

Module Overview

In this inquiry module, students prove basic theorems about circles, paying particular attention to perpendicularity and inscribed angles, in order to see symmetry in circles and as an application of triangle congruence criteria. In the Cartesian coordinate system, students use the distance formula to write the equation of a circle when given the radius and the coordinates of its center. Given an equation of a circle, they draw the graph in the coordinate plane and apply techniques for solving quadratic equations. This helps to determine intersections between lines and circles or parabolas and between two circles.

Essential Questions

- How are the properties of circles important?
- What are the advantages and disadvantages of working with figures in the coordinate plane?

Student Focal Points

1. Understanding, proving, and applying theorems about circles
2. Deriving an understanding, based on similarity, of how to find the arc lengths and areas of sectors of circles
3. Converting between the geometric description and the equation for a circle, derived and rearranged algebraically to communicate features
4. Using coordinates to prove geometric theorems algebraically, including simple proofs involving circles
5. Applying the analysis of circles in modeling situations

Standards for Mathematical Practice

Mathematically proficient students...

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. **Model with mathematics.**
5. **Use appropriate tools strategically.**
6. Attend to precision.
7. **Look for and make use of structure.**
8. Look for and express regularity in repeated reasoning.

Standards for Mathematical Content

Sense-Making Concepts Standard(s)	Sense-Making Strategies Standard(s)	Sense-Making Applications/Modeling Standard(s)
G.C.2 G.C.5 G.MG.1	G.GPE.1	G.C.1 G.C.3 G.GPE.4

Module E - Scope & Sequence

Duration	Standard(s)	
2-3 days	G.C.2 G.MG.1	Lesson 1: Terms and Tangents MP#4, 7
	<u>Text:</u> Section 11.1: Parts of a Circle & 11.2: Properties of Tangents <u>Teacher Resource(s):</u> <u>Collaborative Activity/Task:</u> Tangent Theorem activity, Elbow partner activity <u>Tools/Technology:</u> Compass, straightedge, and protractor for tangent activity	
3 days	G.C.2 G.C.3	Lesson 2: Arcs and Angles : Central, Inscribed, Circumscribed MP#1, 4, 7
	<u>Text:</u> Section 11.3: Central Angles & 11.5: Inscribed Angles and Polygons <u>Teacher Resource(s):</u> https://share.ehs.uen.org/node/13608 https://www.khanacademy.org/math/geometry/cc-geometry-circles/central-inscribed-circumscribed/v/measure-of-circumscribed-angle <u>Collaborative Activity/Task:</u> Inscribed \angle and Circumscribed \angle Activity <u>Tools/Technology:</u> Protractor, compass, straightedge, GeoGebra	
3 days	G.C.3	Lesson 3: Constructions: Inscribed Circle, Circumscribed Circle MP#1, 4, 5, 6
	<u>Text:</u> text does not support this lesson <u>Teacher Resource(s):</u> http://www.geogebra.org/student/m18472 http://www.geogebra.org/student/m18470 http://www.mathopenref.com/constincenter.html http://www.mathopenref.com/constcircumcenter.html <u>Collaborative Activity/Task:</u> <u>Tools/Technology:</u> compass, straightedge, GeoGebra	
3 days	G.C.5 G.MG.1	Lesson 4: Arc Length and Sector Area MP#4, 6
	<u>Text:</u> Section 8.7: Circumference of Area of Circles; 11.3: Arcs and Central Angles <u>Teacher Resource(s):</u> <u>Collaborative Activity/Task:</u> Pizza Partner activity, http://www.ixl.com/math/algebra-2/convert-between-radians-and-degrees http://www.ixl.com/math/geometry/arc-measure-and-arc-length http://www.ixl.com/math/geometry/area-of-sectors <u>Tools/Technology:</u>	
3 days	G.C.1 G.GPE.1 G.GPE.4	Lesson 5: Similarity and Equations of Circles MP#3, 4, 7
	<u>Text:</u> Section 11.7: Equations of Circles <u>Teacher Resource(s):</u> http://learnzillion.com/lessons/2754-demonstrate-circle-similarity-using-translations-and-dilations <u>Collaborative Activity/Task:</u> Guided Practice: Similarity of Transformations <u>Tools/Technology:</u>	
2 days		Module E Review Module E Test (common assessment)

Total Days: 18-19 days (2 flex days)

Content Standards Unpacking: