

Core Content

Cluster Title: Translate between the geometric description and the equation for a conic section.
Standard G.GPE.1: Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
Concepts and Skills to Master
<ul style="list-style-type: none"> Use the Pythagorean Theorem to derive the equation of a circle. Find the center of a circle, given its equation.

Supports for Teachers

Critical Background Knowledge	
<ul style="list-style-type: none"> Use the Pythagorean Theorem to find the distance between two points. Use the method of completing the square to transform equations into desired forms (II.REI.4). 	
Academic Vocabulary	
circle, center of a circle, radius of a circle, completing the square	
Suggested Instructional Strategies	Resources
<ul style="list-style-type: none"> Import images of circle crop fields from Google Earth into a coordinate grid system and find their equations. 	
Sample Formative Assessment Tasks	
<p>Skill-Based Task: A circle is tangent to the x-axis and y-axis in the first quadrant. A point of tangency has coordinates $(4,0)$. Find the equation of the circle.</p>	<p>Problem Task: A circle is inscribed in an equilateral triangle. The equilateral triangle lies in the first quadrant with one vertex at the origin and a second vertex at $(4\sqrt{3},0)$. Find the equation of the circle.</p>

Core Content

Cluster Title: Translate between the geometric description and the equation for a conic section.
Standard G.GPE.2: Derive the equation of a parabola given a focus and directrix.
Concepts and Skills to Master
<ul style="list-style-type: none"> • Develop the geometric definition of a parabola, including a focus and directrix. • Use the distance formula to derive the equation of a parabola.

Supports for Teachers

Critical Background Knowledge	
<ul style="list-style-type: none"> • Find the distance between two points. • Find the midpoint of a segment. 	
Academic Vocabulary	
focus, directrix, midpoint	
Suggested Instructional Strategies	Resources
<ul style="list-style-type: none"> • Begin with a parabola with vertex (0,0). • Define the focus and directrix in terms of distance from the vertex. 	
Sample Formative Assessment Tasks	
Skill-Based Task: Write the equation of a parabola with focus (3,5) and directrix $x=-1$.	Problem Task: A parabola has focus (-2,1) and directrix $y = -3$. Determine whether or not the point (2,1) is part of the parabola. Justify your response.