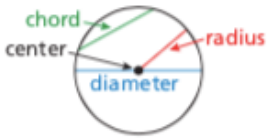
Geometry
Big Ideas Chapter 10 Study Guide - Circles



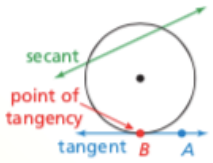
Definitions

Circle: the set of all points in a plane equidistant from a given point called the **Center**.

Radius: a segment whose endpoints are the center and any point on the circle.

Chord: a segment whose endpoints are on the circle.

Diameter: a chord that contains the center of the circle.



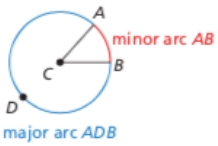
Secant: a line that intersects a circle in two points.

Tangent: a line in the plane of the circle that intersects the circle in exactly one point, the **Point of Tangency**.

Concentric circles: two coplanar circles with a common center.

Central Angle: an angle whose vertex is the center of the circle.

Minor arc: contiguous portion of the circle less than 180˚.



Major arc: contiguous portion of the circle greater than 180˚ and less than 360˚.

Semicircle: contiguous portion of the circle equal to 180˚.

Measure of an arc: equals the measure of its central angle.

Congruent arcs: arcs with the same angle measure.

Inscribed angle: an angle whose vertex is on a circle and whose sides contain chords of the circle.

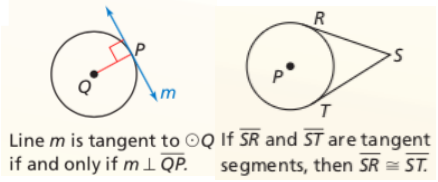
Intercepted arc: an arc that lies between two lines, rays, or segments.

Subtend: the act of a the endpoint of a chord or arc that lies on the sides of an inscribed angle.

Inscribed polygon: a polygon with all of its vertices on the circle.

Circumscribed angle: an angle whose sides are tangent to a circle.

Theorems and Postulates



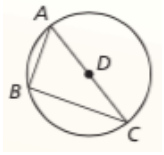
Tangent to Circle | External Tangent

- **Tangent Line to Circle Theorem**: In a plane, a line is tangent to a circle if and only if the line is perpendicular to a radius of the circle at its endpoint on the circle. (P. 532)
- **External Tangent Congruence Theorem**: Tangent segments from a common external point are congruent. (P. 532)
- **Arc Addition Postulate**: The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs. (P. 539)
- **Congruent Circles Theorem/Converse**: Two circles are congruent circles if and only if they have the same radius. (P. 540)
- **Congruent Central Angles Theorem/Converse**: In the same circle, or in congruent circles, two minor arcs are congruent if and only if their corresponding central angles are congruent. (P. 540)
- **Similar Circles Theorem**: All circles are similar. (P .541)
- **Congruent Corresponding Chords Theorem/Converse**: In the same circle, or in congruent circles, two minor arcs are congruent if and only if their corresponding chords are congruent. (P. 546)

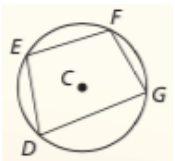
Perpendicular Chord Bisector

Measure of Inscribed Angle

- **Perpendicular Chord Bisector Theorem/Converse**: A diameter of a circle is perpendicular to a chord if and only if the diameter bisects the chord and its arc. (P. 546)
- **Equidistant Chords Theorem**: In the same circle, or in congruent circles, two chords *c* are congruent if and only if they are equidistant from the center. (P. 548)
- **Measure of an Inscribed Angle Theorem**: The measure of an inscribed angle is one-half the measure of its intercepted arc. (P. 554)
- **Inscribed Angles of a Circle Theorem**: two inscribed angles of a circle intercept the same arc, then the angles are congruent. (P. 555)

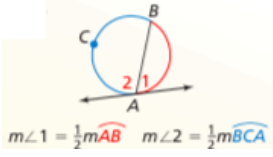


Inscribed Right Triangle



Inscribed Quadrilateral

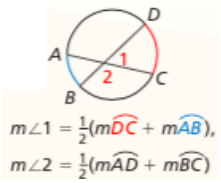
- **Inscribed Right Triangle Theorem**: If a right triangle is inscribed in a circle, then the hypotenuse is a diameter of the circle. Conversely, if one side of an inscribed triangle is a diameter of the circle, then the triangle is a right triangle and the angle opposite the diameter is the right angle. (P. 556)
- **Inscribed Quadrilateral Theorem/Converse**: A quadrilateral can be inscribed in a circle if and only if its opposite angles are supplementary. (P. 556)



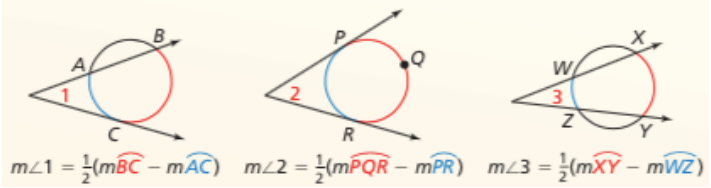
Tangent and Intersected Chord

- **Tangent and Intersected Chord Theorem**: If a tangent and a chord intersect at a point on a circle, then the measure of each angle formed is one-half the measure of its intercepted arc. (P. 562)

- **Angles Inside the Circle Theorem**: If two chords intersect *inside* a circle, then the measure of each angle is one-half the *sum* of the measures of the arcs intercepted by the angle and its vertical angle. (P. 563)
- **Angles Outside the Circle Theorem**: If a tangent and a secant, two tangents, or two secants intersect *outside* a circle, then the measure of the angle formed is one-half the *difference* of the measures of the intercepted arcs. (P. 563)



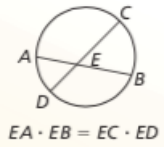
Angles Inside the Circle



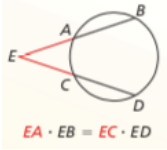
Angles Outside the Circle

- **Circumscribed Angle Theorem**: The measure of a circumscribed angle is equal to 180° minus the measure of the central angle that intercepts the same arc. (P. 564)

- **Segments of Chords Theorem**: If two chords intersect in the interior of a circle, then 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. (P. 570)
- **Segments of Secants Theorem**: If two secant segments share the same endpoint outside a circle, then the product of the lengths of one secant segment and its external segment equals the product of the lengths of the other secant segment and its external segment. (P. 571)

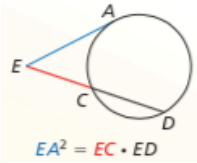


Segments of Chords



Segments of Secants

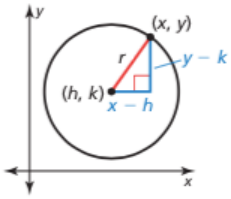
- **Segments of Secants and Tangents Theorem**: a secant segment and a tangent segment share an endpoint outside a circle, then the product of the lengths of the secant segment and its external segment equals the square of the length of the tangent segment. (P. 572)



Segs of Secants and Tangents

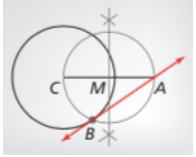
Formulas

Standard Equation of a Circle: $(x-h)^2+(y-k)^2=r^2$ where (h, k) is the center and r is the radius

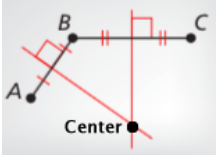


Constructions

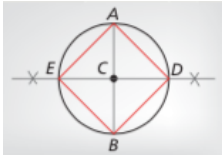
Tangent to circle (P. 533)



Circle center (P. 547)



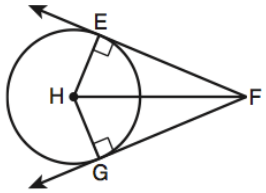
Inscribed Square (P. 557)



Geometry
Big Ideas Chapter 10 Practice Problems
Show all work!!!

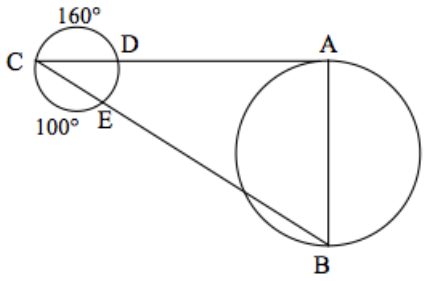
Name _____
Date _____ Period _____

1) The area of circle H is 100π, and HF = 26 cm. What is the perimeter of quadrilateral EFGH?

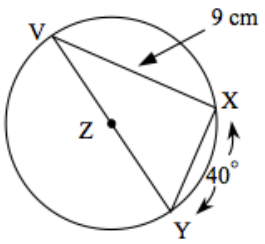


2) Circle D has center (-2, -7) and radius 7. What is the measure, in degrees, of the major arc that passes through points H(-2, 0), J(5, -7), and K(-9, -7)?

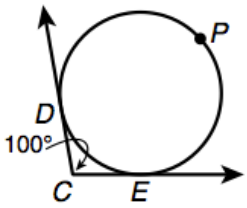
3) The radius of the large circle is 3 and AB is its diameter. $\overline{AC}$ is tangent to the large circle at point A. Find the area of ΔABC.



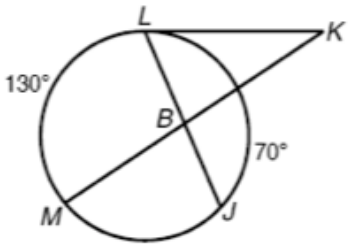
4) Find the radius of the circle.



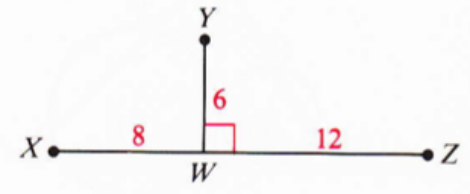
5) Find the minor arc angle $\overset{\frown}{DE}$.



6) $m\angle LKB$ = 40˚. Find $m\angle LBK$ and arc angle $\overset{\frown}{MJ}$.



7) In the figure, a circle can be drawn through points X, Y, and Z. What is the radius of the circle?



8) Find x and round to a tenth.