**Geometry – Honor**

**Unit – Circle**

Equation of a circle (x – h)2 + (y – k)2 = r2, center (h, k) and radius r.

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**Lines that Intersect Circles**

A **chord** is a segment whose endpoints lie on a circle.

A **secant** is a line that intersects a circle at two points.

A **tangent** is a line in the same plane as a circle that intersects it at exactly one point.

The **point of tangency** is the point where the tangent and a circle intersect.

**Pairs of Circles**

Two circles are **congruent circles** if and only if they have congruent radii.

**Concentric circles** are coplanar circles with the same center.

Two coplanar circles that intersect at exactly one point are called **tangent circles**.

**Theorems**

If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.

If a line is perpendicular to a radius of a circle at a point on the circle, then the line is tangent to the circle.

If two segments are tangent to the circle from the same external point, then the segments are congruent.

**Arcs and Their Measure**

A **minor arc** is an arc whose points are on or in the interior of a central angle. The measure of a minor arc is equal to the measure of its central angle.

A **major arc** is an arc whose points are on or in the exterior of a central angle. The measure of a major arc is equal to 360º minus the measure the measure of its central angle.

If the endpoints of an arc lie on a diameter, then the arc is a **semicircle**. The measure of a semicircle is equal to 180º

The measure of and arc formed by two adjacent arcs is the sum of the measure of the two arcs.

**Theorems**

Congruent central angles have congruent chords.

Congruent chords have congruent arcs.

Congruent arcs have congruent central angles.

In a circle, if a radius (or diameter) is perpendicular to a chord, then it is bisects the chord and its arc.

In a circle, the perpendicular bisector of a chord is a radius (or diameter).

**Sector of a Circle**

A sector of a circle is a region bounded by two radii of the circle and their intercepted arc: ()

Area of s segment = area of sector – area of triangle

**Inscribed Angle Theorem**

The measure of an inscribed angle is half the measure of its intercepted arc.

**Corollary**

If inscribed angles of a circle intercept the same arc or subtended by the same chord or arc, then the angles are congruent.

**Theorem**

An inscribed angle subtends a semicircle if and if the angle is the right angle.

If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary.

If a tangent and a secant (or chord) intersect on a circle at the point of tangency, then the measure of the angle formed is half the measure of its intercepted arc.

If two secants or chords intersect in the interior of a circle, then the measure of each angle formed is half the sum of the measures of its intercepted arcs.

If a tangent and a secant, two tangents, or two secants intersect in the exterior of a circle, then the measure of the angle formed is half the difference of the measures of its intercepted arcs.

**Chord-Chord Product Theorem**

If two chords intersect in the interior of a circle, then the products of the lengths of the segments of the chords are equal.

**Secant-Secant Product Theorem**

If two secants intersect in the exterior of a circle, then the product of one secant segment and its external segment equals the product of the lengths of other secant segment and its external segment.

**Secant-Tangent Product Theorem**

If a secant and a tangent intersect in the exterior of a circle, then the product of the lengths of the secant segment and its external segment equals the length of the tangent segment squared.