Geometry Unit 9: Topic 9
Updated Nov. 2021

<table>
<tr><th>Marking
Period</th><th colspan="2">Unit
Title</th><th>Recommended
Instructional Days</th></tr>
<tr><td>4</td><td colspan="2">Coordinate Geometry</td><td>10-15</td></tr>
<tr><td colspan="2">Domain:</td><td rowspan="2">Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

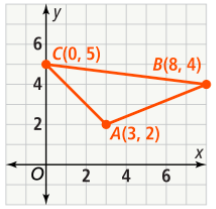
<u>Essential Questions:</u>
1. How are properties of geometric figures represented in the coordinate plane?
2. How can geometric relationships be proven algebraically in the coordinate plane?
3. How is the equation of a circle determined in the coordinate plane?
4. How does the geometric description of a parabola relate to its equation?

<u>Activity Description</u>:
● Polygons in the Coordinate Plane
● Proofs Using Coordinate Geometry
● Circle in the Coordinate Plane
● Parabolas in the Coordinate Plane

<u>Example Tasks:</u>

Task 1:</td></tr>
<tr><td>NJSLS Strand:
G.CO.A.1: Know precise definition of angle, circle, perpendicular line, parallel line, and line segment, based on undefined notions of point, line, distance along a line, and distance around a circular arc.
G.CO.C.10: Prove theorems about triangles.
GPE.A.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.
GPE.A.2: Derive the equation of a parabola given a focus and a directrix.
GPE.B.4: Use coordinates to prove simple geometric theorems algebraically.
GPE.B.7: Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.</td><td>Progress Indicator:
Tests ● Quizzes ● Practice problems for homework ● Online textbook ● Worksheets ● IXL ● Leveled assessments</td></tr>
</table>

What is the perimeter of $\triangle ABC$?



Use the distance formula to find the length of each side.

$$AB = \sqrt{(8-3)^2 + (4-2)^2} = \sqrt{29}$$

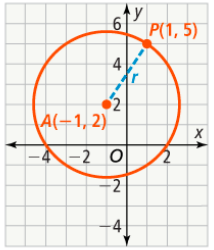
$$BC = \sqrt{(0-8)^2 + (5-4)^2} = \sqrt{65}$$

$$AC = \sqrt{(0-3)^2 + (5-2)^2} = \sqrt{18}$$

$$P = AB + BC + AC$$
$$= \sqrt{29} + \sqrt{65} + \sqrt{18}$$
$$\approx 17.69$$

Task 2:

What is the equation for $\odot A$?



The notation $\odot A$ means a circle with center at point A.

Step 1
Find the radius r.

The radius is the distance from P to A.

$$r = \sqrt{(-1-1)^2 + (2-5)^2} = \sqrt{13}$$

The radius of the circle is $\sqrt{13}$.

Step 2
Use the radius and center to write the equation.

$(x-h)^2 + (y-k)^2 = r^2$ Use the equation of a circle.

$(x-(-1))^2 + (y-2)^2 = \left(\sqrt{13}\right)^2$ Substitute values for h, k, and r.

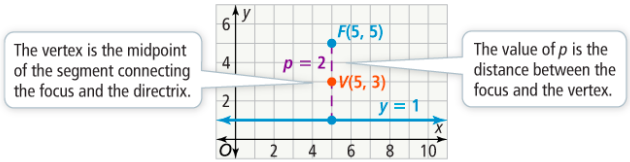
$(x+1)^2 + (y-2)^2 = 13$

The equation for $\odot A$ is $(x+1)^2 + (y-2)^2 = 13$.

Task 3:

A. What equation represents the parabola with focus (5, 5) and directrix $y = 1$?

Graph the focus and directrix to determine the vertex and p.



Write the equation for the parabola with vertex (5, 3) and $p = 2$.

$y - k = \frac{1}{4p}(x - h)^2$ Write the formula for a parabola with vertex (h, k).

$y - 3 = \frac{1}{4(2)}(x - 5)^2$

$y = \frac{1}{8}(x - 5)^2 + 3$

<u>Interdisciplinary Connections:</u>
Topic 9 Project, enVision STEM: Measure a Distance. Textbook page 384 and online
Career Readiness, Life Literacies and Key Skills **Content: Solar Engineering; Construction. NJSLS#: GPE.A.2)**
(Next Generation Science Standards ETS1-2, PS3-3)

Spot Light On:
James B. Pollack - American astrophysicist who worked for NASA's Ames Research Center.

Mathematics Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reason 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.

Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***
Self- awareness Social Awareness Self- Management Relationship Skills Responsible Decision-Making	Recognizing the importance of self-confidence in handling daily tasks and challenges. Demonstrate an awareness of the expectations for social interactions in a variety of ways. Demonstrate an understanding of the need for mutual respect when viewpoints differ. Recognize the skills needed to establish and achieve personal and educational goals. Utilize positive communication and social skills to interact effectively with others. Develop, implement, and model effective problem solving and critical thinking skills.

Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: ● Entry and Exit Slips ● Quizzes ● Self Assessments	**Benchmarks:** ● Chapter Tests ● Projects **Summative Assessments:** ● District Assessments ● Midterms ● Standardized Tests

Differentiated Student Access to Content: Teaching and Learning *Resources/Materials*			
Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
• Textbooks websites • Achieve the core • Khan Academy • Desmos • IXL	• Skill building worksheets • Math Manipulatives	• Dictionary for native languages • Videos in their native language.	• Leveled Assessments • Enrichment worksheets
Supplemental Resources			
Technology: • **Chromebooks, Graphing Calculators, Online math manipulatives** **Other:** • **Zoom and Google Meets, Google Classroom, Interactive Textbooks, Private Tutoring**			
Differentiated Student Access to Content: Recommended *Strategies & Techniques*			
Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
• **Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat**	• **Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break**	• **Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.**	• **Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related**

	assignments into segments of shorter tasks.		

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept: Creativity and Innovation**	
	Core Ideas:	**With a growth mindset, failure is an important part of success**
	Performance Expectation/s:	**9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).**
	Career Readiness, Life Literacies, & Key Skills Practices	
	Act as a responsible and contributing community member and employee. **Attend to financial well-being.** **Consider the environmental, social and economic impacts of decisions.** **Demonstrate creativity and innovation.** **Utilize critical thinking to make sense of problems and persevere in solving them.** **Model integrity, ethical leadership and effective management.** **Plan education and career paths aligned to personal goals.** **Use technology to enhance productivity, increase collaboration and communicate effectively.** **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*	X	LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*