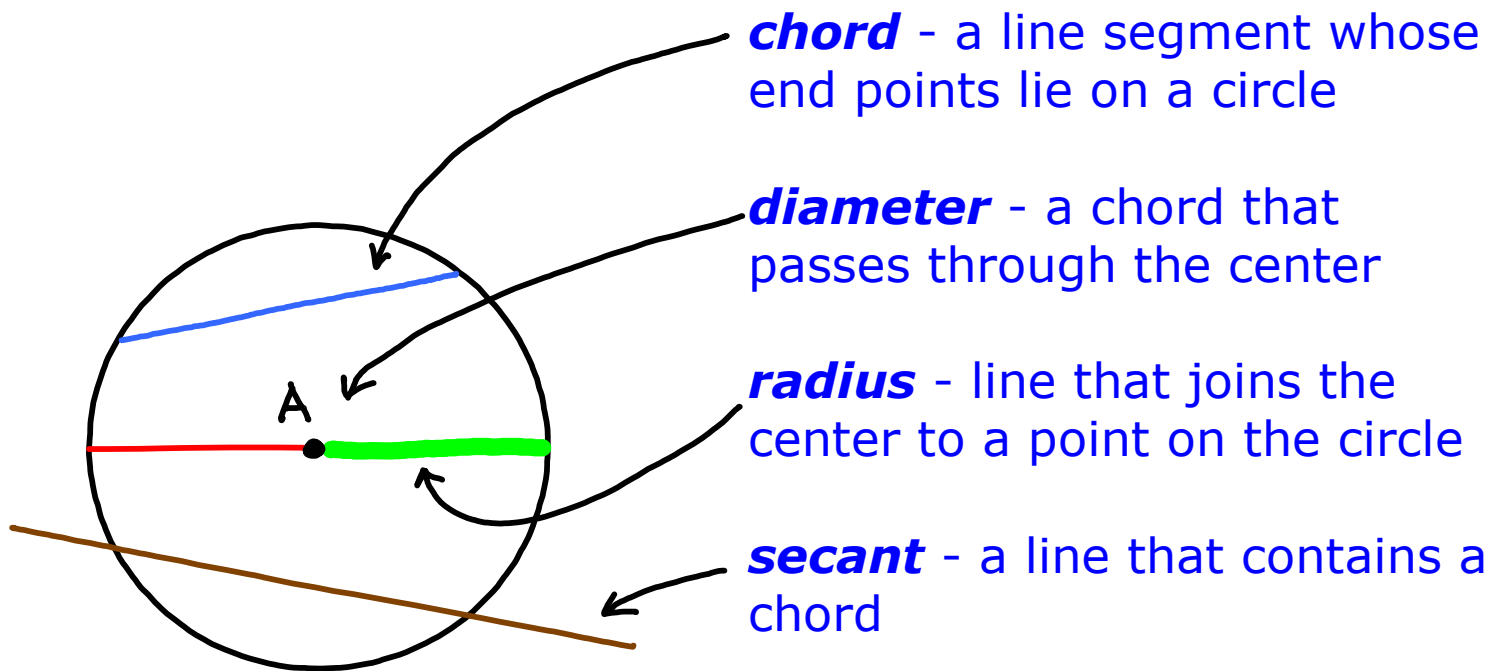


## Chapter Review



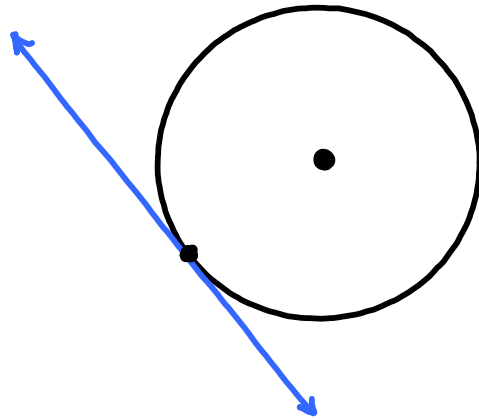
### Parts of Circles and Tangents

How we name a circle  $\odot A$  (A is center)





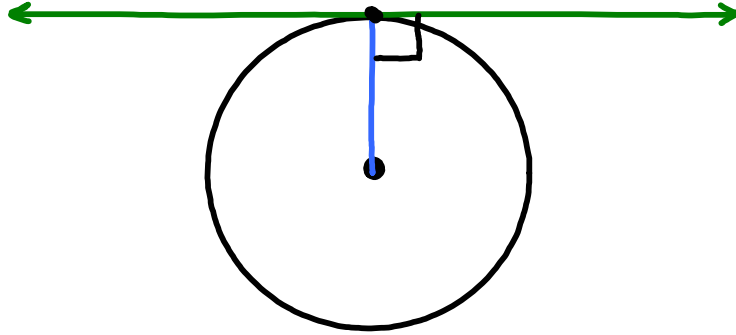
## The tangent of a circle



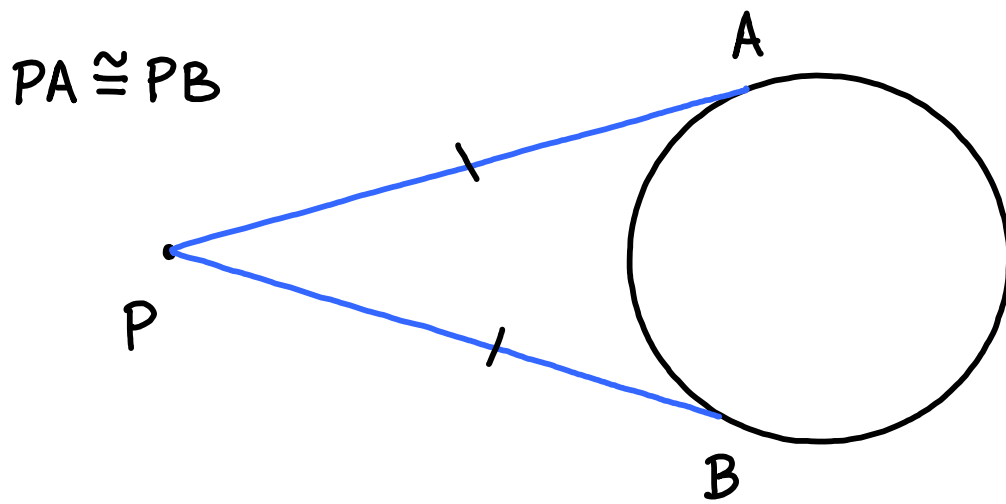
The **tangent** is a line in the plane of the circle that intersects the circle in exactly one point called the **point of tangency**.



## Important properties of tangents

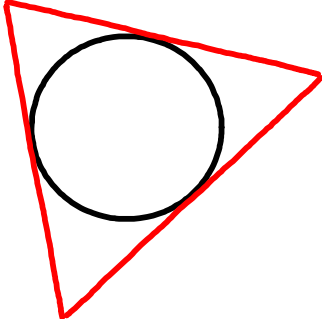


*if a line is tangent to a circle, then the line is perpendicular to the radius drawn to the point of tangency*

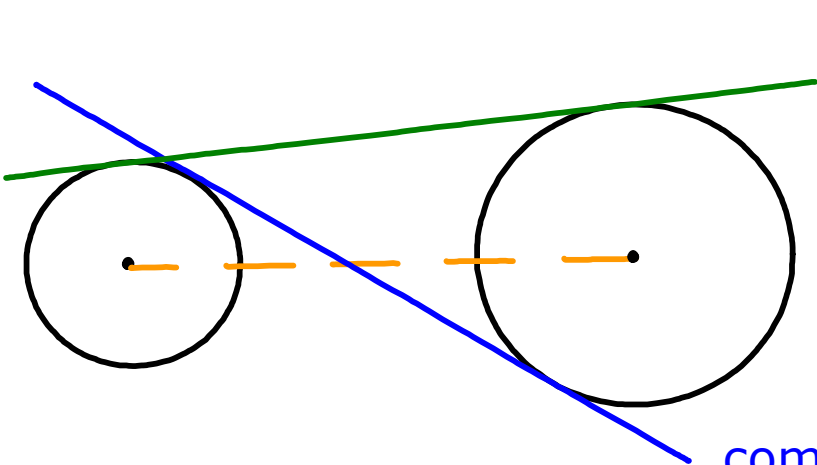


*tangents to a circle from the same point are congruent*

More terms about circles and tangents

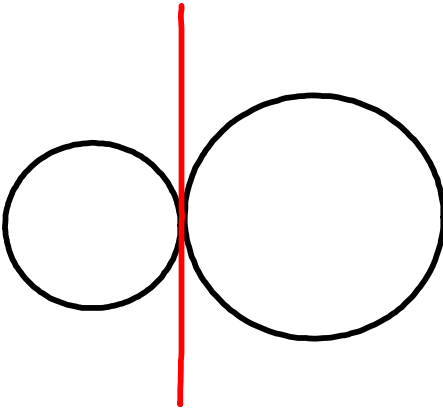


inscribed circle

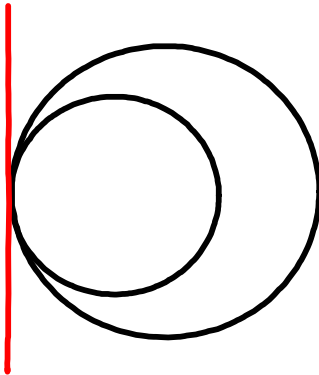


common external tangent

common internal tangent



*externally tangent*

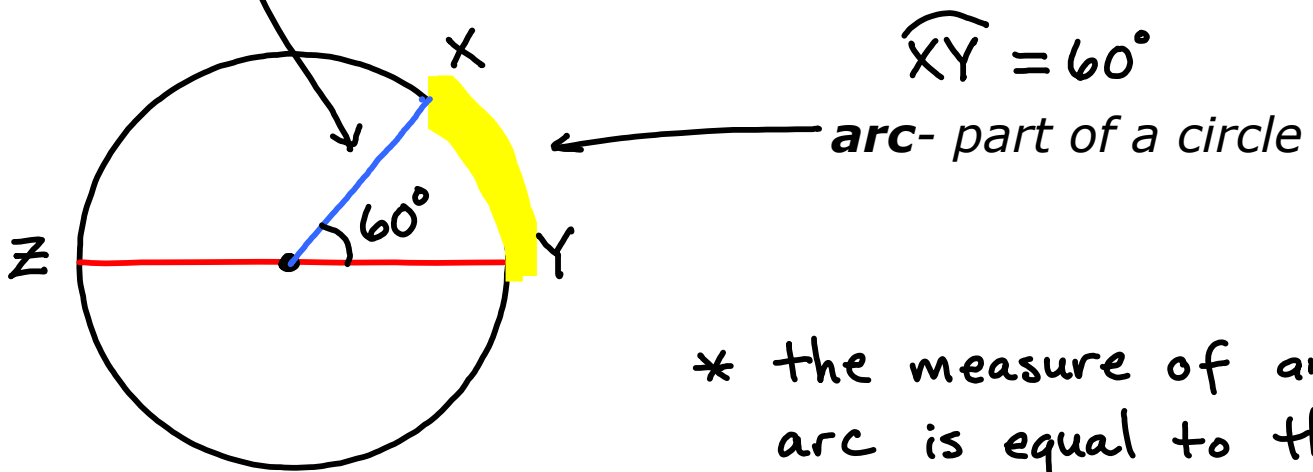


*internally tangent*



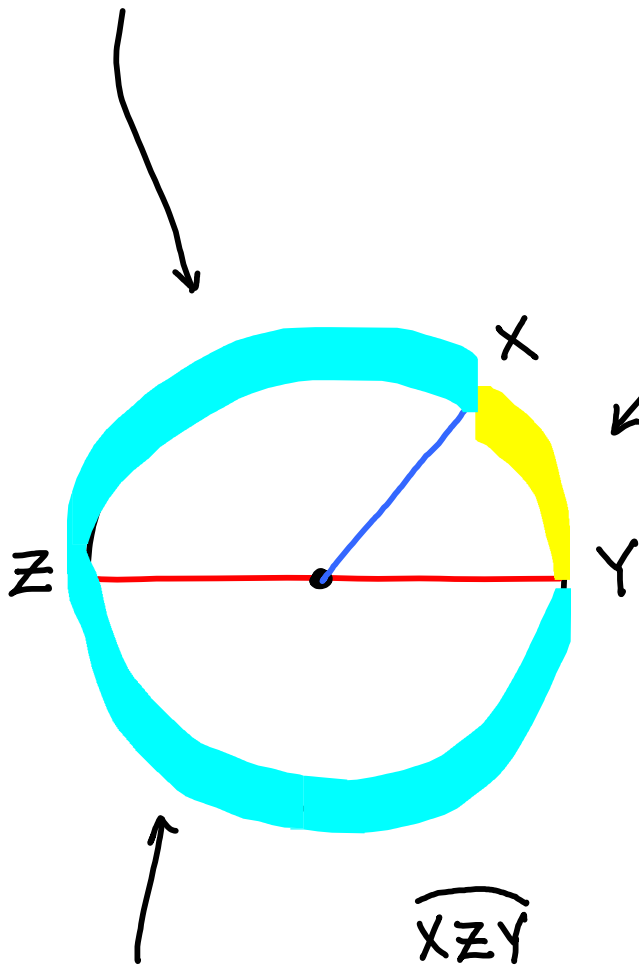
## Arcs and Chords

**central angle** - an angle with its vertex at the center



\* the measure of an arc is equal to the measure of the central angle

**semicircle** - an arc where the end points are on a diameter



**minor arc** - an arc that is less than a semicircle

$\widehat{XY}$

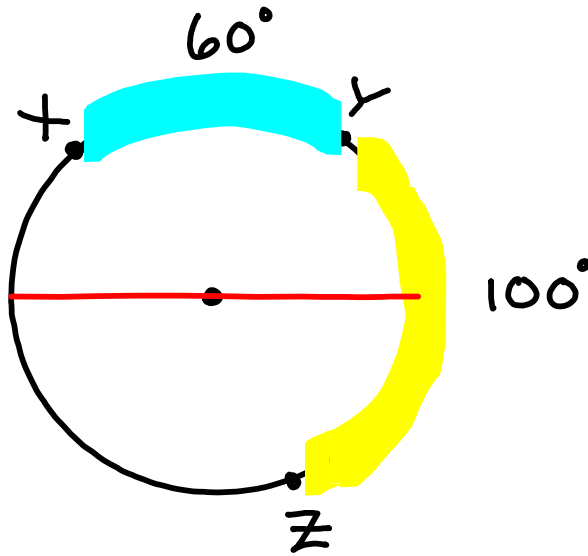
**major arc** - an arc that is greater than a semicircle

$\widehat{XZY}$



## Properties and theorems about arcs and chords

*The measure of the arc formed by two adjacent arcs is the sum of the measures of these two arcs*

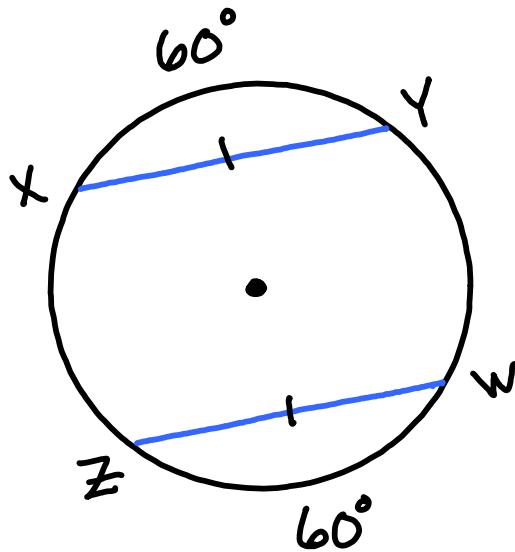


$$\begin{aligned}\widehat{XYZ} &= \widehat{XY} + \widehat{YZ} \\ &= 60^\circ + 100^\circ \\ \widehat{XYZ} &= 160^\circ\end{aligned}$$



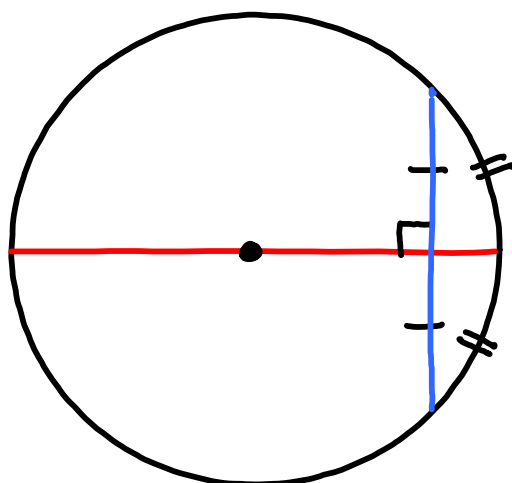
*In the same circle or congruent circles:*

- \* Congruent arcs have congruent chords*
- \* Congruent chords have congruent arcs*



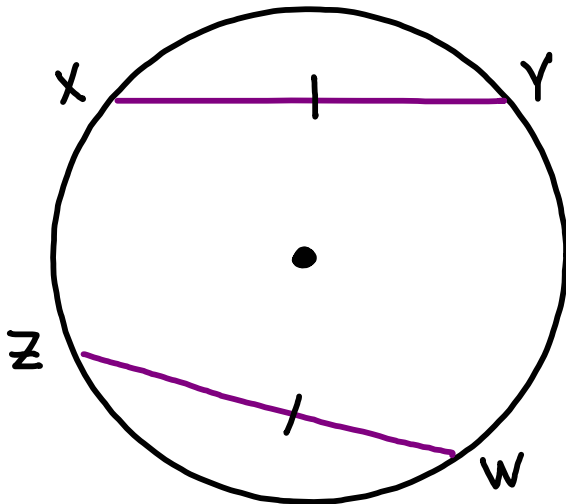
$$\overset{\frown}{XY} \cong \overset{\frown}{ZW}$$
$$\overline{XY} = \overline{ZW}$$

*A diameter that is perpendicular to a chord bisects the chord and its arc*



*In the same circle or in congruent circles:*

- \* Chords equally distant from the center are congruent*
- \* Congruent chords are equally distant from the center*



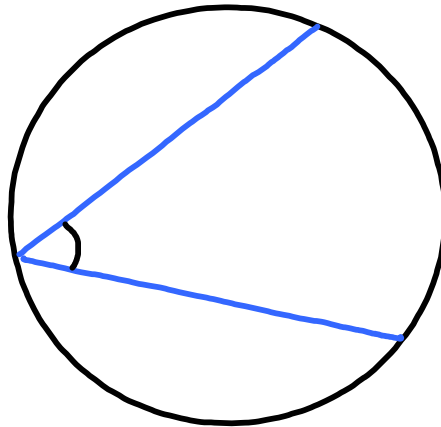
$$XY \cong ZW$$

*XY, ZW are the same distance from the center*



## Inscribed Angles

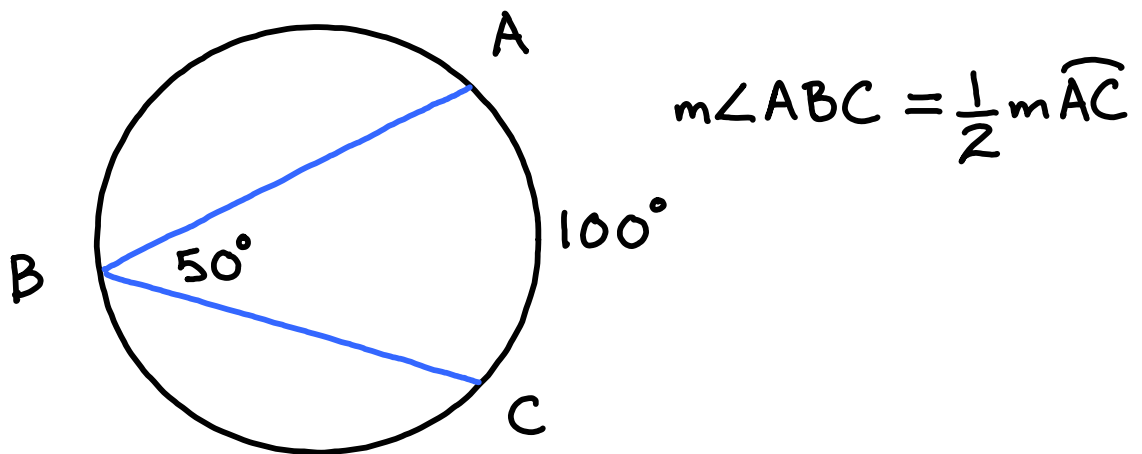
**inscribed angle** - is an angle whose vertex is on a circle and whose sides contain chords of the circle.



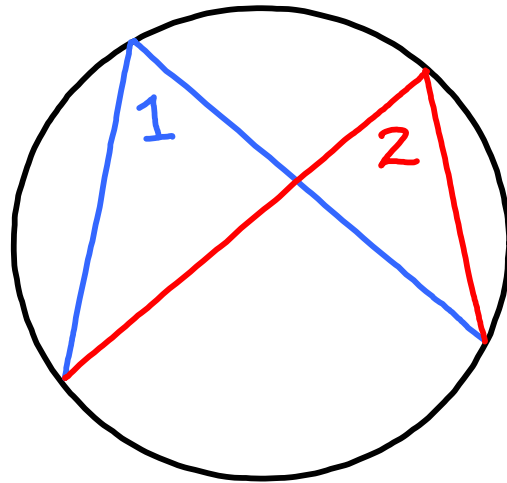


## some important theorems and properties of inscribed angles

*the measure of an inscribed angle is equal to half the measure of it's intercepted arc*

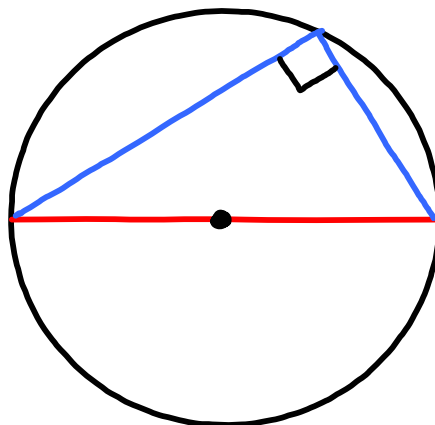


*if two inscribed angles intercept the same arc, then the angles are congruent*

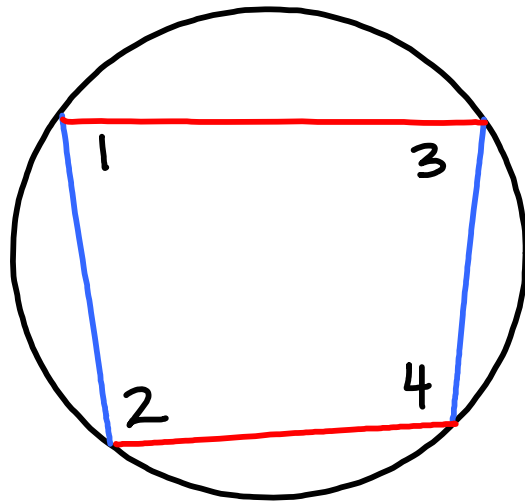


$$\angle 1 \cong \angle 2$$

*an angle inscribed in a semicircle is a right angle*



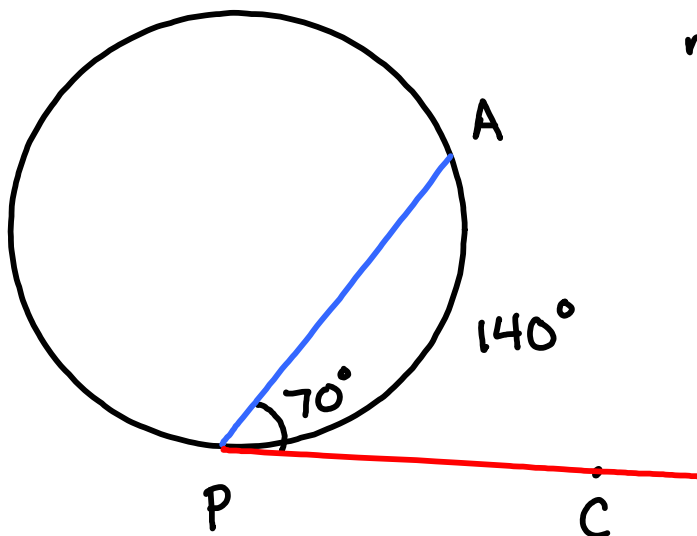
*if a quadrilateral is inscribed in a circle, then its opposite angles are supplementary*



$$\angle 2 + \angle 3 = 180^\circ$$

$$\angle 1 + \angle 4 = 180^\circ$$

*the measure of an angle formed by a chord and a tangent is equal to half the measure of the intercepted arc*



$$m\angle APC = \frac{1}{2} m\widehat{AP}$$



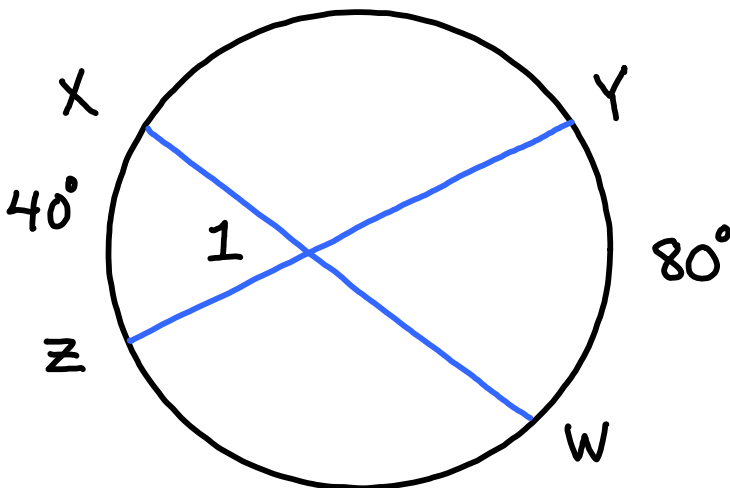
## Other Angle Relationships in Circles



important theorems and properties of other angles in circles

*The measure of an angle formed by two chords that intersect inside a circle is equal to half the sum of the measures of the intercepted arcs.*

$$m\angle 1 = \frac{1}{2}(m\widehat{XZ} + m\widehat{YW})$$



$$\angle 1 = \frac{1}{2}(40^\circ + 80^\circ)$$

$$\angle 1 = 60^\circ$$

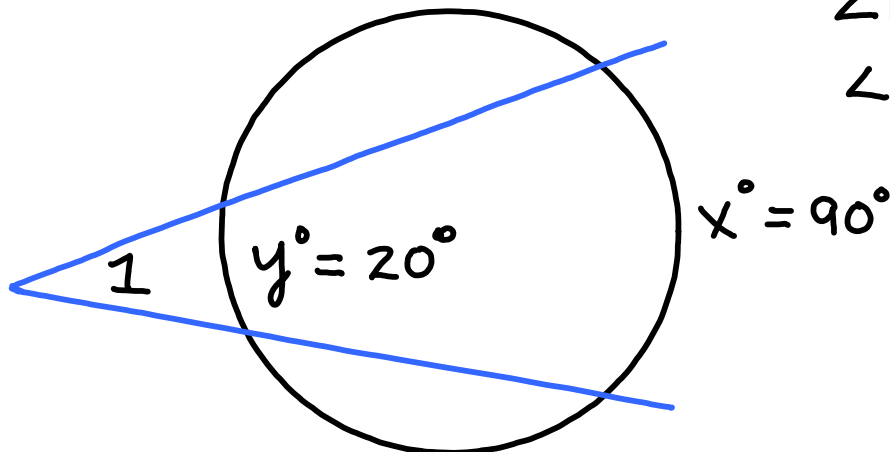


The measure of an angle formed by two secants, two tangents, or a secant and a tangent drawn from a point outside a circle is equal to half the difference of the measures of the intercepted arcs

**two secants**

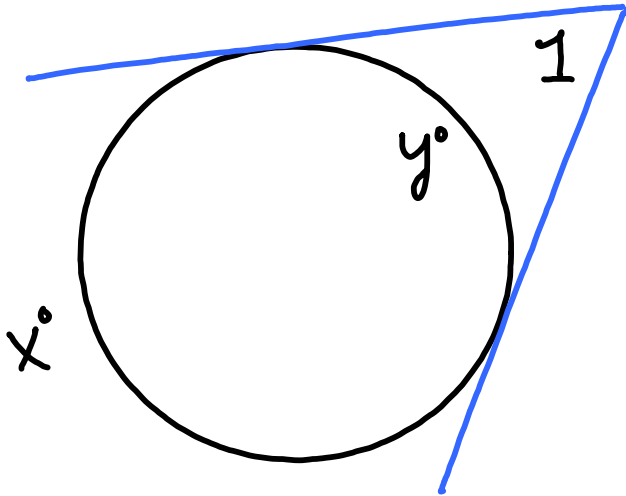
$$m \angle 1 = \frac{1}{2}(x - y)$$

$$\begin{aligned} \angle 1 &= \frac{1}{2}(90 - 20) \\ \angle 1 &= 35^\circ \end{aligned}$$



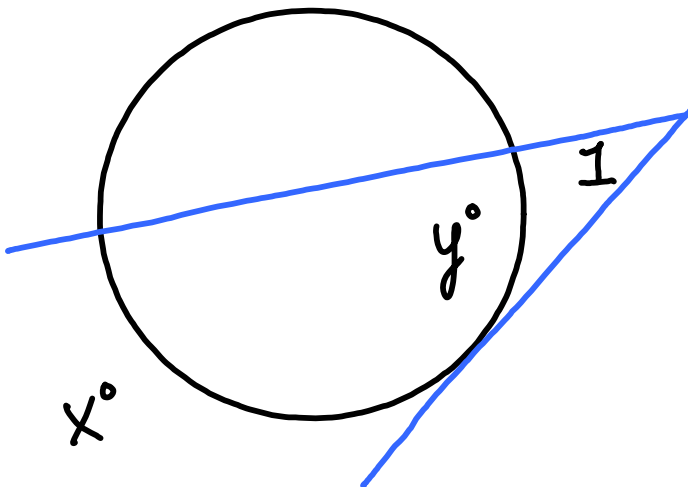
**two tangents**

$$m\angle 1 = \frac{1}{2}(x - y)$$



**secant and a tangent**

$$m\angle 1 = \frac{1}{2}(x - y)$$

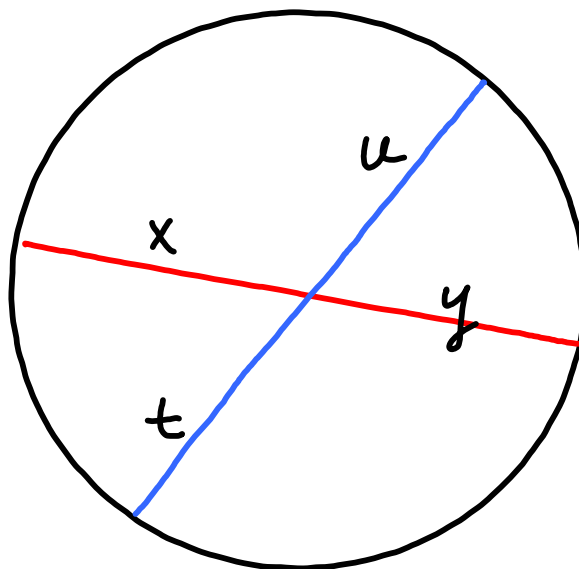




## Segment Lengths and Circles

### ***two chords***

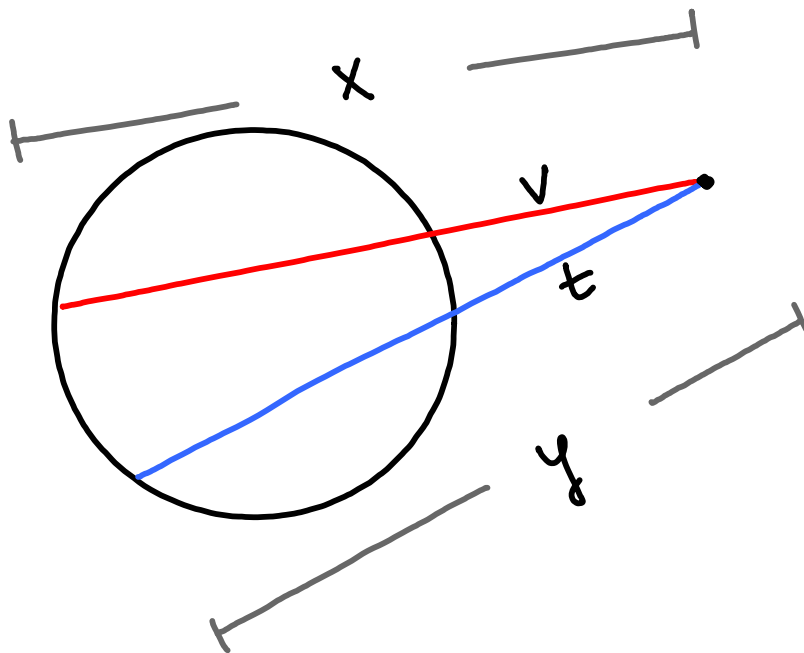
*when two chords intersect inside a circle, the product of the segments of one chord equals the product of the segments of the other chord.*



$$x \cdot y = t \cdot u$$

## ***two secants***

*when two secant segments are drawn to a circle from an external point, the product of one secant segment and its external segment equals the product of the other secant segment and its external segment.*



$$x \cdot v = y \cdot t$$

## ***secant and tangent***

*when a secant segment and a tangent segment are drawn to a circle from an external point, the product of the secant segment and its external segment is equal to the square of the tangent segment*

