Due Wednesday, 3/29:

12.1 p. 487 #16-26; p. 488 #34-36; p. 489 #37-39

12.2 p. 493 #8-18

12.3 p. 501 #23-29; p. 502-503 #43-47

Due Friday, 3/31:

12.4 p. 508 #35-42

12.5 p. 513 #22-38

12.6 p. 518 #11-15

Ch 12 Review pp. 523-524 #9-16; p. 525 #45-50; p. 526 #55-61

Chapter 12: Circles

12.1 - Circles, Radii, and Chords

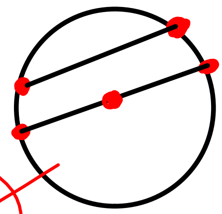
Def: A **circle** is the set of all points in a plane that are at a given distance from a given point in the plane.

Def: Circles are **concentric** iff they lie in the same plane and have the same center.

Def: A **radius** of a circle is a line segment that connects the center of the circle to any point on it.
The radius of a circle is the length of one of these line segments.

Corollary: All radii of a circle are equal.

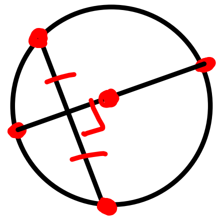
Def: A **chord** of a circle is a line segment that connects two points of the circle.



Def: A **diameter** of a circle is a chord that contains the center. *The* diameter of a circle is the length of one of these chords.

Theorem 56: If a line through the center of a circle is perpendicular to a chord, it also bisects the chord.

Theorem 57: If a line through the center of a circle bisects a chord that is not a diameter, it is also perpendicular to the chord.



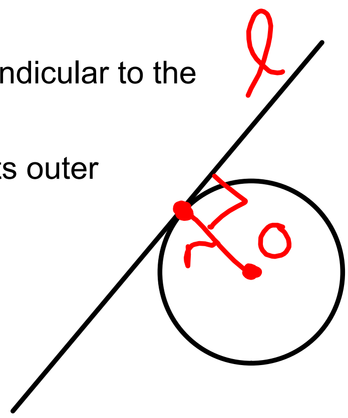
Theorem 58: The perpendicular bisector of a chord of a circle contains the center of the circle.

12.2 - Tangents

Def: A **tangent** to a circle is a line in the plane of the circle that intersects the circle in exactly one point.

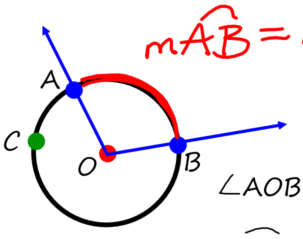
Theorem 59: If a line is tangent to a circle, it is perpendicular to the radius drawn to the point of contact.

Theorem 60: If a line is perpendicular to a radius at its outer endpoint, it is tangent to the circle.



12.3 - Central Angles and Arcs

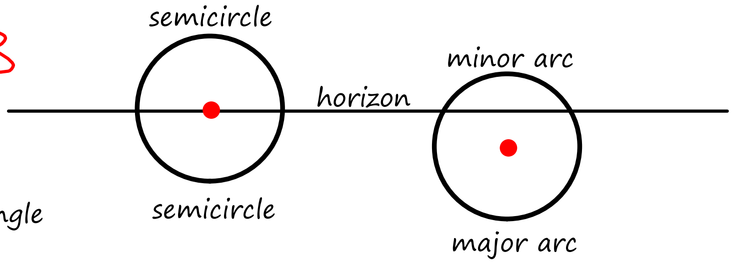
$m\overset{\frown}{AB} = m\angle AOB$



$\angle AOB$ is a central angle

$\overset{\frown}{AB}$ is the minor arc

$\overset{\frown}{ACB}$ is the major arc



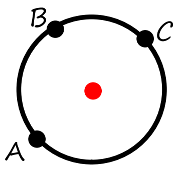
Def: A **central angle** of a circle is an angle whose vertex is the center of the circle.

Def: A **reflex angle** is an angle whose measure is more than 180°

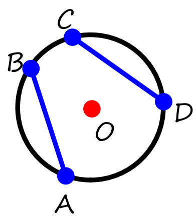
Def: The **degree measure** of an arc is the measure of its central angle.

Postulate 10: The Arc Addition Postulate

If C is on $\overset{\frown}{AB}$, then $m\overset{\frown}{AC} + m\overset{\frown}{CB} = m\overset{\frown}{ACB}$



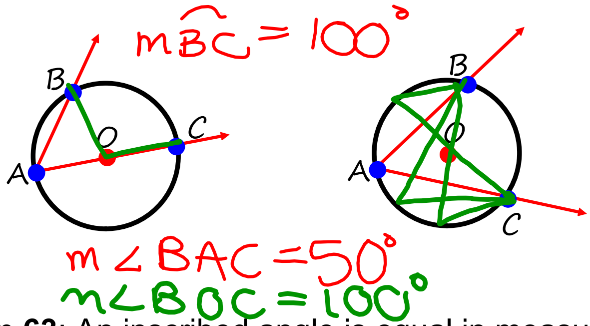
Theorem 61: In a circle, equal chords have equal arcs.



Theorem 62: In a circle, equal arcs have equal chords.

12.4 Inscribed Angles

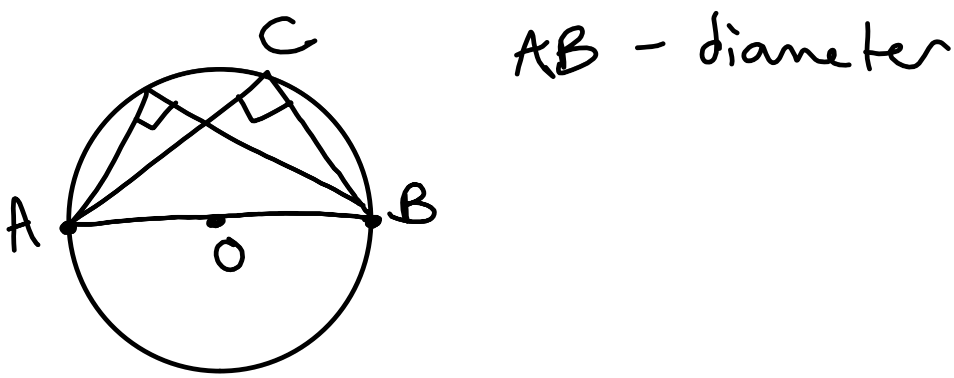
Def: An **inscribed angle** is an angle whose vertex is on a circle, with each of the angle's sides intersecting the circle in another point.



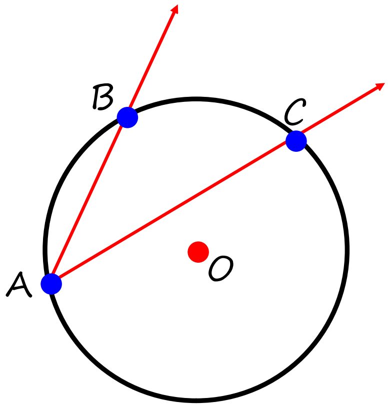
Theorem 63: An inscribed angle is equal in measure to half its intercepted arc.

Corollary 1 to Theorem 63: Inscribed angles that intercept the same arc are equal.

Corollary 2 to Theorem 63: An angle inscribed in a semicircle is a right angle.



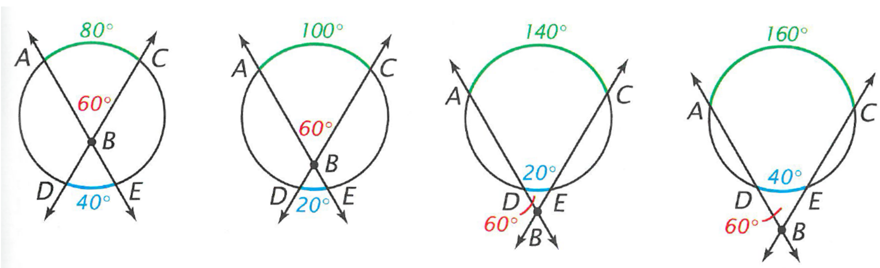
Theorem 63: An inscribed angle is equal in measure to half its intercepted arc.



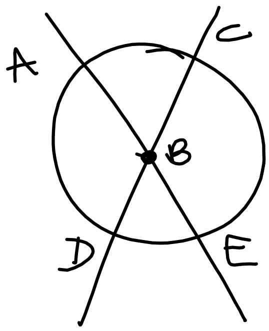
12.5 Secant Angles

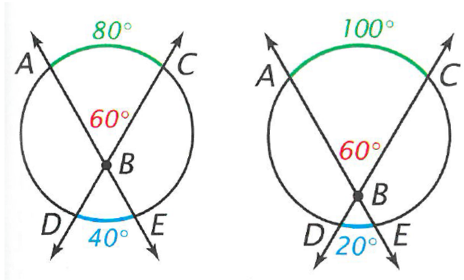
Def: A **secant** is a line that intersects a circle in two points.

Def: A **secant angle** is an angle whose sides are contained in two secants of a circle so that each side intersects the circle in at least one point other than the angle's vertex.



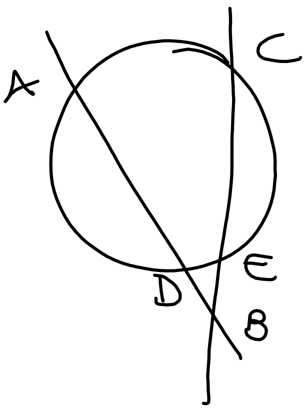
Theorem 64: A secant angle whose vertex is inside a circle is equal in measure to half the sum of the arcs intercepted by it and its vertical angle.

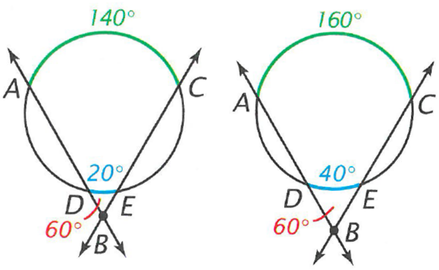




$$m\angle ABC = \frac{1}{2}\left(m\widehat{AC} + m\widehat{DE}\right)$$

Theorem 65: A secant angle whose vertex is outside a circle is equal in measure to half the difference of its larger and smaller intercepted arcs.



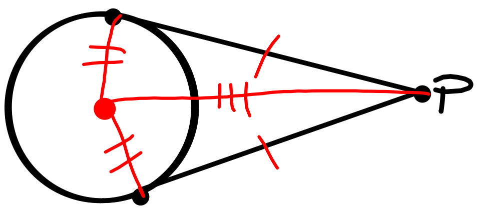


$$m\angle ABC = \frac{1}{2}\left(m\widehat{AC} - m\widehat{DE}\right)$$

12.6 - Tangent Segments and Intersecting Chords

Def: If a line is tangent to a circle, then any segment of the line having the point of tangency as one of its endpoints is a **tangent segment** to the circle.

Theorem 66: The tangent segments to a circle from an external point are equal.



Theorem 67: The Intersecting Chords Theorem

If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

To show: (AE)(EB)=(CE)(ED)

$xy = zw$