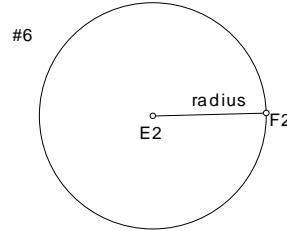
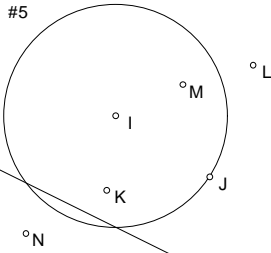
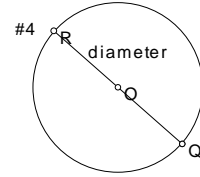
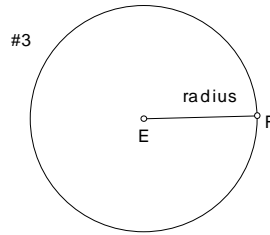
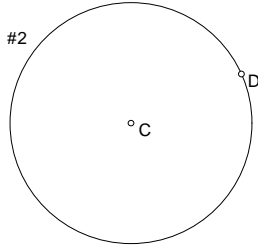
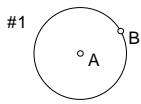
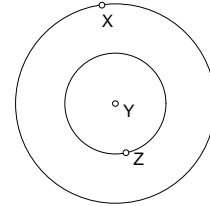


16.

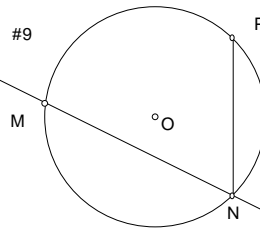
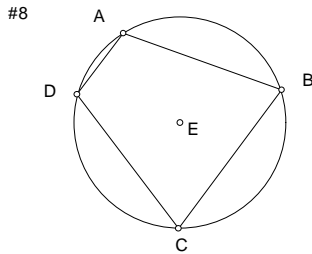


#7 Circle y with radius YZ and circle Y with radius YX are concentric circles.



Points L and N are exterior points of circle I.
Points M, I and K are interior points of circle I. J is on circle I.

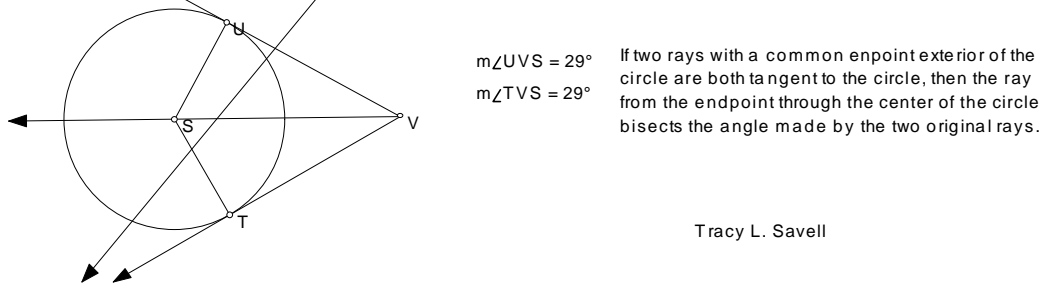
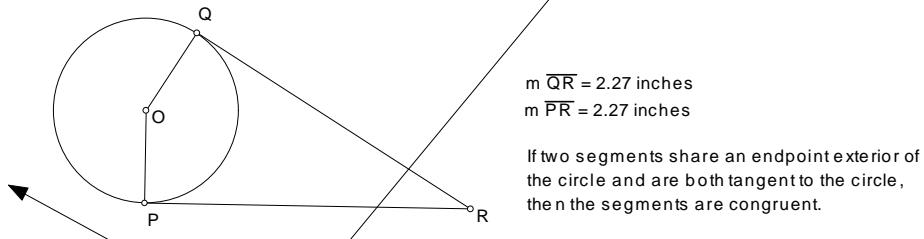
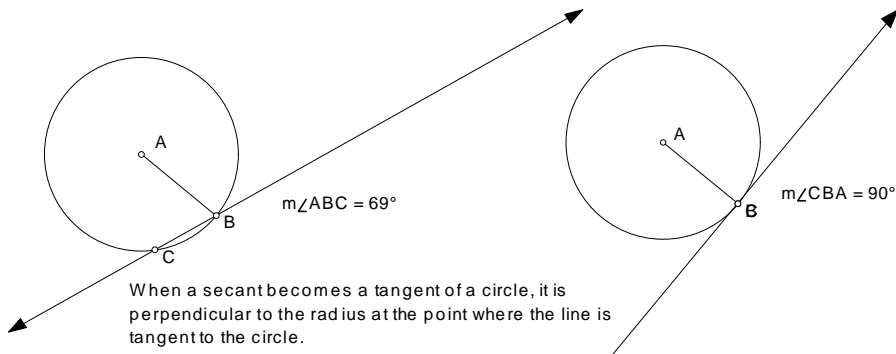
The two circles above are congruent circles.
 $EF = 0.79$ inches
 $E2F2 = 0.79$ inches



Quadrilateral ABCD is inscribed in circle E. Circle E is circumscribed about quadrilateral ABCD.

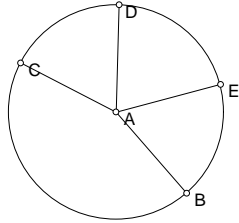
Segment PN is a chord of circle O. Line MN is a secant of circle O.

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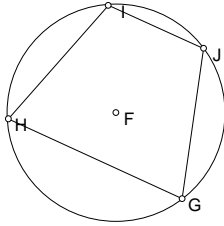
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$m\angle CAD = 64^\circ$
 $m\angle DAE = 74^\circ$
 $m\angle EAB = 64^\circ$



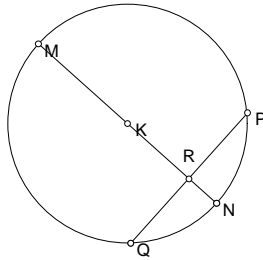
$m\widehat{EB} \text{ on } \odot AB = 64^\circ$
 $m\widehat{DE} \text{ on } \odot AB = 74^\circ$
 $m\widehat{DC} \text{ on } \odot AB = 64^\circ$

1. An arc had the same measure as the central angle which makes the arc.
2. If two central angles are congruent, then their arcs are congruent.



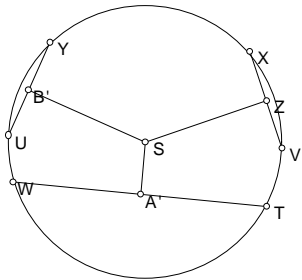
$m\overline{HI} = 1.03$ inches $m\angle HI \text{ on } \odot FG = 89^\circ$
 $m\overline{IJ} = 0.71$ inches $m\angle IJ \text{ on } \odot FG = 58^\circ$
 $m\overline{JG} = 1.03$ inches $m\angle JG \text{ on } \odot FG = 89^\circ$
 $m\overline{GH} = 1.30$ inches $m\angle GH \text{ on } \odot FG = 124^\circ$

If two chords of a circle are congruent then the minor arcs made by the chords are also congruent.



$m\overline{OP} = 1.18$ inches
 $QR = 0.59$ inches
 $RP = 0.59$ inches
 $m\angle OP \text{ on } \odot KL = 94^\circ$
 $m\angle QN \text{ on } \odot KL = 47^\circ$
 $m\angle LP \text{ on } \odot KL = 47^\circ$

If the diameter of a circle and a chord of the circle are perpendicular, then the diameter is a perpendicular bisector of the chord and it also bisects the arc made by the chord.



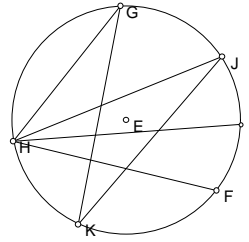
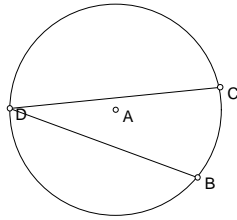
$m\overline{UY} = 0.69$ inches $m\overline{SB'} = 0.87$ inches
 $m\overline{XV} = 0.69$ inches $m\overline{SZ} = 0.87$ inches
 $m\overline{TW} = 1.72$ inches $m\overline{SA'} = 0.36$ inches

1. If two chords are congruent, then they are the same distance from the center of the circle.
2. If two chords are not congruent, then the longer chord is closer to the center of the circle.

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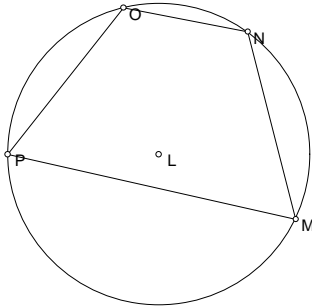
$m\angle CDB = 26^\circ$
 $m\widehat{CB}$ on $\odot AB = 52^\circ$

An inscribed angle measure is half of the measure of the arc it intercepts.



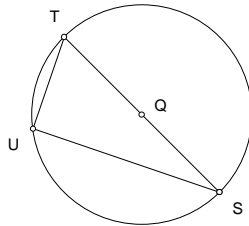
$m\angle GHJ = 30^\circ$
 $m\angle JHI = 18^\circ$
 $m\angle IHF = 18^\circ$
 $m\angle GKJ = 30^\circ$
 $m\widehat{GJ}$ on $\odot EF = 59^\circ$
 $m\widehat{JI}$ on $\odot EF = 36^\circ$
 $m\widehat{IF}$ on $\odot EF = 36^\circ$

If two inscribed angles intercept congruent arcs or the same arc, the angles are congruent.



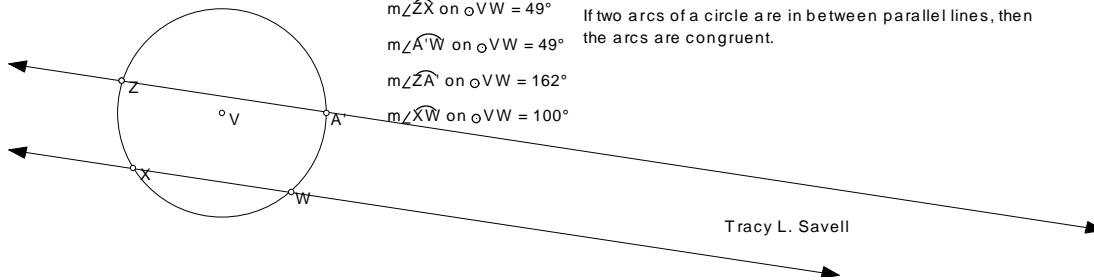
$m\angle OPM = 65^\circ$ $m\angle NMP = 63^\circ$
 $m\angle ONM = 115^\circ$ $m\angle PON = 117^\circ$

If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary. This happens mathematically because there are 360 degrees in a circle. The opposite angles of an inscribed quadrilateral intercept a minor arc and its corresponding major arc. The sum of these arcs is 360 degrees. Since each of the angles is an inscribed angle, their sum must be half of the sum of the arcs which is 180 degrees. Two angles whose sum is 180 degrees are supplementary.



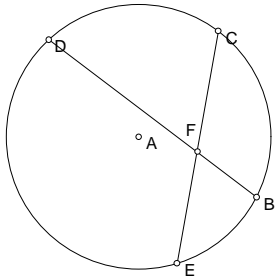
$m\angle TUS = 90^\circ$

If an inscribed angle intercepts a semicircle, then the angle is a right angle. Mathematically this happens because a semicircle is 180 degrees and the inscribed angle is half of that, which is 90 degrees.



$m\widehat{ZX}$ on $\odot VW = 49^\circ$ If two arcs of a circle are in between parallel lines, then the arcs are congruent.
 $m\widehat{AW}$ on $\odot VW = 49^\circ$
 $m\widehat{ZA}$ on $\odot VW = 162^\circ$
 $m\widehat{XW}$ on $\odot VW = 100^\circ$

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$$m\angle BFE = 63^\circ$$

$$m\widehat{BE} \text{ on } \odot AB = 46^\circ$$

$$m\widehat{DC} \text{ on } \odot AB = 80^\circ$$

$$\frac{((m\widehat{BE} \text{ on } \odot AB) + (m\widehat{DC} \text{ on } \odot AB))}{2} = 63^\circ$$

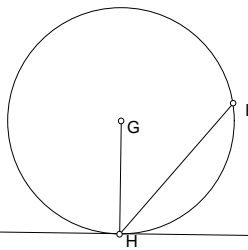
$$m\angle CFB = 117^\circ$$

$$m\widehat{CB} \text{ on } \odot AB = 80^\circ$$

$$m\widehat{DE} \text{ on } \odot AB = 154^\circ$$

$$\frac{((m\widehat{CB} \text{ on } \odot AB) + (m\widehat{DE} \text{ on } \odot AB))}{2} = 117^\circ$$

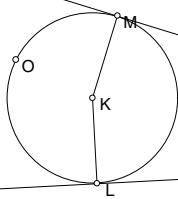
If two chords intersect inside a circle, then the measure of the angle formed is half the sum of the two arcs it intercepts.



$$m\angle IHJ = 50^\circ$$

$$m\widehat{IH} \text{ on } \odot GH = 100^\circ$$

If a tangent and a chord of a circle intersect in a point on the circle, the angle formed is half of the arc it intercepts.

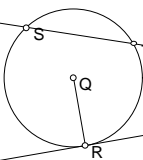


$$m\widehat{ML} \text{ on } \odot KL = 160^\circ$$

$$m\widehat{MOL} \text{ on } \odot KL = 200^\circ$$

$$m\angle MNL = 20^\circ$$

$$\frac{((m\widehat{MOL} \text{ on } \odot KL) - (m\widehat{ML} \text{ on } \odot KL))}{2} = 20^\circ$$

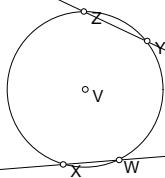


$$m\angle TUR = 19^\circ$$

$$m\widehat{SR} \text{ on } \odot QR = 147^\circ$$

$$m\widehat{TR} \text{ on } \odot QR = 109^\circ$$

$$\frac{((m\widehat{SR} \text{ on } \odot QR) - (m\widehat{TR} \text{ on } \odot QR))}{2} = 19^\circ$$



$$m\angle YA'W = 30^\circ$$

$$m\widehat{YW} \text{ on } \odot VW = 103^\circ$$

$$m\widehat{ZX} \text{ on } \odot VW = 163^\circ$$

$$\frac{((m\widehat{ZX} \text{ on } \odot VW) - (m\widehat{YW} \text{ on } \odot VW))}{2} = 30^\circ$$

If two tangents, two secants, or a tangent and a secant intersect outside a circle, then the angle formed is equal to half of the difference of the arcs it intercepts.

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