

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. (8.G.8) 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. (8.G.8) 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.