

**Mathematics**  
**Geometry: Academic**  
**Unit 10: Areas of Plane Figures**

<b>Essential Understandings</b>	<ul style="list-style-type: none"> <li>▪ Area has many real-life applications.</li> </ul>
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>▪ What is area?</li> <li>▪ What is perimeter?</li> <li>▪ What is circumference?</li> <li>▪ How do we find areas of geometric figures?</li> <li>▪ How can we use area to answer other real-life situations?</li> </ul>
<b>Essential Knowledge</b>	<ul style="list-style-type: none"> <li>▪ The area and perimeter of polygons and circles can be used to solve many real-life applications.</li> </ul>
<b>Vocabulary</b>	<p><u>Terms:</u></p> <ul style="list-style-type: none"> <li>○ area, perimeter, altitude, base, height; center, apothem, radius, and central angle of a regular polygon; circumference, Pi (<math>\pi</math>), segment (of a circle), sector (of a circle); probability and geometric probability</li> </ul>
<b>Essential Skills</b>	<ul style="list-style-type: none"> <li>▪ Find the area and perimeter of triangles, parallelograms, rectangles, rhombuses, squares and trapezoids.</li> <li>▪ Find the area and perimeter of regular polygons.</li> <li>▪ Apply the Pythagorean Theorem and right triangle trigonometry to find the areas and perimeters of polygons and circles.</li> <li>▪ Find the area and circumference circles.</li> <li>▪ Find the area of a segment and a sector of a circle.</li> <li>▪ Find the lengths of arcs of a circle.</li> <li>▪ Find geometric probability.</li> <li>▪ Find ratios to find the areas and perimeters of similar polygons.</li> <li>▪ Find the area and perimeter of regions enclosed by combining (parts of) circles and polygons.</li> </ul>

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<p><b>Related Maine Learning Results</b></p>	<p><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. Geometric Measurement C4.Students find the surface area and volume of three-dimensional objects. a. Find the volume and surface area of three-dimensional figures including cones and spheres. b. Determine the effect of changes in linear dimensions on the volume and surface areas of similar and other three-dimensional figures.</p>
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<b>Related Maine Learning Results</b>	<p>D. Algebra  Symbols and Expressions  D1.Students understand and use polynomials and expressions with rational exponents.</p> <ol style="list-style-type: none"> <li>a. Simplify expressions including those with rational numbers.</li> <li>b. Add, subtract, and multiply polynomials.</li> <li>c. Factor the common term out of polynomial expressions.</li> <li>d. Divide polynomials by <math>(ax+b)</math>.</li> </ol> <p>Equations and Inequalities  D2.Students solve families of equations and inequalities.</p> <ol style="list-style-type: none"> <li>a. Solve systems of linear equations and inequalities in two unknowns and interpret their graphs.</li> <li>b. Solve quadratic equations graphically, by factoring in cases where factoring is efficient, and by applying the quadratic formula.</li> <li>c. Solve simple rational equations.</li> <li>d. Solve absolute value equations and inequalities and interpret the results.</li> <li>e. Apply the understanding that the solution(s) to equations of the form <math>f(x) = g(x)</math> are x-value(s) of the point(s) of intersection of the graphs of <math>f(x)</math> and <math>g(x)</math> and common outputs in table of values.</li> <li>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.</li> </ol> <p>D3.Students understand and apply ideas of logarithms.</p> <ol style="list-style-type: none"> <li>a. Use and interpret logarithmic scales.</li> <li>b. Solve equations in the form of <math>x + b^y</math> using the equivalent form <math>y = \log_b x</math>.</li> </ol>
<b>Sample Lessons And Activities</b>	<ul style="list-style-type: none"> <li>▪ Use the Area Addition Postulate, the formula for the areas of a triangle and a rectangle to find the areas of figures that are composed of triangles and rectangles</li> </ul>
<b>Sample Classroom Assessment Methods</b>	<ul style="list-style-type: none"> <li>▪ Quizzes</li> <li>▪ Take-home worksheets</li> <li>▪ Tests</li> </ul>
<b>Sample Resources</b>	<ul style="list-style-type: none"> <li>▪ <u>Publications:</u> <ul style="list-style-type: none"> <li>○ <u>Geometry</u>, Jurgensen, Brown, Jurgensen (McDougal Littell)</li> <li>○ <u>Geometry: Concepts and Skills</u>, Larson, Boswell, Stiff (McDougal Littell)</li> </ul> </li> </ul>