Mathematics
Geometry II Honors
Unit 4: Inequalities in Geometry

Essential Understandings	▪ In triangles and other polygons, segments of unequal lengths and angles of unequal measures are used to derive many geometric relationships.
Essential Questions	▪ What are the inequality properties of one triangle? ▪ What are the inequality properties when comparing two triangles?
Essential Knowledge	▪ The measures of the angles in a triangle are related to the lengths of the sides in the triangle. ▪ The measure of an exterior angle of a triangle is related to the measures of its remote interior angles. ▪ The measure of an angle in one triangle relates to the measure of the corresponding angle in a second triangle. ▪ The length of a side in one triangle relates to the length of the corresponding side in a second triangle. ▪ Inverse, converse, and contrapositive are variations of a conditional statement.
Vocabulary	▪ <u>Terms</u>: 　○ inverse, converse, contrapositive, logically equivalent statements, indirect proof, SSS Inequality, SAS Inequality
Essential Skills	▪ Identify largest angle to smallest angle in a triangle. ▪ Identify longest side to shortest side in a triangle. ▪ Use SSS Inequality and SAS Inequality to compare the sides and angles of two different triangles. ▪ Write the inverse, converse, and contrapositive of a conditional statement. ▪ Identify logically equivalent statements.

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Related Maine Learning Results	<u>Mathematics</u>
	C. Geometry
	  Geometric Figures
	  C1.Students justify statements about polygons and solve problems.
	      a. Use the properties of triangles to prove theorems about figures and relationships among figures.
	      b. Solve for missing dimensions based on congruence and similarity.
	      c. Use the Pythagorean Theorem in situations where right triangles are created by adding segments to figures.
	      d. Use the distance formula.
	  C2.Students justify statements about circles and solve problems.
	      a. Use the concepts of central and inscribed angles to solve problems and justify statements.
	      b. Use relationships among arc length and circumference, and areas of circles and sectors to solve problems and justify statements.
	  C3.Students understand and use basic ideas of trigonometry.
	      a. Identify and find the value of trigonometric ratios for angles in right triangles.
	      b. Use trigonometry to solve for missing lengths in right triangles.
	      c. Use inverse trigonometric functions to find missing angles in right triangles.

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Related Maine Learning Results	D. Algebra
	Equations and Inequalities
	D2.Students solve families of equations and inequalities.
	   a. Solve systems of linear equations and inequalities in two unknowns and interpret their graphs.
	   b. Solve quadratic equations graphically, by factoring in cases where factoring is efficient, and by applying the quadratic formula.
	   c. Solve simple rational equations.
	   d. Solve absolute value equations and inequalities and interpret the results.
	   e. Apply the understanding that the solution(s) to equations of the form $f(x) = g(x)$ are x-value(s) of the point(s) of intersection of the graphs of $f(x)$ and $g(x)$ and common outputs in table of values.
	   f. Explain why the coordinates of the point of intersection of the lines represented by a system of equations is its solution and apply this understanding to solving problems.
	D3.Students understand and apply ideas of logarithms.
	   a. Use and interpret logarithmic scales.
	   b. Solve equations in the form of $x + b^y$ using the equivalent form $y = \log_b x$.

Sample Lessons And Activities	▪ Introduce and prove The Exterior Angle Inequality Theorem ("The measure of an exterior angle of a triangle is greater than the measure of either remote interior angle.") ▪ Use this theorem to determine relative angle measurements of figures containing triangles
Sample Classroom Assessment Methods	▪ Quizzes ▪ Take-home worksheets ▪ Tests
Sample Resources	▪ <u>Publications:</u> ○ <u>Geometry</u>, McDougal Littell