Mathematics
Geometry: Academic
Unit 3: Parallel Lines

Essential Understandings	▪ Parallel lines have many properties and applications in geometry.
Essential Questions	▪ What are some relationships between angles formed by parallel lines and a transversal? ▪ What is the difference between deductive and inductive reasoning? ▪ What determines parallel lines? ▪ What are the names of the special pairs of angles formed by a transversal? ▪ What theorems involve parallel lines?
Essential Knowledge	▪ Parallel lines and a transversal form pairs of angles that are congruent or supplementary. ▪ Congruent angles can determine parallel lines. ▪ The sum of the measures of the interior angles of a triangle is 180. ▪ Skew lines are noncoplanar. ▪ The sum of the interior angles of a polygon is related to the number of sides. ▪ The sum of the exterior angles of a polygon, one at each vertex, is always equal to 360. ▪ A regular polygon has congruent sides and congruent angles. ▪ Inductive reasoning involves using patterns, not deductions.
Vocabulary	▪ <u>Terms</u>: ○ parallel lines, parallel planes, skew lines, transversal, corresponding angles, alternate interior angles, same side interior angles, same side exterior angles, alternate exterior angles, same side exterior angles, polygon, regular polygon, pentagon, hexagon, octagon, decagon, n-gon, convex, nonconvex, exterior angle of a polygon, interior angle of a polygon, remote interior angles of a triangle, inductive reasoning
Essential Skills	▪ Prove certain angles are congruent when two parallel lines are cut by a transversal ▪ Prove certain angles are supplementary when two parallel lines are cut by a transversal ▪ Prove two lines are parallel if certain angles are congruent. ▪ Prove two lines are parallel if certain angles are supplementary. ▪ Identify scalene, isosceles, equilateral, acute, right obtuse and equiangular triangles. ▪ Find the measures of the angles of a triangle based on given information. ▪ Identify polygons, pentagons, hexagons, octagons, decagons, etc. ▪ Find the measure of an angle in a triangle from other known angle measures.

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.
	D. Algebra
	  Symbols and Expressions
	  D1.Students understand and use polynomials and expressions with rational exponents.
	    a. Simplify expressions including those with rational numbers.
	    b. Add, subtract, and multiply polynomials.
	    c. Factor the common term out of polynomial expressions.
	    d. Divide polynomials by (ax+b).

Mathematics
Geometry: Academic
Unit 3: Parallel Lines

Related Maine Learning Results	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	▪ Define and identify angles associated two lines cut by a transversal: corresponding angles, alternate interior angles, same side interior angles, etc.
Sample Classroom Assessment Methods	▪ Quizzes ▪ Take-home worksheets ▪ Tests

Sample Resources	▪ <u>Publications</u>:
	   o <u>Geometry</u>, Jurgensen, Brown, and Jurgensen, McDougal Littell
	   o <u>Geometry: Concepts and Skills</u>, Larson, Boswell, and Stiff, McDougal Littell