CIRCLES

Terms and Vocabulary:

1. **Circle**: The set of all points in a plane that are equidistant from a fixed point called the **center**.

2. **Radius**: A segment whose endpoints are the center of a circle and a point on the circle. (Note: All **radii** of the same circle are congruent).

3. **Chord**: A segment whose endpoints are 2 points on a circle.

4. **Secant**: A line that intersects a circle in two points.

5. **Diameter**: A chord that passes through the center of a Circle.

6. **Tangent**: A line that intersects a circle in exactly one point.

7. **Concentric Circles**: Circles with the same center are called _____________ circles.

8. **Congruent Circles**: have congruent radii.

9. A polygon is **inscribed** in a circle if its sides are chords of the circle.

10. **A polygon is circumscribed** about a circle if its sides are tangent to the circle.

11. A **minor arc** has a measure that is less than 180°. We name a minor with 2 letters.

12. A **major arc** arc has a measure that is greater than 180°. We name a major arc with 3 letters.

13. A **semicircle** is an arc whose endpoints are the endpoints of a diameter. It has a measure of 180°. We name a semicircle with 3 letters.
14. **Central Angle**: An angle whose vertex is the center of a circle.

The measure of a central angle is equal to the measure of its intercepted arc.

15. **Inscribed Angle**: An angle whose vertex is a point on a circle and whose sides contain chords.

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

**According to theorems**:

16. A radius drawn to a tangent at the point of tangency is **perpendicular** to the tangent.

17. **Tangent** segments from an exterior point to a circle are congruent.

18. In a circle, or in congruent circles, congruent central angles intercept congruent arcs.

19. In a circle, or in congruent circles, **congruent chords** intercept congruent arcs.

20. If a diameter (or radius) is perpendicular to chord, then it **bisects** the chord and it **bisects** its arcs.

(Converse is also true).
21. In the same circle (or congruent circles) two chords are congruent if they are **equidistant** from the center. (Converse is true)

22. If two inscribed angles intercept the same arc, then they are congruent.

23. If an angle is inscribed in a **semicircle** then it is a right angle.

24. If a quadrilateral can be inscribed in a circle then both pairs of its opposite angles are supplementary.

25. The measure of an angle formed by a tangent and a chord/secant intersecting at the point of tangency is equal to **half** the measure of the intercepted arc.

26. If 2 chords intersect in a circle, the measure of each angle is equal to \( \frac{1}{2} \) the sum of the intercepted arcs made by the angle and its vertical angle.

\[
m\angle 1 = \frac{1}{2}(x + y)
\]

27. If an angle is formed such as one of the above: \( m\angle 1 = \frac{1}{2}(y - x) \)

![Diagram of geometric figures showing the measures of angles formed by intersecting chords and secants.](image)
28. If 2 chords $\overline{AB}$ and $\overline{CD}$ intersect inside a Circle at point $X$ then lengths $AX \cdotXE = CX \cdot XD$

(Hint: It comes from similar triangles)

29. If 2 secants intersect outside of a circle at $X$:

(lengths) $AX \cdotXE = CX \cdot XD$

(Hint: It comes from similar triangles).