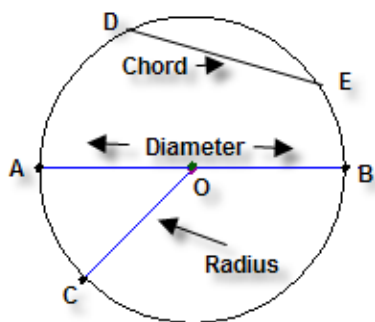


Learning Objective:

- Identify the inscribed angle in a circle.
- Identify the subtended arc for an inscribed angle.
- Recognize that angles subtended by the same arc are equal.
- Understand that angles subtended by the same arc are equal when the size or location of the circle is changed.
- Identify the central angle and the inscribed angle subtended by the same arc.
- Recognize that the central angle is twice the size of the inscribed angle subtended by the same arc.
- Understand that the central angle is twice the size of the inscribed angle subtended by the same arc when the size or location of the circle is changed.
- Identify the tangent to a circle.
- Recognize that the tangents to a circle from the same exterior point are equal.
- Identify the point of tangency when the radius intersects the tangent.
- Recognize that the radius is perpendicular to the tangent at the point of contact.
- Understand that the tangents are equal and the radii to the point of contact are perpendicular to them when the circle is changed in size or location.
- Identify the chord of a circle.
- Recognize that the perpendicular from the centre of a circle to a chord bisects the chord.
- Recognize that the perpendicular from the centre of a circle to a chord bisects the chord when the size and location of a circle are changed.

Helpful Hints:



Circle: is a closed curve in which all points are the same distance from a fixed point within called the centre (O).

Circumference: the outer edge of the circle or the measurement of that outer edge.

Diameter: a line segment that passes through the centre having endpoints (A, B) on the circle or the measurement of that line segment.

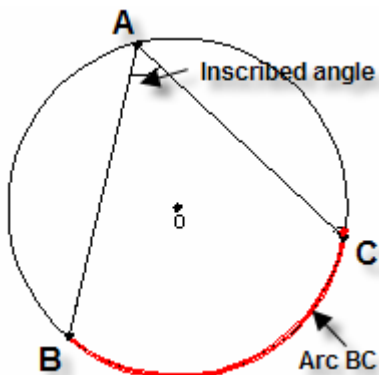
Radius (plural radii): a line segment joining the centre to a point on the circumference of the circle (OC, OA or OB) or the measurement of that line segment. A radius is one half the length of the diameter in the same circle.

Chord: a line segment that passes through any two points on a circle (DE). The diameter is the longest chord in a circle.

CIRCLE PROPERTIES

Note: Click [About the Property](#) in the **Explore It** mode for extra information on each property.

1. **Inscribed Angle Property:** The inscribed angles subtended by the same arc are equal in measure.



Inscribed Angle: an angle that has its vertex (A) and endpoints (B and C) on the circle.

Eg. $\angle BAC$ is an inscribed angle

Subtended: to be in the opposite position of or to extend under.

Eg. $\angle A$ is in the opposite position of (subtended by) arc BC.

Eg. Arc BC extends under (subtends) $\angle A$.

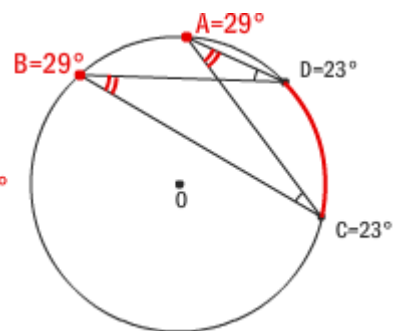
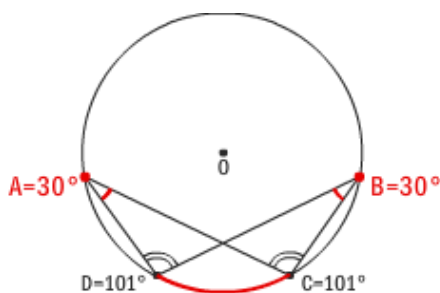
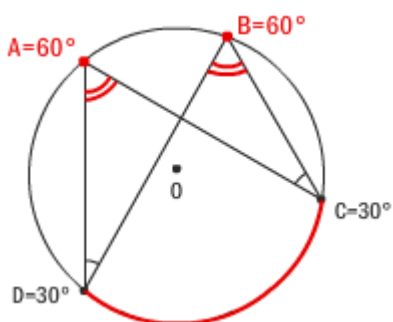
Arc: a part of the circumference of a circle.

Eg. Arc BC.

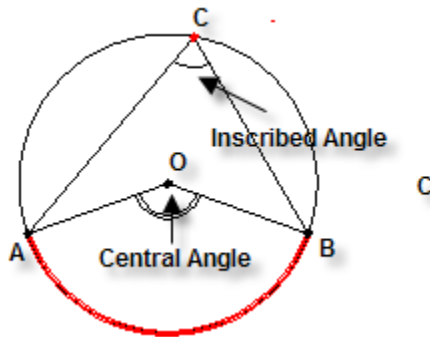
Eg. $\angle A$ is inscribed "in" arc BAC.

Examples:

In each case, the inscribed angles ($\angle A$ and $\angle B$) are subtended by the same arc (DC) and are equal in measure.



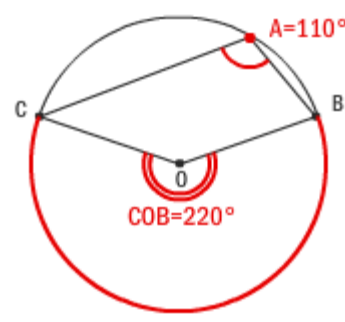
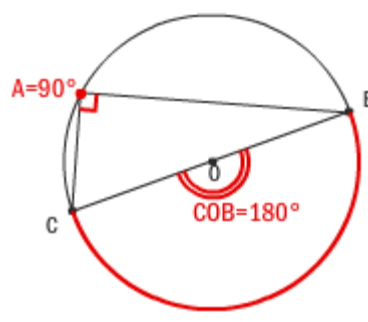
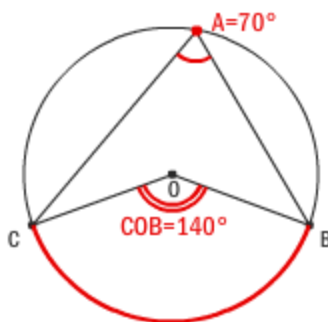
2. **Central Angle Property:** The measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc.



Central Angle: an angle that has its vertex at the centre of the circle (O) and endpoints on the circle (A and B).

Eg. $\angle AOB$

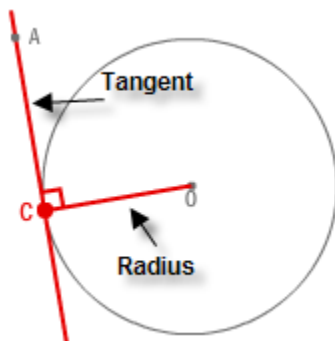
Examples: In each case the central angle ($\angle COB$) and the inscribed angle ($\angle A$) are subtended by the same arc (CB) and thus, the central angle is twice the measure of the inscribed angle.



Semicircle

Note: In the special case of the semicircle, the central angle is 180° and the inscribed angle is 90° . Therefore, all angles in a semicircle are right angles.

3. **Tangent Property:** A tangent to a circle is perpendicular to the radius at the point of tangency.



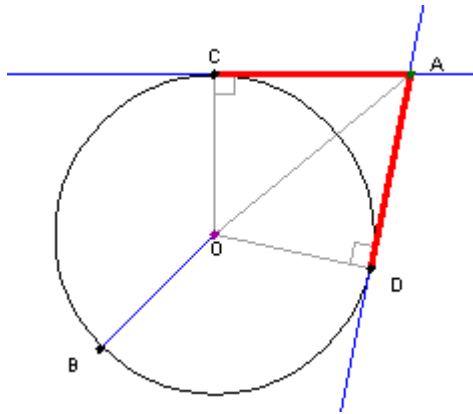
Tangent to a Circle: a line segment (AC) that intersect a circle at only one point (C).

Perpendicular: when two segments meet at 90° . This symbol is used to indicate that two segments are perpendicular:



Point of Tangency: the point where a tangent (AC) touches the circle (C).

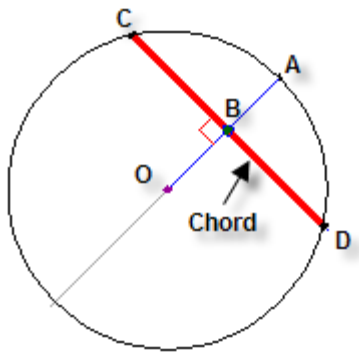
Example:



Two tangents (AC and AD) from an exterior point (A) are equal in length.

The radii (OC and OD) are perpendicular to the tangents at the points of tangency (C and D).

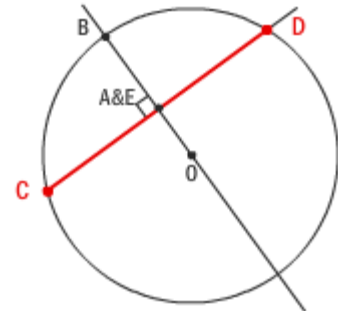
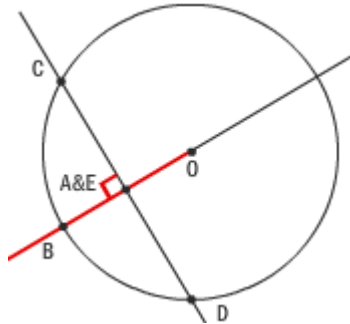
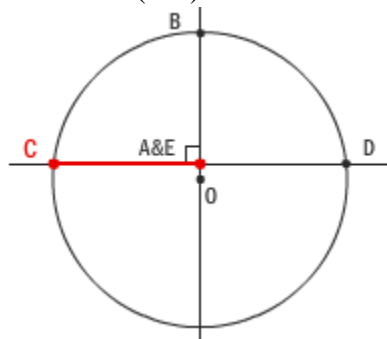
4. **Chord Property:** the perpendicular from the centre of a circle to a chord bisects the chord.



Chord: a line segment that intersects a circle in only two points (CD).

Bisect: to cut into two equal parts (CB and DB).

Examples: In each case the perpendicular (OB) from the centre (O) of the circle to the chord (CD) bisects the chord (CA and DA or CE and DE).



The diameter (AB) of a circle is the longest chord of a circle.

