

Lake Trigonometry Project Rubric

Category	Criteria				Points
	25	20	15	10	
Solving Equations using Trigonometric Identities	<p>Student correctly and completely:</p> <p>Sets up the trigonometric equation</p> <p>Determines the observer's viewing angle using the equation</p> <p>Determines the drone's viewing angle using right triangle relationships and the observer's viewing angle</p>	<p>Student sets up an incorrect equation, but solves it correctly and determines both angles OR</p> <p>Student correctly determines both angles but has insufficient/unclear justification OR</p> <p>Student correctly solves for the observer's viewing angle but not the drone's viewing angle</p>	<p>Student correctly sets up the trigonometric equation but is unable to determine either angle OR</p> <p>Student sets up an incorrect equation (with many correct components) and solves it incorrectly</p>	<p>Student incorrectly determines both angles and lacks justification OR</p> <p>Student sets up an incorrect equation and solves it incorrectly</p>	
Geometric Constructions	<p>Student correctly and completely:</p> <p>Approximates the shape of the lake and draws it on the diagram clearly (using compass, ruler, etc. as necessary)</p> <p>Properly determines the geometric center of the lake (example: finding the centroid, circumcenter, orthocenter, or incenter if using a triangle)</p>	<p>Student approximates the shape of the lake and draws it on the diagram clearly (using compass, ruler, etc. as necessary), but approximates the center of the lake without using geometric techniques OR</p> <p>Student draws a figure on the lake but did not use tools to ensure the figure was accurate, but uses geometric techniques to determine the center</p>	<p>Student does not select a geometric figure to approximate the lake (example: outlines the outer edges of the lake) and approximates the center of the lake without using geometric techniques</p>	<p>Student work indicates guessing the center of the lake without approximating its shape or using any geometric techniques</p>	

<p>Reasoning using Trigonometry</p>	<p>Student correctly and completely:</p> <p>Uses the center of the lake found in #2 to find the distance to the farthest edge of the lake/figure</p> <p>Uses half the viewing angle of the drone found in #1 and the above distance in a tangent function to determine the necessary minimum height.</p>	<p>Student uses the center and camera angle, but incorrectly determines the height due to an error in calculation or choosing the wrong trig function</p> <p>OR</p> <p>Student uses a guess and check method to determine a height that would allow the drone to record the whole lake, but is not the lowest possible and verifies this height using trigonometry</p>	<p>Student guesses a reasonable height for the drone using questionable logic and does not verify their answer mathematically</p>	<p>Student does not use the information found in #1 and #2 to support/ determine their answer, which may be a simple guess or not provided at all</p>	
<p>Modeling</p>	<p>Student correctly and completely:</p> <p>Creates a clear, labeled diagram of the lake, observer, and drone for #1 (forming a right triangle)</p> <p>Clearly demonstrates all constructions on the lake diagram for #2</p> <p>Creates a clear, labeled diagram of the drone, center of the lake, and edge of the lake for #3 (forming a right triangle)</p>	<p>Student has diagrams for #1 and #3 and shows constructions on #2, but work may be missing labels, or somewhat unclear. Constructions may have been completed without using a compass or ruler.</p>	<p>Student has very unclear diagrams for #1 and #3 that do not demonstrate the locations of the lake, center, drone, or observer.</p> <p>Student may have attempted to create one diagram to use and update for every problem.</p>	<p>Student did not create diagrams for #1 and #3 or demonstrate constructions at all on #2</p>	

Total: _____