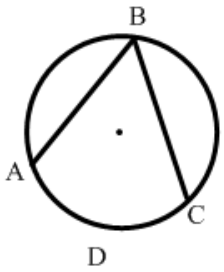
Circle Geometry

1. **Chord** – A line segment joining 2 points on a curve such as a circle.

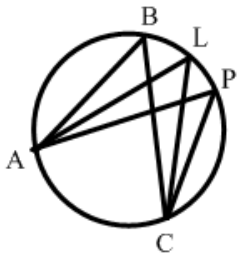
2. **Inscribed Angle** – An angle whose vertex lies on the circle and whose arms intersect the circle.

   We say that the inscribed angle is **subtended** by the arc of the circle which is cut off by the arms of the angle and which does not contain the vertex.

   Examples:



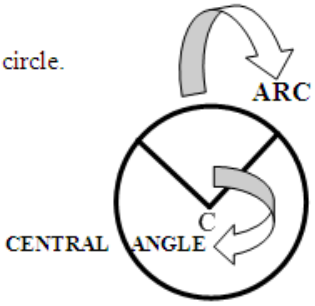
- < ABC is an inscribed angle
- Arc ADC subtends <ABC



- A given arc subtends many inscribed angles.
- <ABC, <ALC, and <APC are all subtended by the same arc AC.

Do you see any other angles subtended by the same arc???

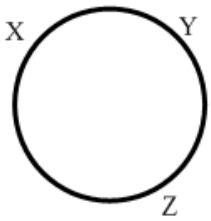
3. <u>Central Angle</u> – The angle formed by the radii at the centre of the circle.



<u>Note:</u>

- The symbol for an arc is $\overset{\frown}{\ }$.
- A **major arc** is an arc that is more than half of the circumference of a circle (semicircle).
- A **minor arc** is an arc that is less than a semicircle.
- We name arcs by their endpoints, and for a major arc or a semicircle we need to include a point in between.

Example:

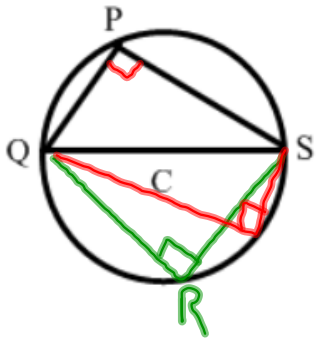


Here , $\overset{\frown}{XYZ}$ is a **<u>major arc</u>** and $\overset{\frown}{XY}$ is a **<u>minor arc</u>.**

Angles in a Circle

Angle Property I

The inscribed angle drawn on a diameter is a right angle.

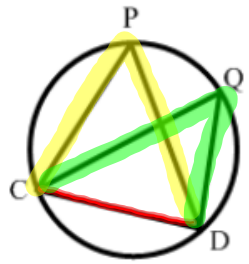


QS is a diameter.

$< P = 90°$

Angle Property II

Inscribed angles drawn on the same side of a chord have equal measures.

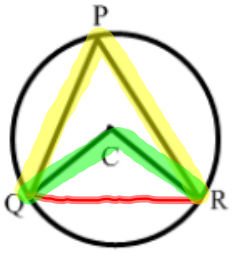


< P and < Q are inscribed on the same chord CD.

< P = < Q

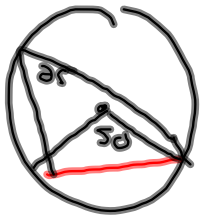
Angle Property III

The measure of a central angle in a circle is twice the inscribed angle drawn on the same chord.



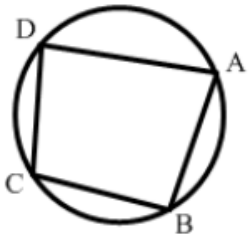
< P and < QCR are inscribed on the same chord QR.

< P = ½ < QCR **or** < QCR = 2 < P



Angle Property IV

The opposite angles of an **inscribed quadrilateral** are supplementary (add to 180°)



ABCD is an inscribed quadrilateral.

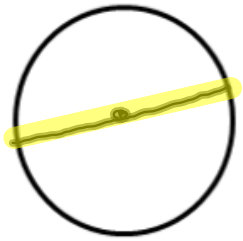
$\angle A$ and $\angle C$ are opposite, therefore $\angle A + \angle C = 180°$

$\angle B$ and $\angle D$ are opposite, therefore $\angle B + \angle D = 180°$

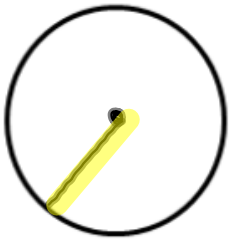
PARTS OF A CIRCLE / CIRCLE ANGLE PROPERTIES

Draw of highlight each of the following:

1. Diameter



2. Radius

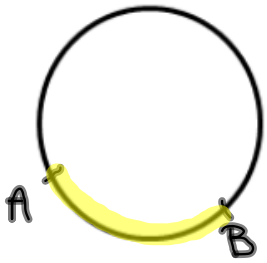


3. Circumference

$C = 2\pi r$

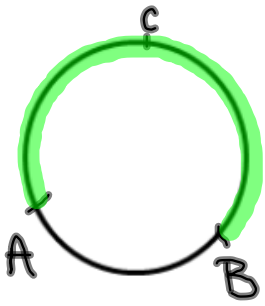
$C = \pi d$

4. Minor Arc



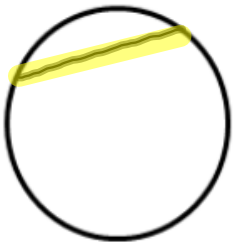
$\overset{\frown}{AB}$

5. Major Arc

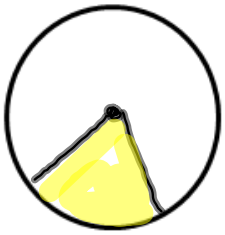


$\overset{\frown}{ACB}$

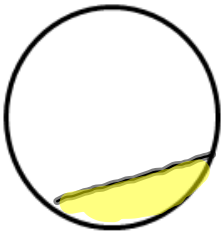
6. Chord



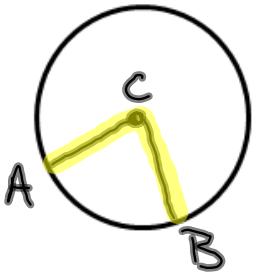
7. Sector



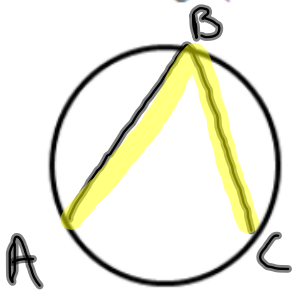
8. Segment



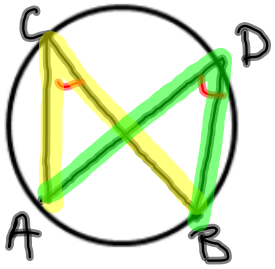
9. Central Angle (< ACB)



10. Inscribed Angle (< ABC)



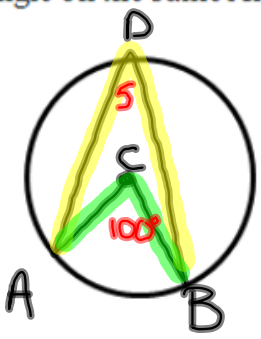
11. 2 Angles Inscribed on Arc AB



$\angle C = \angle D$

Angle Property 2

12. A Central Angle and an Inscribed Angle on the same Arc AB



$\angle C = \frac{1}{2}(\angle D)$

13. Cyclic Quadrilateral