Max. 8 Pages

Grade Level	10th[th]	**Content Area**	Math
Course Title (grades 9-12 Only)	Geometry		
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	In order to master this standard, students must be very comfortable using the Pythagorean theorem to solve triangle problems. Students must also have expose to completing squares to find missing values. Students should also be very confortable with fundamental geometric vocabulary.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	In alignment with FES's one-to-one methodology, students will use their computers, Canvas, and the Acellus software. Canvas and Acellus will provide diagnostic data and videos/modules for introduction to new material/direct instruction. At the end of the lesson, students will use Acellus Courseware or their Canvas Online Learning System to complete a formative assessment. For the summative assessment, students will also use Acellus or Canvas. Direct instruction will use multiple checks for understanding, and computer-based Kagan cooperative strategies will be implemented during guided practice.		
Standard Number and Description *List the Number* and the full description for the Required Standard or Science Performance Objective listed in section A.6.*	#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. .		
Materials/Resources Needed	Computers, interactive notebooks, headphones, practice sheets in the online forum, timer.		

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Standard (e.g., 6.EE.7). For HS Math, use Conceptual Category-Domain, Standard (e.g., A-REI.6). For Science, use Grade, Strand, Concept, PO (e.g., 4.1.3.1).*

Lesson (add as needed)	Instructional Strategies TW = teacher will. SW = students will. CFU = checks for understanding.	Student Activities
1	**Objective**: SWBAT write the long and short form equation for a circle **Key Points/Terms:** • Short form: $x^2 + y^2 = r^2$ • Long form: $(x – h)^2 + (y – k)^2 = r^2$	Students will write down the objective and key points in their online notebooks.
	Activation of Prior Knowledge: Teacher will place a "Do Now" activity in the online learning system discussion portal and instruct students to begin. The "Do Now" problem will ask students to write down everything they can remember about circles in 45 seconds. Minimum quota is 7 independent answers. Teacher will ask students to share out and add any fundamental concepts not discussed.	Student will complete the "Do Now" activity diligently and quietly. Students will respond with at least 7 independent answers. Students will ask clarifying questions if necessary.
	INM/Modeling: Teacher will instruct students to complete the Acellus "circular equations" diagnostic and continue onto the new material modules. The new material modules will provide instructional examples of short and long form equations for a circle. These modules will provide examples and ask check for understanding questions. Teacher will model the expected behavior during this learning time. Teacher will provide assistance when necessary through the online learning system and will redirect students to additional modules if needed.	Students will use the Acellus modules to complete the introduction to new material about circular equations. Other screens unrelated to the lesson will be prohibited. Students will complete the diagnostic before moving onto the new material modules and will note deficiencies. Students will take notes about writing the long and short form equations during the module via online notebook and will sit quietly and respectfully when finished.
	Guided Practice: Teacher will ask students to open the discussion forum about short and long form circular equations. Inside the forum, teacher will have written instructions to help students complete the guided practice exercise about rewriting long and short form equations from given integers. Students are expected to type their answers in the Canvas	Students will participate in the guided practice activity by rewriting the short and long form equations with given integers. Students will use correct mathematical language and will clearly

	online learning system and once finished, provide positive feedback to their classmates. Teacher will reference the expected behavior notes available in the online forum and will use checks for understanding questions to monitor comprehension. Teacher will monitor progress via online tracking and will redirect students to further discussion posts if necessary. **Independent Practice**: Teacher will direct students to the formative assessment/independent practice section of Acellus. Teacher will reference the expected behavior in the online learning system and monitor progress via online tracking. Teacher will remind students that they must answer 80% of the questions correctly in order to master the standard. The formative assessment will ask students to solve 10 linear equation and inequalities questions. **Exit Ticket**: Teacher will present two exit ticket questions at the conclusion of the short and long form circular equations lesson. These questions will take place in the online learning system and once complete, students can leave the module. Teacher will instruct students to make any final comments or questions in the appropriate forum location before exiting the module.	express the equations in Canvas. Students will demonstrate respectful behavior and will reference the key points when necessary. Students will answer all checks for understanding and will remain quiet once finished. Students will use Acellus to complete the formative assessment/independent practice. Students will do their best to achieve 80% mastery on the formative assessment. Students will remain respectful during independent practice and will check their answers once finished. Students will complete the exit ticket problems and will exit the online learning system once finished. Students will ask any final questions or make any final comments in the appropriate forum location before leaving the module.
2	**Objective**: SWBAT define the purpose for completing the square by typing a paragraph into Canvas with examples. **Key Points/Terms:** • An equation in which one side is a perfect square trinomial that can be easily solved by taking the square root of the other side. **Activation of Prior Knowledge**: Teacher will place a "Do Now" activity in the online learning system discussion portal and instruct students to begin. The "Do Now" problem will ask students to write the short and long forms of a circular	Students will write down the objective and key points in their online notebooks. Student will complete the "Do Now" activity diligently and quietly. Students will respond to all checks for understanding and will share their short and long form answers via the online learning system.

	equation from last lesson. Teacher will post checks for understanding questions in the “Do Now” to ensure understanding.	
	INM/Modeling: Teacher will instruct students to complete the Acellus deficiency diagnostic about perfect squares. Once complete, teacher will instruct students to continue onto the new material modules. The new material modules will provide instructional examples of completing the square and when you would use the technique. The module will include practice questions to ensure understanding. The teacher will use their own checks for understanding located in the online learning system to ensure comprehension and will monitor progress via online tracking. Teacher will provide assistance when necessary through the online learning system and will redirect students to additional modules if differentiation is needed.	Students will use the Acellus perfect squares module to during introduction to new material. Other screens unrelated to the lesson will be prohibited. Students will complete the diagnostic before moving onto the new material modules and note deficiencies. Students will take notes during the module via online notebook and will sit quietly and respectfully when finished.
	Guided Practice: Teacher will ask students to open the “perfect squares“ discussion forum within Canvas. Inside the forum, teacher will ask students to write a mini lesson that explain how to compete the square. Teacher will also model how to add an example problem to the min lesson. Teacher will monitor progress via online tracking and will redirect students to further discussion posts if necessary.	Students will participate in the guided practice activity by writing a mini lesson for completing the square. Students will use correct mathematical language and will clearly express the steps within their lesson. Students will demonstrate respectful behavior and will reference the key points when necessary. Students will answer all checks for understanding and will remain quiet once finished.
	Independent Practice: Teacher will direct students to the formative assessment/independent practice section of Acellus. Teacher will explain that the formative assessment will ask students to answer 5 complete the square problems. Teacher will model expected behavior and provide redirections if necessary.	Students will use Acellus to complete the formative assessment/independent practice. Students will do their best to achieve 80% mastery on the formative assessment and will use their knowledge about perfect squares to complete the problem sets. Students will remain respectful during independent practice and will check their answers once finished.
	Exit Ticket: Teacher will present an exit ticket questions at the conclusion of the lesson. This question will ask students to complete one final square problem and write their answers on a sticky note. Students will place the sticky note on the door on the way out of class.	Students will complete the exit ticket sticky note and place on the door once finished.

3	**Objective**: SWBAT demonstrate understanding of circles and perfect squares by writing the correct equation for various circles. **Key Points/Terms:** • Rely on your knowledge of completing the square to write these equations.	Students will write down the objective and key points in their online notebooks.
	Activation of Prior Knowledge: Teacher will place a "Do Now" activity in Canvas and instruct students to begin. The "Do Now" problem will ask students to complete the square of their mastery check from yesterday. Teacher will instruct students that this data points gives a clear picture of complete the square retention.	Student will complete the "Do Now" activity in Canvas diligently and quietly. Students will respond to all checks for understanding and will share their answers via the online learning system. Students will participate in the discussion about complete the square retention.
	INM/Modeling: Teacher will instruct students to Acellus to complete the new material module about "writing equations that describe circles". Once complete, students will answer check for understanding questions. Teacher will provide assistance when necessary through the online learning system and will redirect students to additional modules if needed.	Students will use the Acellus modules to complete the introduction to new material. Other screens unrelated to the lesson will be prohibited. Students will ask clarifying questions about circular equations and will sit quietly when finished.
	Guided Practice: Teacher will ask students to open the "circular equations individual whiteboard" forum. Inside the forum, teacher will have written instructions to help students answer questions privately, like hidden individual whiteboards. Students are expected to answer questions without assistance from their classmates. Students will also provide feedback after being taught to on how the "teacher" could improve their method. Teacher will reference the expected behavior notes available in the online forum and will use checks for understanding questions to monitor comprehension. Teacher will monitor progress via online tracking.	Students will participate in the guided practice activity by using their hidden individual whiteboards forum. Students will hear that answers are anonymous to each other, but clear to the teacher. Students will answer all checks for understanding and will remain quiet once finished.
	Independent Practice: Teacher will direct students to the formative assessment/independent practice section of Acellus.	

	Teacher will reference the expected behavior in the online learning system and monitor progress via online tracking. Teacher will remind students that they must answer 80% of the questions correctly in order to master the standard. The formative assessment will ask students to solve 10 circular equations questions that range from radius and missing information when completing the square. **Exit Ticket**: Teacher will present two exit ticket questions at the conclusion of the lesson. These questions will ask students to find the equation for two final circular equations problems. Teacher will instruct students to answer these on the index cards and to drop the cards into the class folder when leaving.	Students will use Acellus to complete the formative assessment/independent practice. Students will do their best to achieve 80% mastery on the formative assessment. Students will remain respectful during independent practice and will check their answers once finished. Students will complete the exit ticket problems within Canvas. Students will ask any final questions or make any final comments in the appropriate forum location before leaving the module.
4	**Assessment Introduction:** Teacher will welcome students and lead them though calming warm up exercises to decrease test anxiety. Teacher will ask students to recall and share test-taking strategies. Teacher will direct students to the Acellus portal and help them find the summative assessment. Teacher will model appropriate test taking behavior and direct students to the login screen. **Assessment:** The Acellus summative will consist of 20 questions. Students much achieve 80% or better to master this standard. Teacher will monitor student progress via online tracking.	Students will prepare for the summative by completing the calming exercises and sharing their test taking strategies. Students will complete the summative assessment to the best of their ability. Students must score 80% or better to master the standard.

Summative Assessment Items: *Attach here.* For each summative assessment item, include an answer key or scoring rubric describing how points are to be awarded.

(Two points each. 10 points total. Must achieve 80% of better to master the standard)

1. Write the long form and short form equations for a circle.

2. Define the purpose for completing a square.

3. What is the equation of a circle centered at $(-4, 5)$ with a radius of $\sqrt{2}$?

4. What are the center and radius of the circle described by the equation: $x^2 - 4x + y^2 + 10y + 13 = 0?$

5. Graph the circle for problem #4.

Answer Key:

1. Long Form: $(x - h)^2 + (y - k)^2 = r^2$
   Short Form: $x^2 + y^2 = r^2$

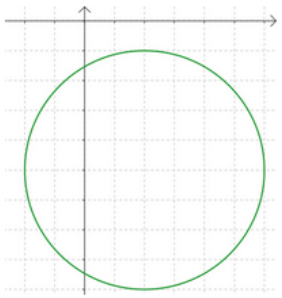
2. When completing the square, you are trying to figure out what number to add to make a perfect square trinomial.

3. $h = -4$, $k = 5$, $r = \sqrt{2}$.

   The equation of the circle is: $(x - (-4))^2 + (y - 5)^2 = \left(\sqrt{2}\right)^2$.
   This can be simplified to $(x + 4)^2 + (y - 5)^2 = 2$.

4. Complete the square to rewrite the equation in graphing form:

$$x^2 - 4x + \underline{4} + y^2 + 10y + \underline{25} = -13\underline{+4 + 25}$$
$$(x-2)^2 + (y+5)^2 = 16$$

The center of the circle is $(2, -5)$ and the radius is 4.

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