

## Topic A: Central and Inscribed Angles

## G-C.A.2, G-C.A.3

Focus Standards:	G-C.A.2	Identify and describe relationships among inscribed angles, radii, and chords. <i>Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</i>
	G-C.A.3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
Instructional Days:	6	
Lesson 1:	Thales' Theorem (E) <sup>1</sup>	
Lesson 2:	Circles, Chords, Diameters, and Their Relationships (P)	
Lesson 3:	Rectangles Inscribed in Circles (E)	
Lesson 4:	Experiments with Inscribed Angles (E)	
Lesson 5:	Inscribed Angle Theorem and its Applications (E)	
Lesson 6:	Unknown Angle Problems with Inscribed Angles in Circles (E)	

The module begins with students exploring Thales' theorem. The first activity is a paper pushing discovery exercise where students push angles of triangles and trapezoids through a segment of fixed length to discover arcs of a circle (G-C.A.2). Students revisit the terms diameter and radius and are introduced to the terms central angle and inscribed angle. Lesson 2 begins the study of inscribed angles, which is the focus of this module. In this lesson, students study the relationships between circles and their diameters and between circles and their chords. Through the use of proofs (G-C.A.2), students realize that the perpendicular bisector of a chord contains the center. They also realize that the diameter is the longest chord, and congruent chords are equidistant from the center. Lesson 3 continues the study of inscribed angles by having students use a compass and straight edge to inscribe a rectangle in a circle (G-C.A.3). They then study the similarities of circles and the properties of other polygons that allow certain polygons to be inscribed in circles. Inscribed angles are compared to central angles in the same arcs in Lesson 4 with students using trapezoids and a paper pushing exercise similar to that of Lesson 1 to understand the difference between a major and minor arc. Students then explore inscribed and central angles and use repeated patterns (MP.7) to realize that the measure of a central angle is double the angle inscribed in the same arc. In Lesson 5, students are introduced to the inscribed angle theorem, but they are only introduced to inscribed angles that are not obtuse. Students prove that inscribed angles are half the angle measure of the arcs they subtend. Lesson 6 completes the study of the inscribed angle theorem as students use their knowledge of chords, radii, diameters, central angles, and inscribed angles to persevere in solving a variety of unknown angle problems (MP.1). Throughout

<sup>&</sup>lt;sup>1</sup> Lesson Structure Key: P-Problem Set Lesson, M-Modeling Cycle Lesson, E-Exploration Lesson, S-Socratic Lesson

this module, students perform activities and constructions to enhance their understanding of the concepts studied. Through the use of proofs (MP.3 and concepts previously studied), students arrive at new theorems and definitions.