

Geometry Info Sheet #40

Arcs, Arc Measurement, and Central Angles in Circles

Definitions

- Circle:** The set of all points in a plane equidistant from a given point (the center)
- Radius:** A line segment from the center of a circle to any point on the circle
- Diameter:** A segment with endpoints on a circle and which passes through the center of the circle
- Arc:** A curved section of a circle; an arc is an unbroken part of a circle
- Semicircle:** Half a circle; it is an arc whose endpoints are the endpoints of a diameter
- Minor Arc:** An arc that is shorter than a semicircle of the same circle; it is named by its endpoints
- Major Arc:** An arc that is longer than a semicircle of the same circle; it is named by its endpoints, along with another point that lies on the arc

Two arcs of the same circle are adjacent arcs when they intersect at exactly one point.

Central Angle: An angle in the plane of a circle whose vertex is the center of the circle; it is formed by two radii of the circle, and it, in turn, forms an arc on the circle

The degree measure of a minor arc is the measure of the arc's central angle. The degree measure of a major arc is 360° minus the degree measure of its related minor arc. A semicircle is 180° .

Postulates and Theorems

- Congruent Circles Theorem:** Two circles are congruent if and only if their radii are the same lengths; to be congruent, there must be a rigid motion or a composition of rigid motions that maps one circle onto the other
- Arc Congruence Postulate:** In the same circle or in congruent circles, two minor arcs are congruent if and only if their central angles are congruent.
- Arc Addition Postulate:** In a circle, the degree measure of an arc formed by two adjacent arcs is the sum of the degree measures of the two arcs ($m\widehat{ABC} = m\widehat{AB} + m\widehat{BC}$).

All circles are similar. Two arcs are similar arcs if and only if they have the same degree measure. All congruent arcs are similar, but not all similar arcs are congruent.