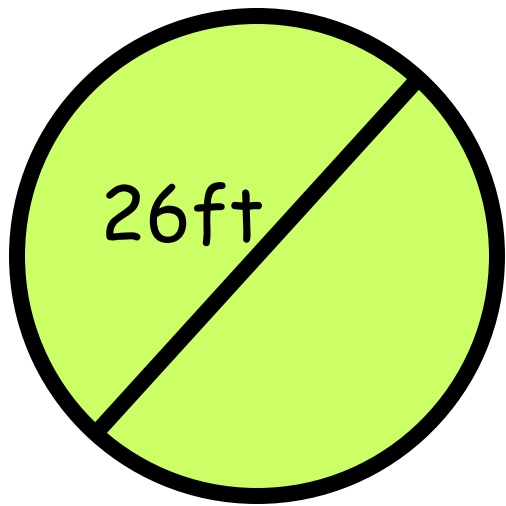
Formula: <u>A = πr²</u>

r = <u>radius</u>

Example 1:

18cm

$A = \pi r^2$

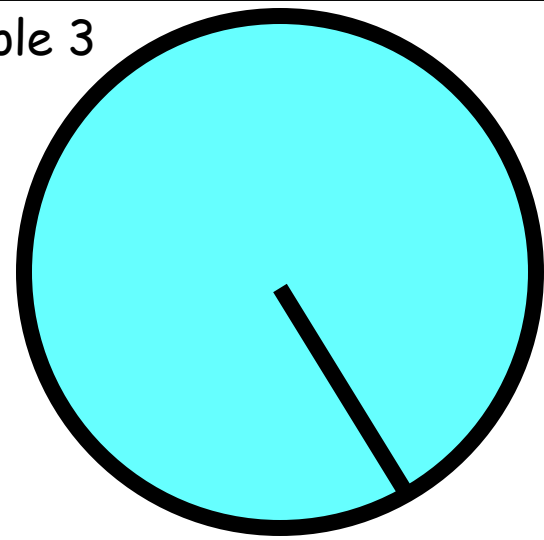$A = (\pi)(324)$

$A = 324\pi \ cm^2$

$1017.36 \ cm^2$

Example 2

26ft

d = 26ft

r = 13ft

A = (13²)(π)

A = 169π ft²

Example 3

A = 16π m²

Find the radius.

A = πr²

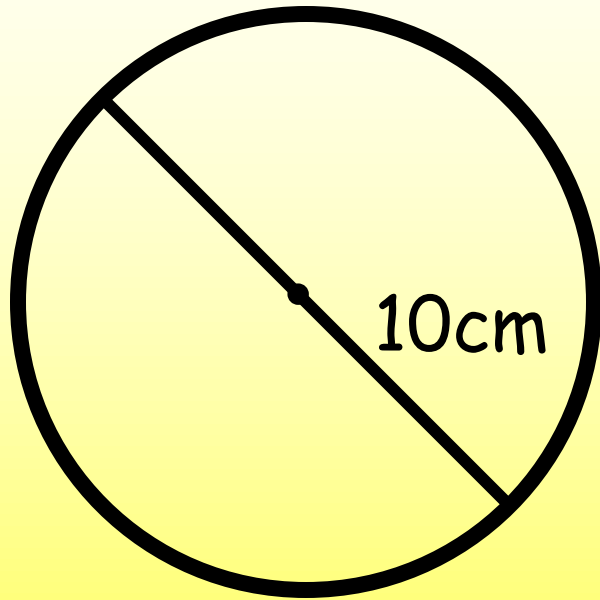16π = πr²

16 = r²

r = 4m

11.6

Area of Sectors

Arc Length

Arc Length – <u>a portion (or fraction) of the whole circumference.</u>

Ex1.

Find the length of a semicircle.

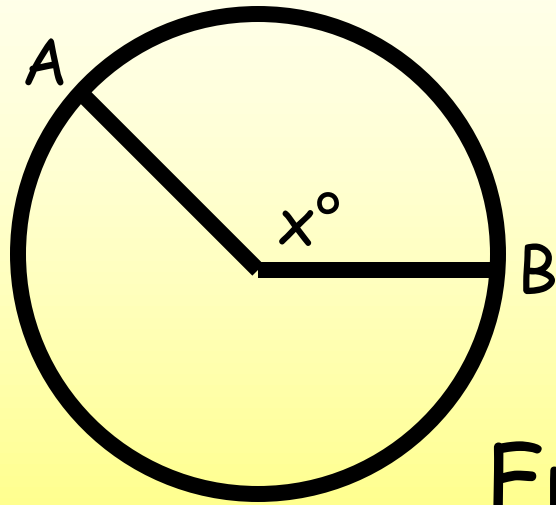First, find the whole circumference:

$C = 2\pi r$

$C = 2(\pi)(10)$

$C = 20\pi$ cm

Multiply your answer by ½ :

$\boxed{10\pi \text{ cm}}$

Formula:
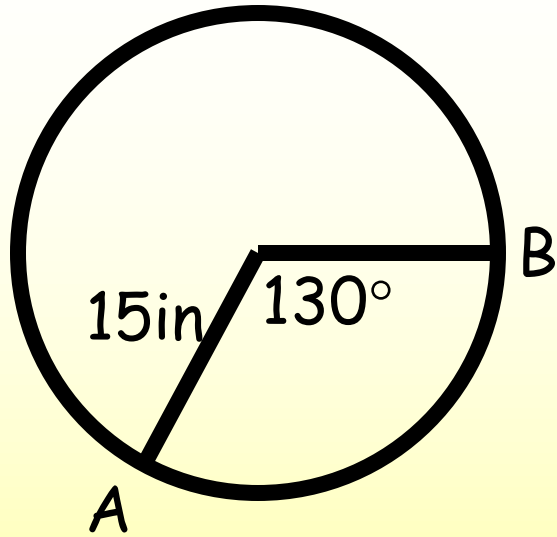
Arc Length $= \left(\dfrac{x}{360}\right)(2\pi r)$

Circumference

Fraction of the circle
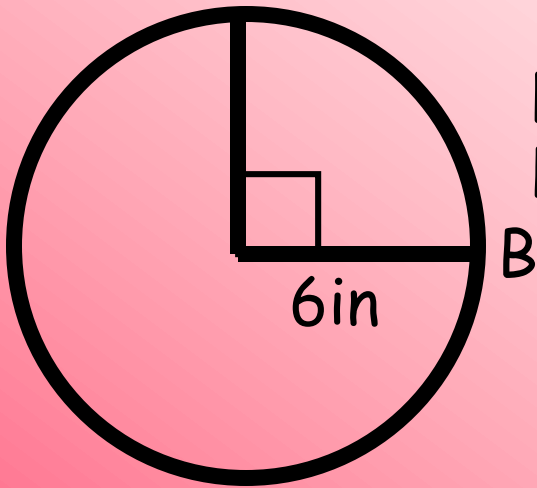
Example 2 – Find the length of $\widehat{AB}$.

$$\left(\frac{x}{360}\right)(2\pi r)$$

$$\left(\frac{130}{360}\right)(2\pi 15)$$

$$\frac{65}{6}\pi in$$

Example 3

A
B

6in

Find the length of $\overset{\frown}{AB}$.

$$\left(\frac{x}{360}\right)(2\pi r)$$

$$\left(\frac{90}{360}\right)(2\pi \cdot 6)$$

$$3\pi \text{ in}$$

Example 4

A
18m   60°   B

Find the length of $\overset{\frown}{AB}$.

$$\left(\frac{x}{360}\right)(2\pi r)$$

$$\left(\frac{60}{360}\right)(2\pi \cdot 18)$$

$$6\pi \text{ m}$$
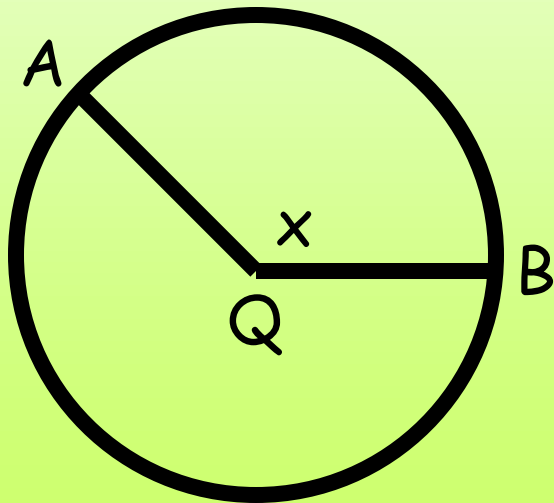
<u>Area of a Sector</u> – a region of a circle created by two radii; a portion (or fraction) of the entire area.
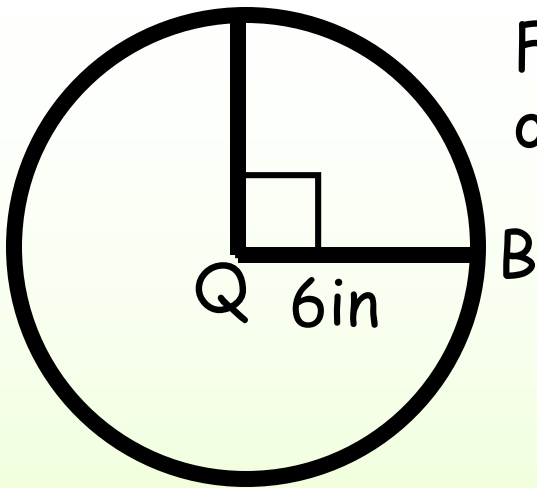
Formula:

Area of Sector $= \left(\dfrac{x}{360}\right)\left(\pi r^2\right)$
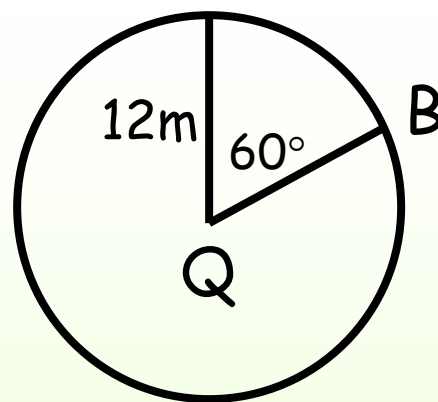

Area

Fraction of the circle

A — **Example 1**

Find the area of sector AQB

Q 6in **B**

$$\left(\frac{x}{360}\right)\left(\pi r^2\right)$$

$$\left(\frac{90}{360}\right)\left(\pi 6^2\right)$$

$9\pi \ in^2$

A — **Example 2**

Find the area of sector AQB.

12m 60° **B**

Q

$$\left(\frac{x}{360}\right)\left(\pi r^2\right)$$

$$\left(\frac{60}{360}\right)\left(\pi 12^2\right)$$

$24\pi \ m^2$