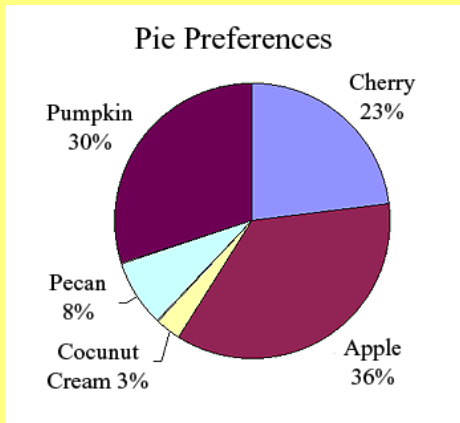


10.2 ANGLES & ARCS

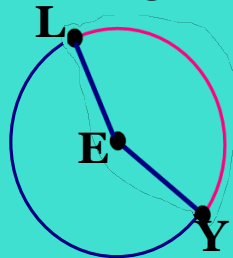


A **central angle** is an angle whose vertex is at the center of a circle.

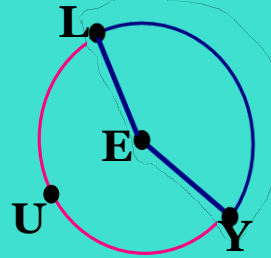
Sum of Central Angles

The sum of the measures of the central angles of a circle with no interior points in common is 360.

A central angle separates a circle into two arcs.



\widehat{LY} is the **minor arc** of $\odot E$.



\widehat{LUY} is the **major arc** of $\odot E$.

Minor arcs are written using the two endpoints.

Major arcs are written using the two endpoints & one point in between.

Definition of Arc Measure

The measure of an arc is the measure of its central angle.

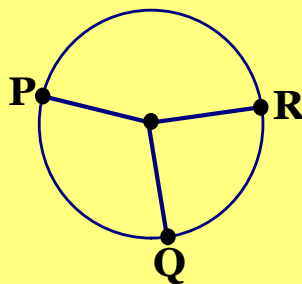
The measure of a semicircle is 180.

adjacent arcs- arcs of a circle that have exactly one point in common

Postulate 26: Arc Addition Postulate

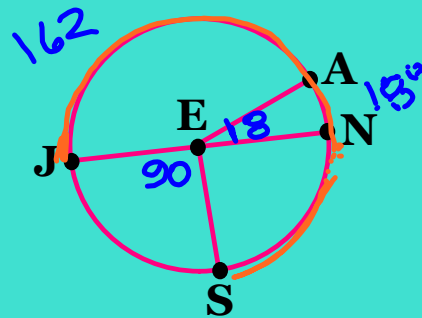
The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.

So if Q is a point on \widehat{PR} , then $m\widehat{PQ} + m\widehat{QR} = m\widehat{PQR}$.



Example 1

In $\odot E$, $m\angle AEN = 18$, \overline{JN} is a diameter, and $m\angle JES = 90$. Find each measure.



a) $m\widehat{AN} = 18^\circ$

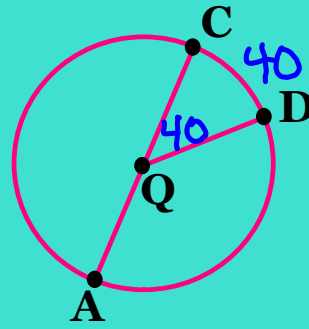
b) $m\widehat{JA} = 162^\circ$

c) $m\widehat{JAS} = 270^\circ$

Example 2

In $\odot Q$, $m\angle CQD = 40$ and \overline{AC} is a diameter.

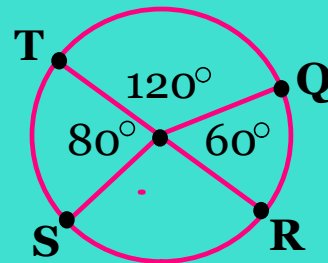
Find each measure.



- $m\widehat{CD} = 40^\circ$
- $m\widehat{CAD} = 320^\circ$
- $m\widehat{AD} = 140^\circ$
- $m\widehat{DCA} = 220^\circ$

Example 3

Identify the given arc as a major arc, minor arc, or semicircle, and find the measure of the arc.



- $m\widehat{TQ} = 120^\circ$
minor
- $m\widehat{QRT} = 240^\circ$
major
- $m\widehat{TQR} = 180^\circ$
semicircle
- $m\widehat{QS} = 160^\circ$
minor
- $m\widehat{TS} = 80^\circ$
minor

Other info about circles...

Concentric circles lie in the same plane and have the same center, but have different radii.



All circles are **similar**.

Circles that have the same radius are **congruent circles**. These are also **similar**.



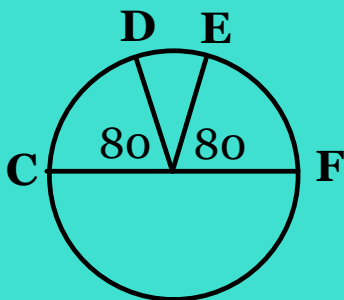
If two arcs of one circle have the same measure, then they are **congruent arcs**.



concentric circles in nature

Example 4

Tell whether the following arcs are congruent.
Explain why or why not.



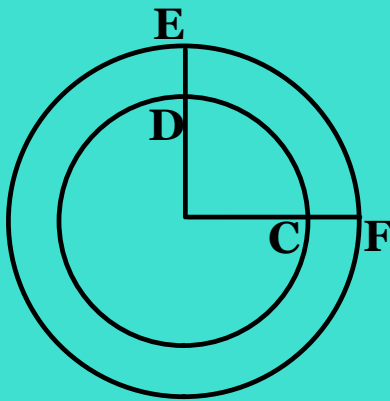
congruent

$m\widehat{CD}$ & $m\widehat{EF}$

same measure

Example 5

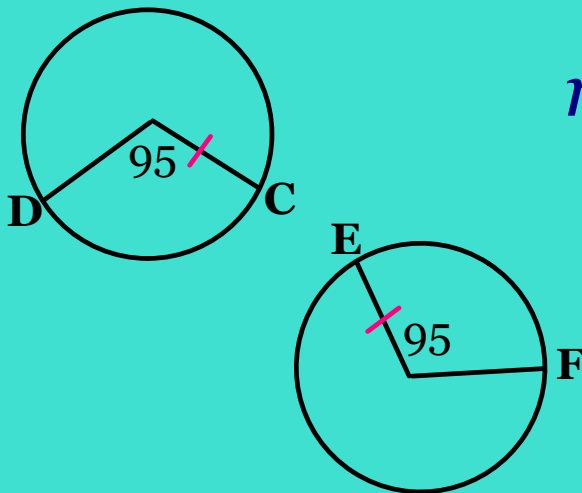
Tell whether the following arcs are congruent.
Explain why or why not.



no
 $m\widehat{CD}$ & $m\widehat{EF}$
 diff. radii

Example 6

Tell whether the following arcs are congruent.
Explain why or why not.



congruent
 $m\widehat{CD}$ & $m\widehat{EF}$
 same measure
 \cong radii

Circumference of a Circle

If a circle has a circumference of C units and a radius of r units, then $C = 2\pi r$.



Example 7

Find the exact circumference of $\odot P$ shown below.

$C = 2\pi r$ or $C = \pi d$
 $C = 34\pi$ units
 $16^2 + 30^2 = c^2$
 $256 + 900 = c^2$
 $1156 = c^2$
 $34 = c$

Example 8

Find the exact circumference of $\odot P$ shown below.

$$C = \pi d$$

$$C = 5\pi \text{ units}$$

