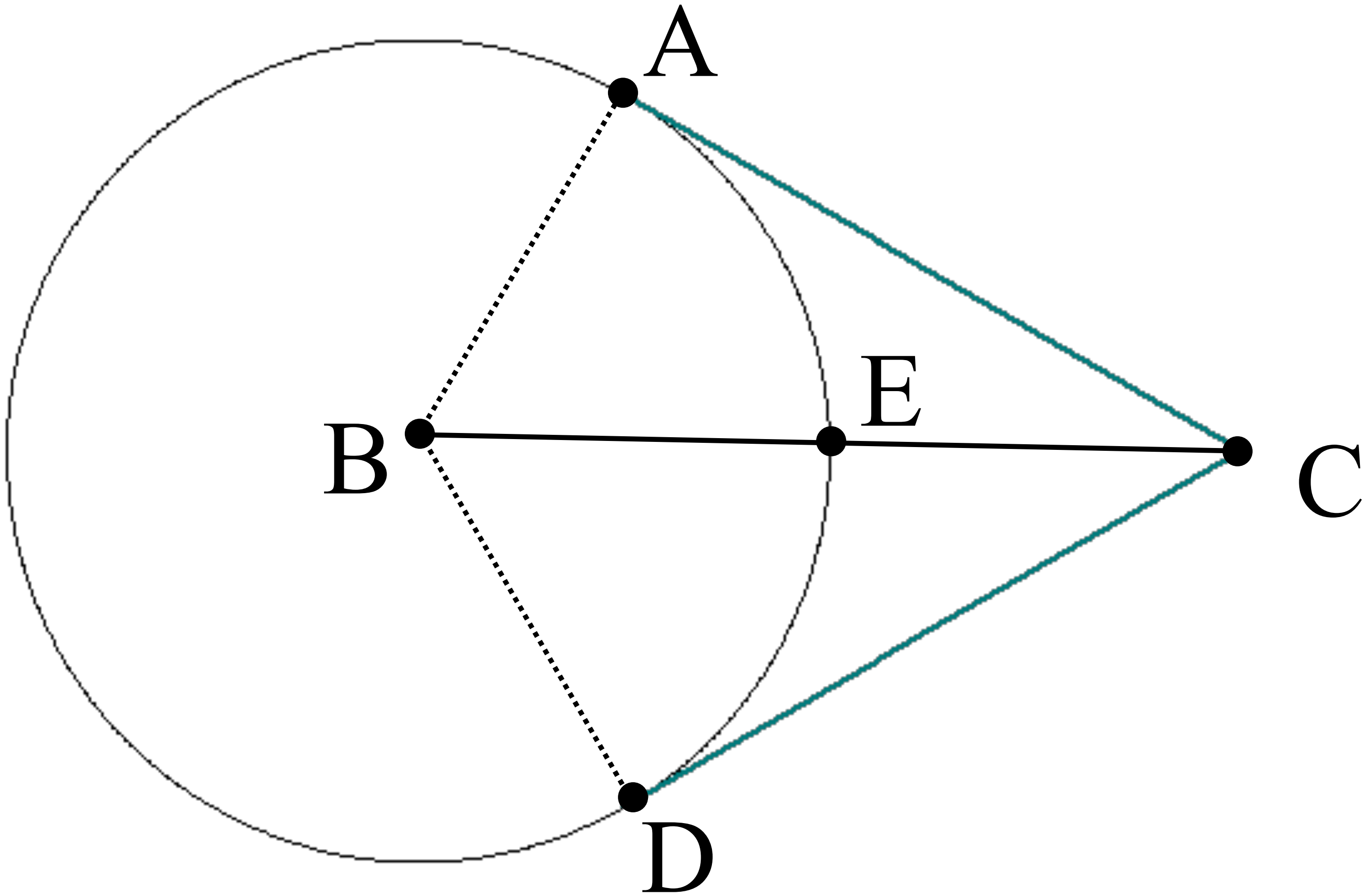


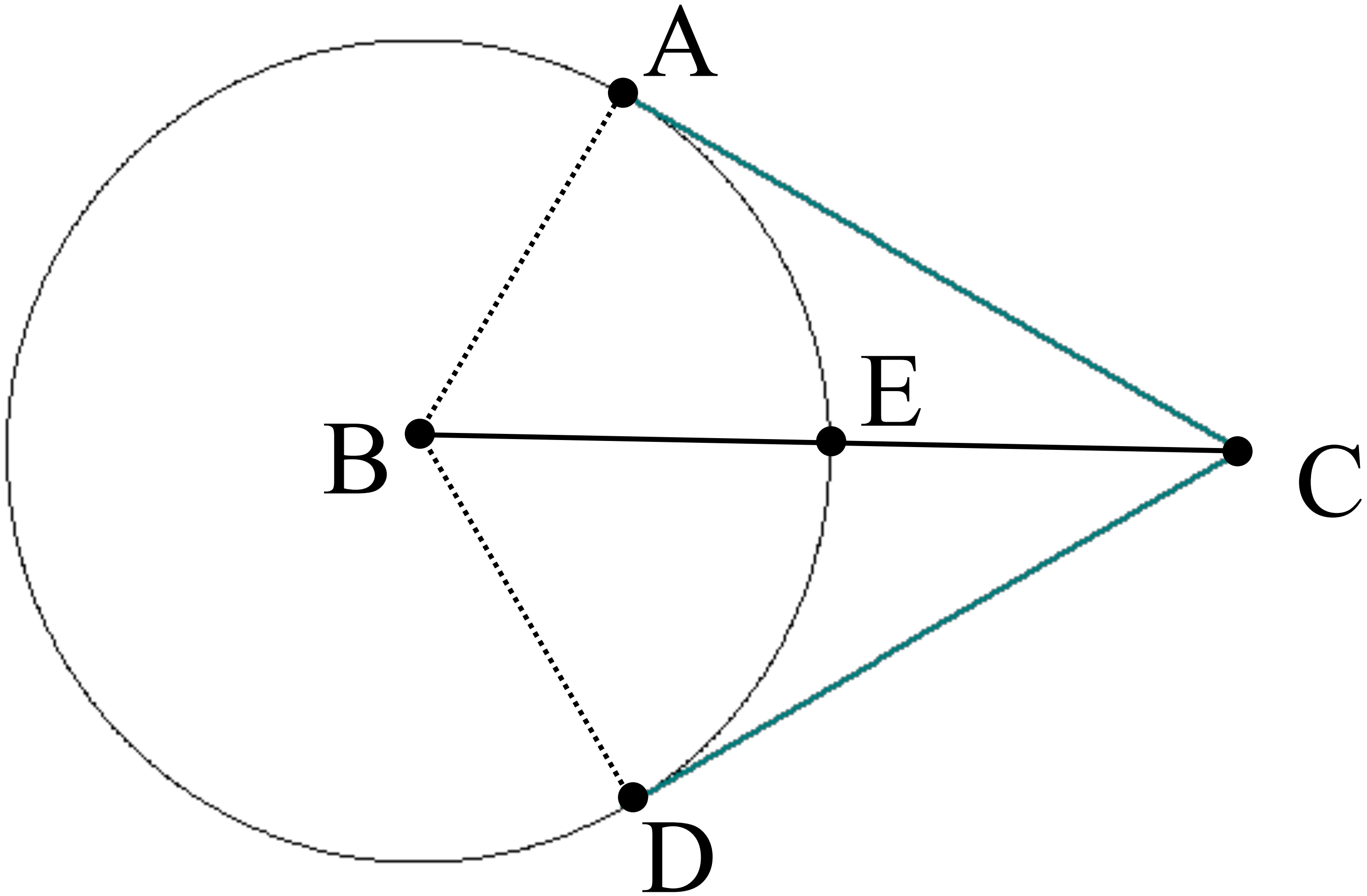
$\odot B$ has a radius of 5 cm

$m\angle ACD = 50°$

$\overline{AC}$ and $\overline{DC}$

are tangent to $\odot B$

Find $m\angle ABD$ (Note that figure is not drawn to scale)



$\odot B$ has a radius of 5 cm

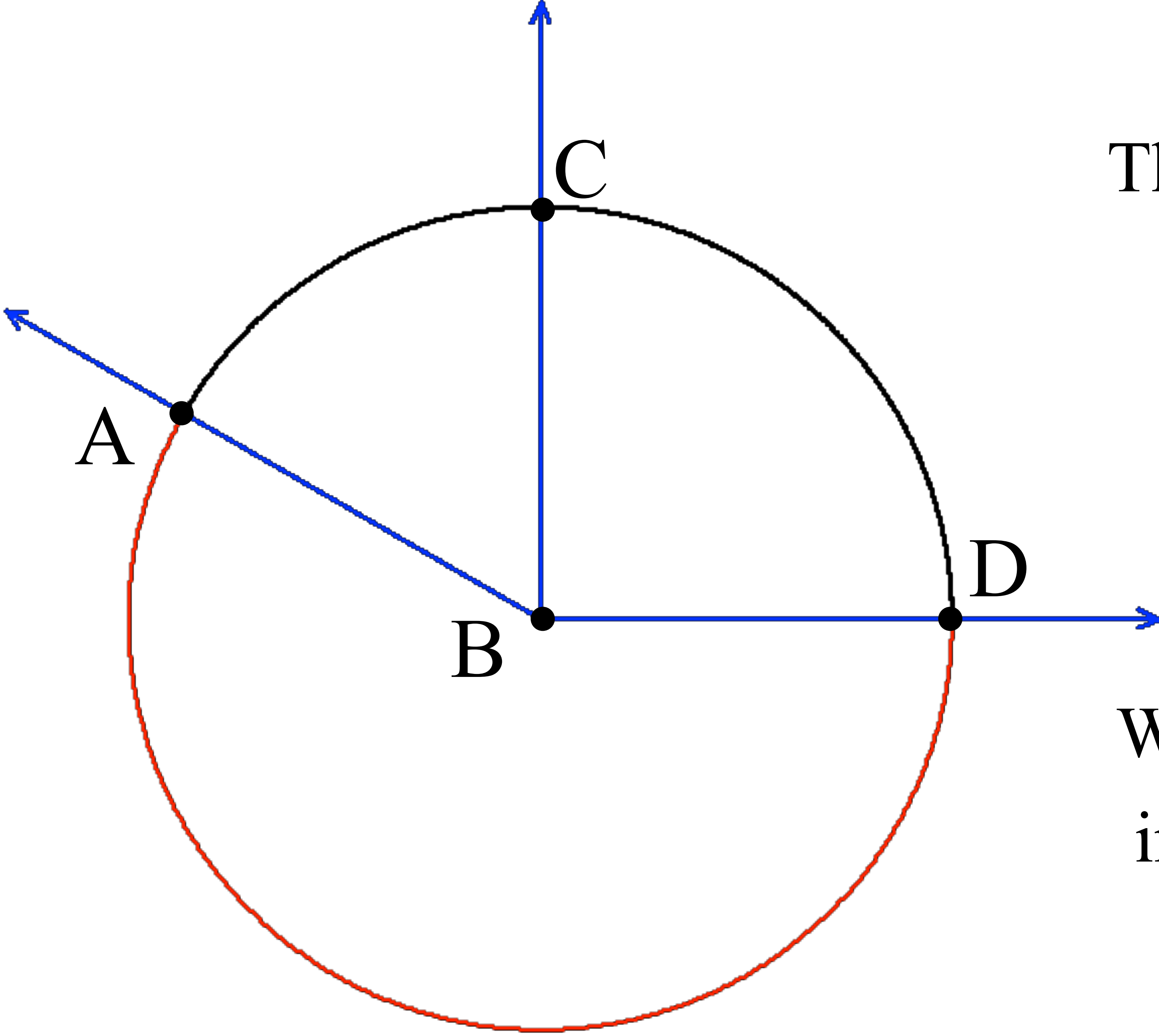
EC = 8 cm

$\overline{AC}$ and $\overline{DC}$

are tangent to $\odot B$

Find AC and DC (Note that figure is not drawn to scale)

Arcs & Chords

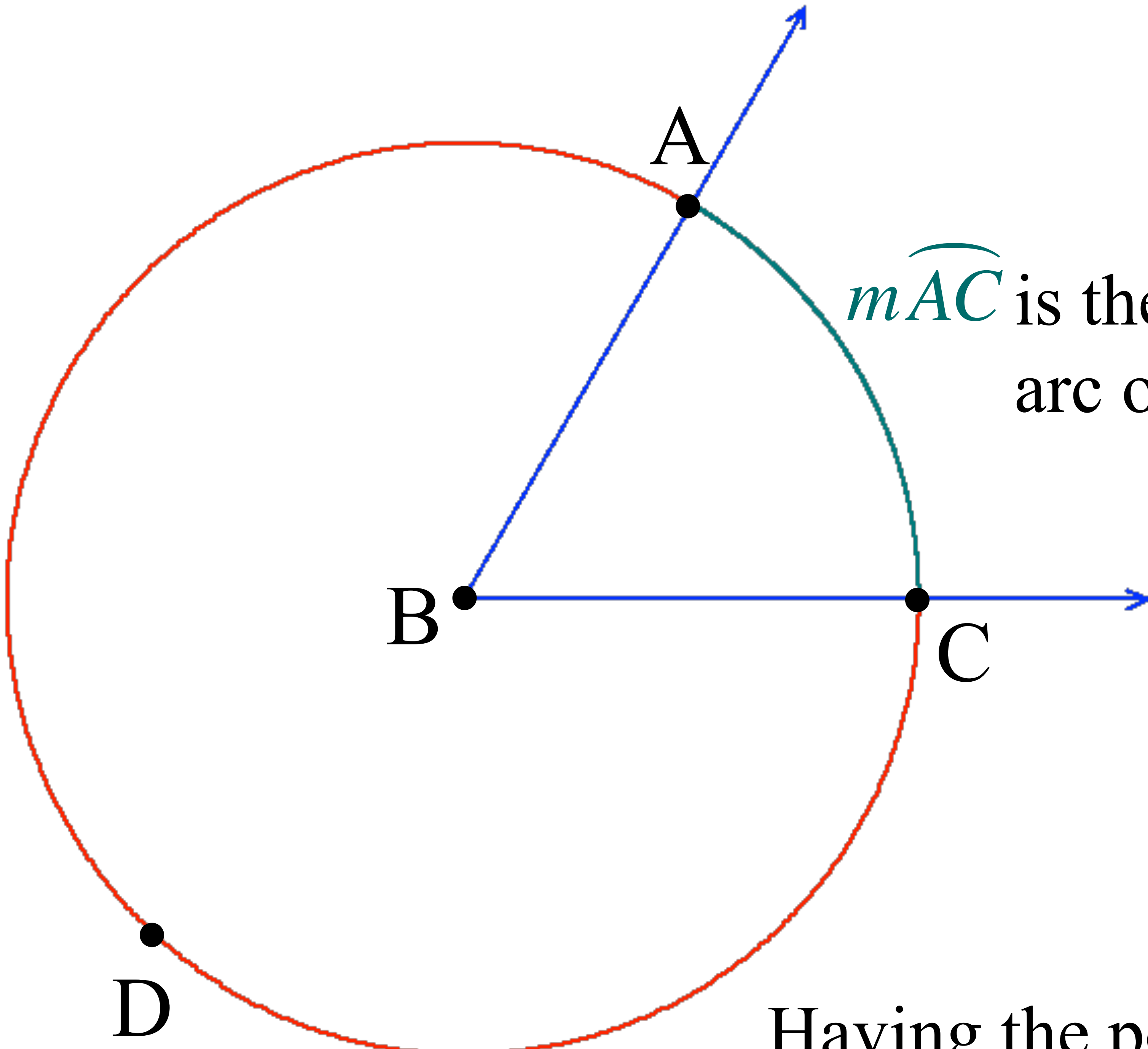


The Arc Addition Postulate

$$m\overset{\frown}{AC} + m\overset{\frown}{CD} = m\overset{\frown}{ACD}$$

Why didn't I just call it $m\overset{\frown}{AD}$ instead of $m\overset{\frown}{ACD}$?

Because $m\overset{\frown}{AD}$ is the arc here in red

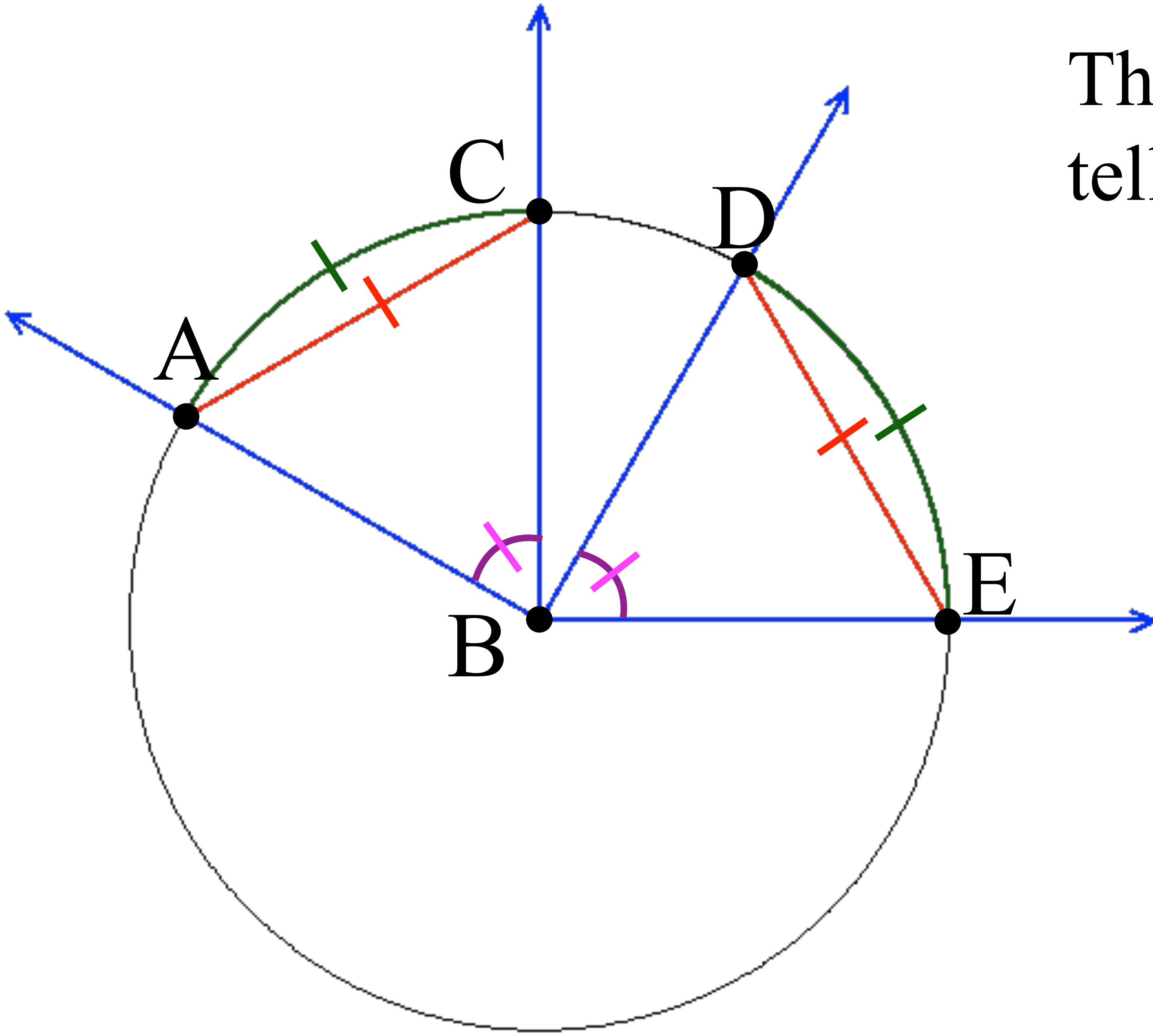


$m\widehat{AC}$ is the measure of the minor arc of central angle $m\angle ABC$

$$m\widehat{AC} = m\angle ABC$$

Having the point D helps us note the difference between the minor arc $m\widehat{AC}$ and the major arc $m\widehat{ADC}$

It is considered the major arc because it lies outside of the central angle $m\angle ABC$ while the minor arc lies inside the central angle



Theorem 12-2-2 (pg 803) simply tells us

Congruent Central Angles

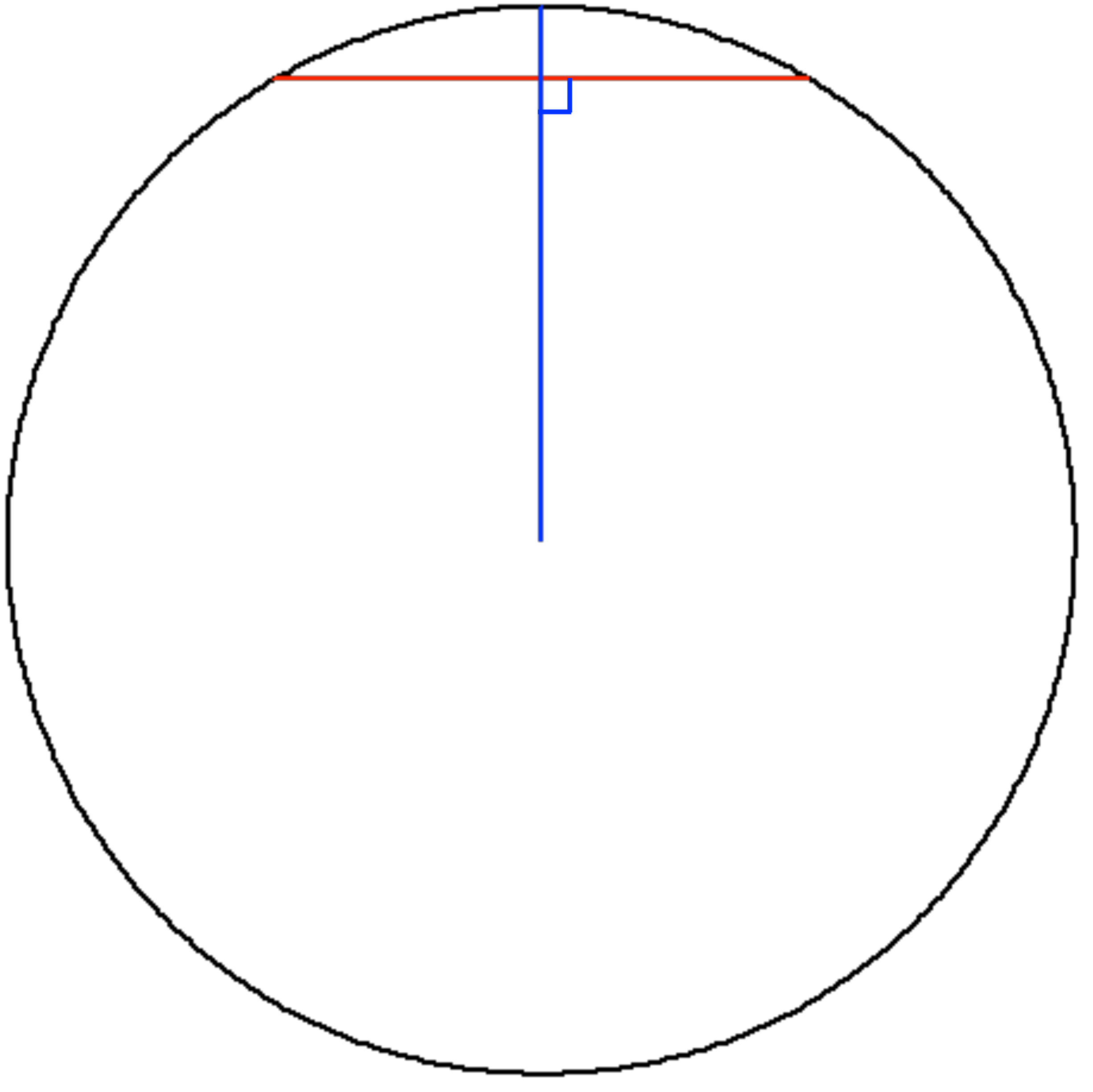
$\angle ABC \approx \angle DBE$

mean Congruent Chords

$\overline{AC} \approx \overline{DE}$

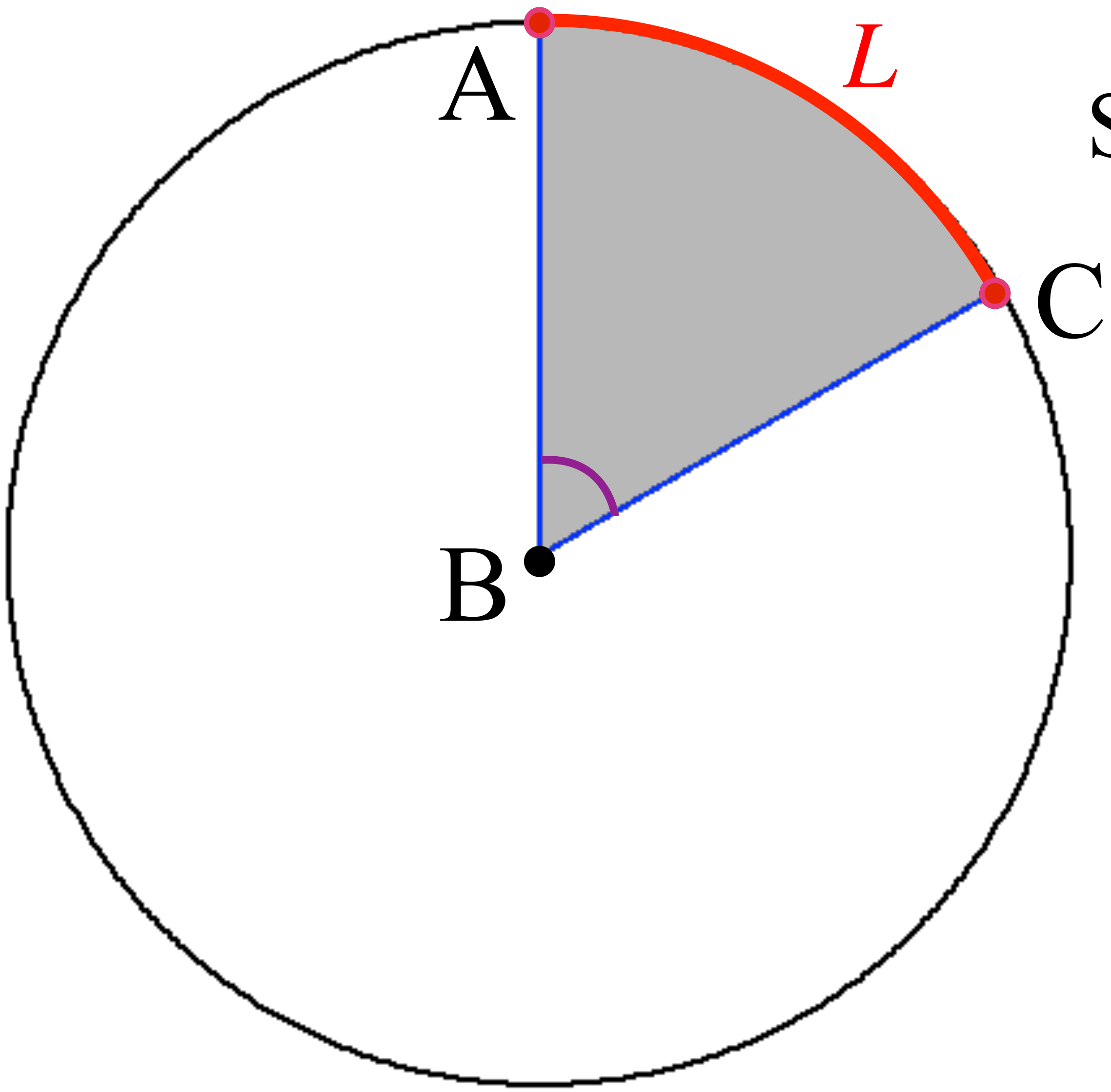
mean Congruent Arcs

$\overparen{AC} \approx \overparen{DE}$



A radius or diameter of a circle is perpendicular to the chord iff it bisects the chord

How would we find the area of this sector?



Since the area of the full circle is

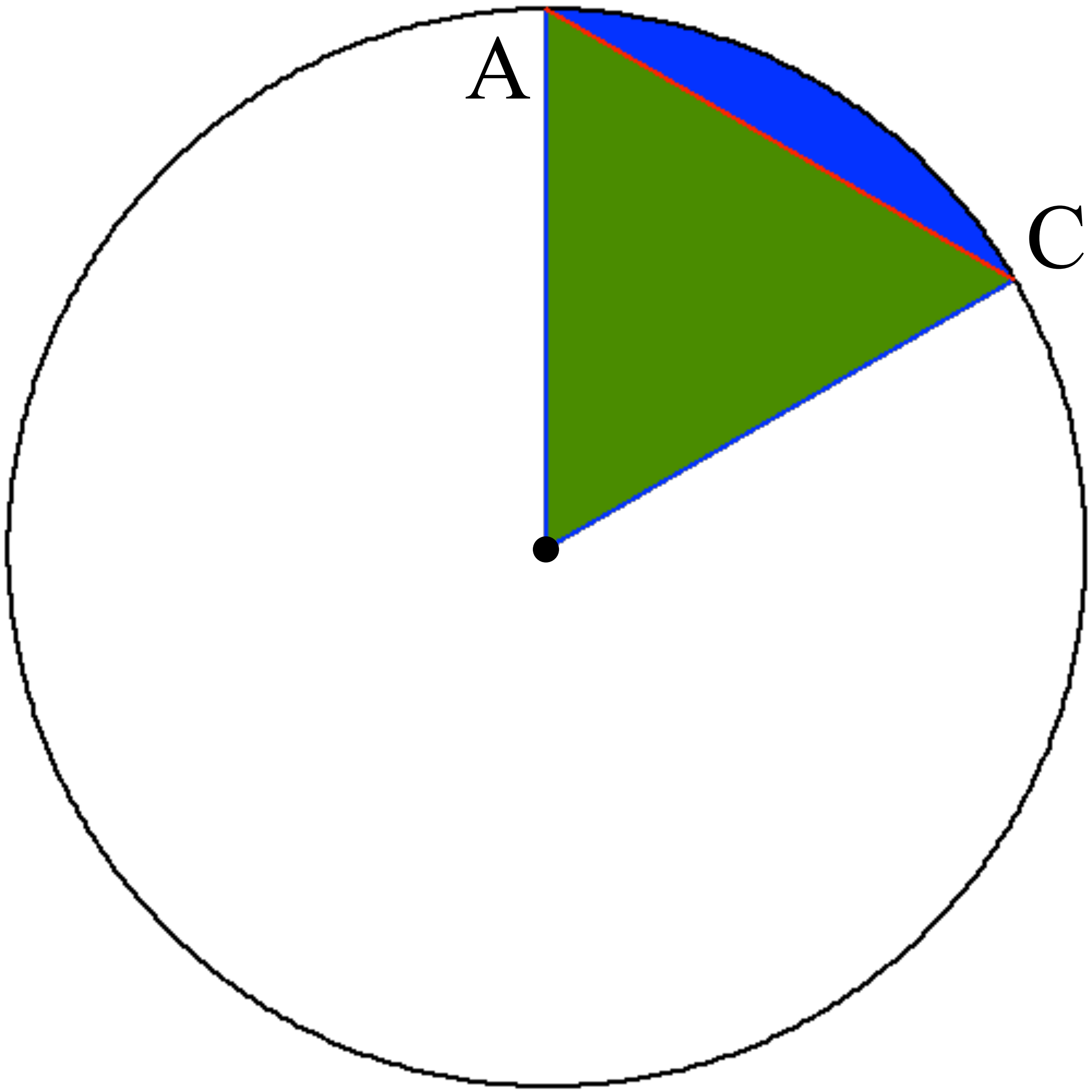
$$A = \pi r^2$$

We just need the measure of the central angle $m\angle ABC$

$$A_{sector} = \pi r^2 \frac{m\angle ABC}{360^\circ}$$

In the same way we can find the distance along the arc $\overset{\frown}{AC}$ by multiplying the same fraction by circumference

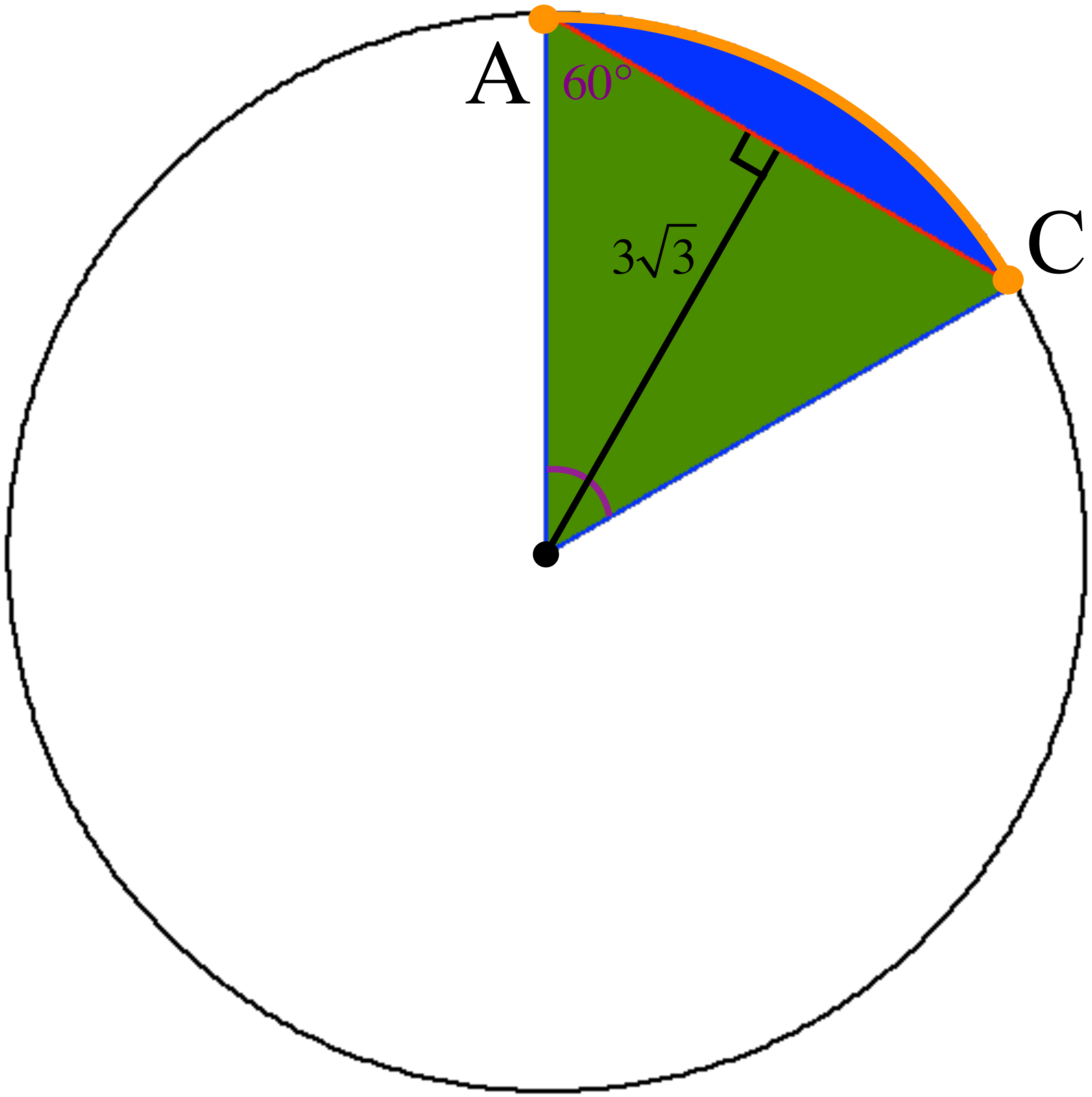
$$L = 2\pi r \frac{m\angle ABC}{360^\circ}$$



We can also now find the area of both the triangle and the segment between it and the arc

$$A_{segment} = A_{sector} - A_{triangle}$$

Note that the triangle will always be at least isosceles so as long as we have the central angle we can find everything else



We can also now find the area of both the triangle and the segment between it and the arc

$$A_{segment} = A_{sector} - A_{triangle}$$

$$m\angle ABC = 60^\circ$$

The radius of the circle is 6 cm

Find the area of the segment ACB and arc length $\overset{\frown}{AC}$

$$A_{sector} = \pi 6^2 \frac{60^\circ}{360^\circ} = 6\pi \longrightarrow A_{segment} = 6\pi - 9\sqrt{3}\ cm^2$$

$$A_{triangle} = \frac{1}{2}bh = \frac{1}{2}6\left(3\sqrt{3}\right) = 9\sqrt{3}$$

Since the central angle is 60º the triangle is equilateral

Arc Length

$$L = 2\pi 6 \frac{60^\circ}{360^\circ} = 2\pi\ cm$$