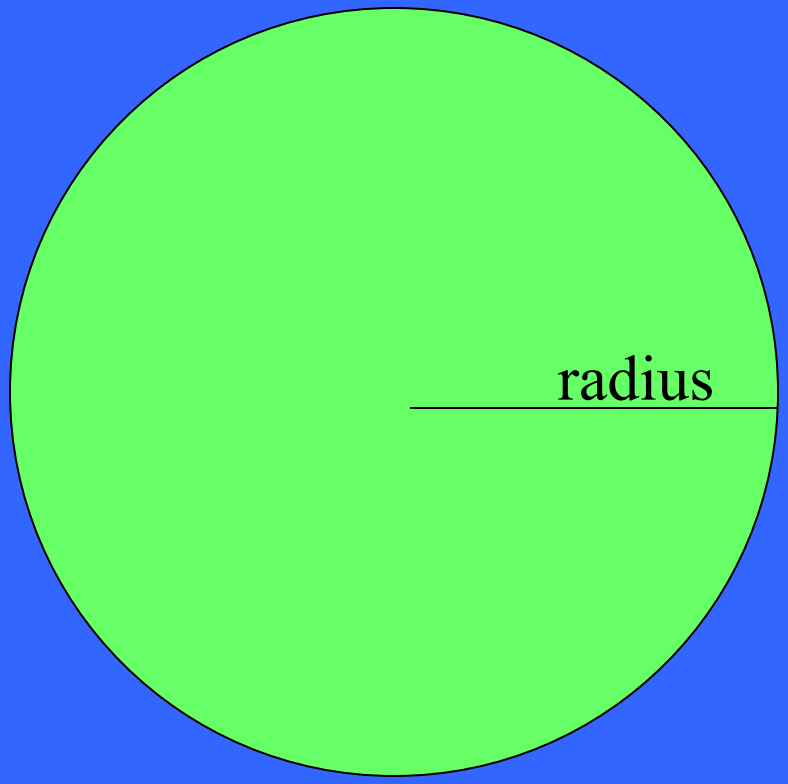
Area of a Circular Sectors & Segments

Area of a Circle

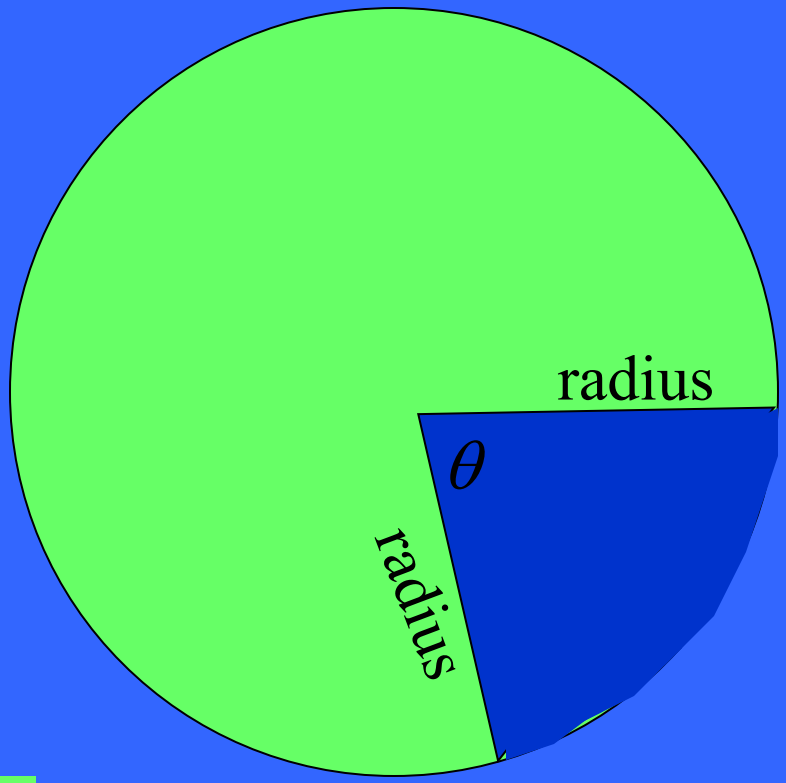
$$Area = \pi r^2$$



Area of a Sector

A sector is a pie-like shape of the circle, where theta is the measure of the central angle.

(a percentage of the circle)

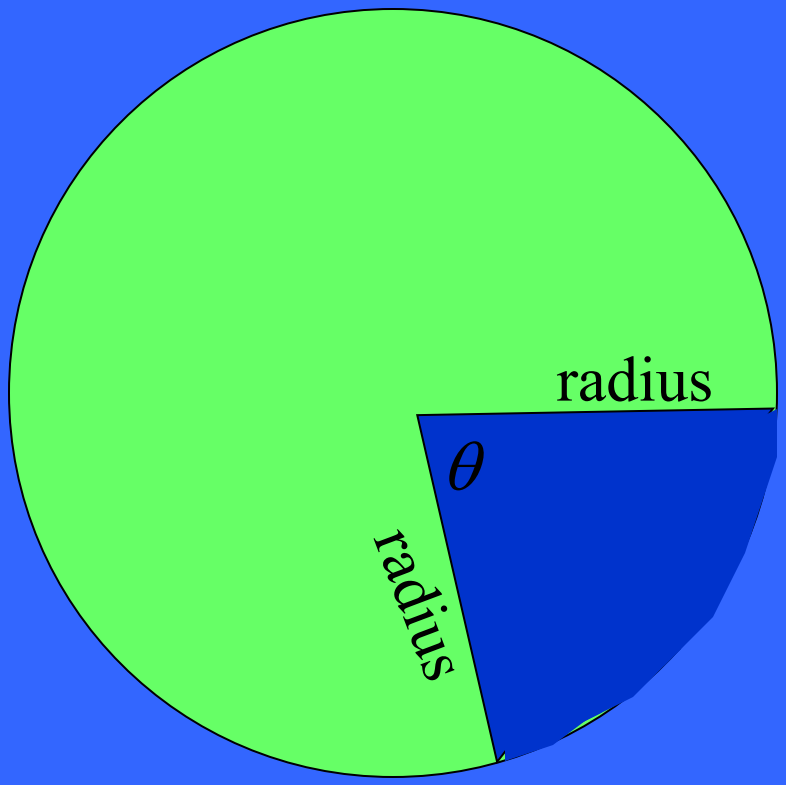


$$Area = \left(\frac{\theta}{360^\circ}\right)\pi r^2$$

Example 1

If θ is 60° and radius is 4 cm, what is the area of the sector?

$$Area = \left(\frac{\theta}{360^\circ}\right)\pi r^2$$



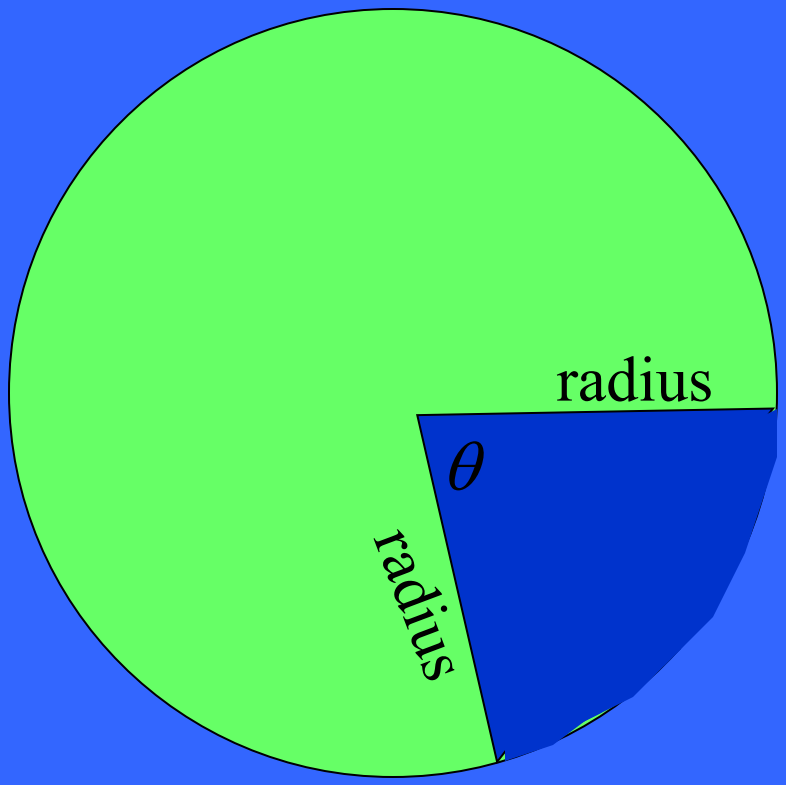
$$\text{Area} = \frac{(60)(\pi)(4)^2}{360}$$

Example 2

If θ is 100° and radius is 7 cm, what is the area of the sector?

$$Area = \left(\frac{\theta}{360^\circ}\right)\pi r^2$$

Area = $\frac{(100)(\pi)}{360}(7)^2$

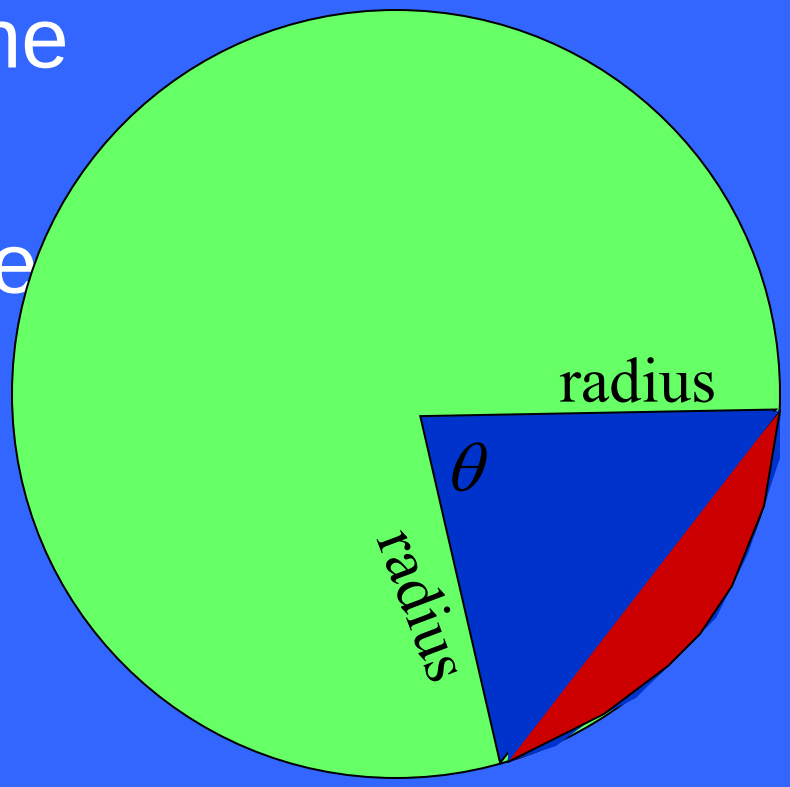


Area of a Segment

A segment is the portion of the circle with the radii connected at their endpoints and the central arc.

(The crust of the pie slice

The red piece is the segment.



Area of a Segment

The segment is the sector minus the triangle.

Area of a sector is $Area = \left(\frac{\theta}{360^\circ}\right)\pi r^2$.

The area of the triangle is $\frac{1}{2}ab\sin\theta$

As here a=b =r

Hence the area of a segment is :

$$\text{Area} = (\theta/360)\pi r^2 - \frac{1}{2}r^2\theta$$

Example 3

Find the area of a segment of a circle whose radius is 10 cm, and central angle is 90°.

Step 1: Find the area of the sector.

$$Area = \left(\frac{\theta}{360^\circ}\right)\pi r^2$$

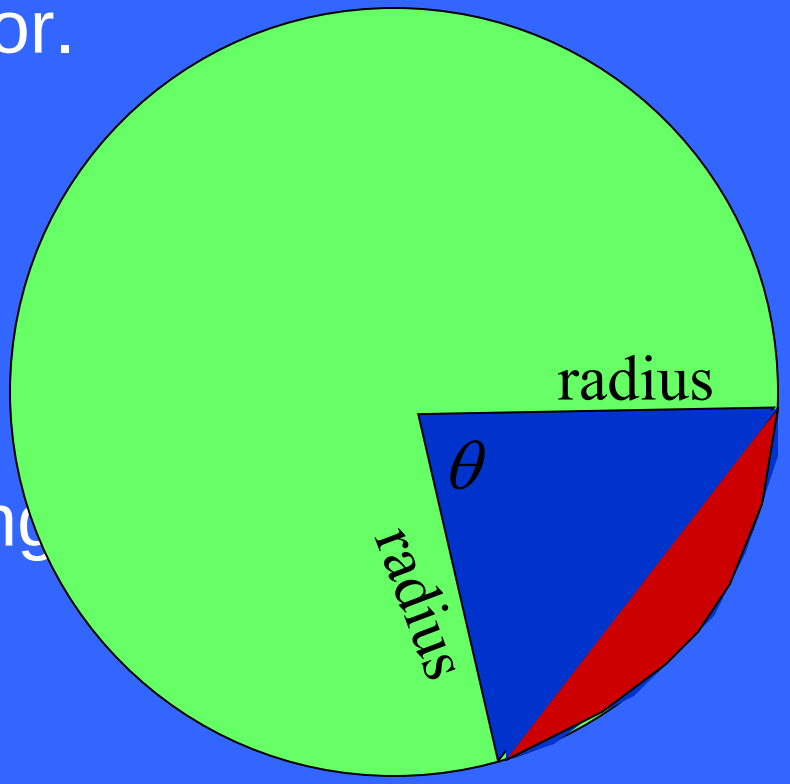
Area= (90/360)(3.14)(10^2)

=

Step 2: Find the area of the triang

Area = $\frac{1}{2}ab\ \sin\ \theta$

= ½ (10)(10)(1)



- Step 3: Subtract Sector – Triangle

Example 4

Find the area of a segment of a circle whose radius is 16 cm, and central angle is 90°.

Step 1: Find the area of the sector.

$$Area = \left(\frac{\theta}{360^\circ}\right)\pi r^2$$

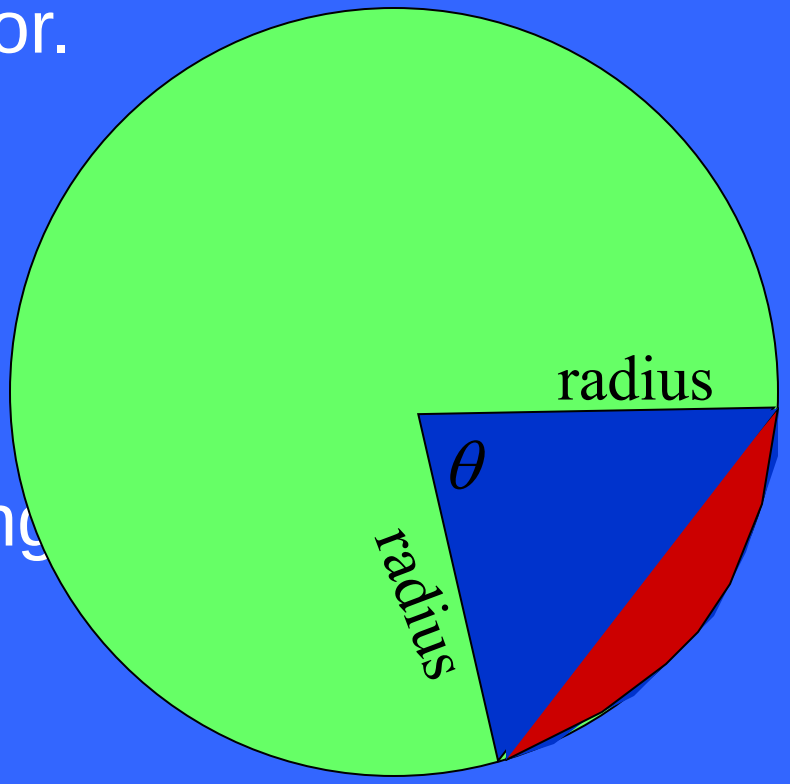
Area= (90/360)(3.14)(16^2)

=

Step 2: Find the area of the triang

Area = $\frac{1}{2}ab\sin\theta$

= ½ (16)(16)



Step 3: Subtract Sector – Triangle