

**Mathematics**  
**Algebra II: CP**  
**Unit 7: Conic Sections**

<b>Essential Understandings</b>	<ul style="list-style-type: none"> <li>▪ Conic sections can be used to model real-life situations.</li> </ul>
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>▪ What are conic sections?</li> <li>▪ What characteristics of the equation determine the type of conic section?</li> <li>▪ How do you manipulate the general equation of a conic section into standard form?</li> <li>▪ How do you draw reasonable graphs of conic sections?</li> </ul>
<b>Essential Knowledge</b>	<ul style="list-style-type: none"> <li>▪ Algebraic manipulation is used put the equation in standard form.</li> <li>▪ The coefficients of quadratic terms determine the type of conic section.</li> </ul>
<b>Vocabulary</b>	<ul style="list-style-type: none"> <li>▪ <u>Terms:</u> <ul style="list-style-type: none"> <li>○ conic section, circle, ellipse, parabola, major and minor axis, vertices, foci, center</li> </ul> </li> </ul>
<b>Essential Skills</b>	<ul style="list-style-type: none"> <li>▪ Complete the square.</li> <li>▪ Sketch graphs of conic sections.</li> <li>▪ Identify the type of conic section.</li> <li>▪ Given specific information, the student will be able to generate the equation of the conic section.</li> </ul>
<b>Related Maine Learning Results</b>	<p><u>Mathematics</u></p> <p>A. Number</p> <p>Real Number</p> <p>A1.Students will know how to represent and use real numbers.</p> <ol style="list-style-type: none"> <li>a. Use the concept of nth root.</li> <li>b. Estimate the value(s) of roots and use technology to approximate them.</li> <li>c. Compute using laws of exponents.</li> <li>d. Multiply and divide numbers expressed in scientific notation.</li> <li>e. Understand that some quadratic equations do not have real solutions and that there exist other number systems to allow for solutions to these equations.</li> </ol>

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<p><b>Related Maine Learning Results</b></p>	<p>C. Geometry Geometric Figures C1.Students justify statements about polygons and solve problems.</p> <ul style="list-style-type: none"><li>a. Use the properties of triangles to prove theorems about figures and relationships among figures.</li><li>b. Solve for missing dimensions based on congruence and similarity.</li><li>c. Use the Pythagorean Theorem in situations where right triangles are created by adding segments to figures.</li><li>d. Use the distance formula.</li></ul> <p>C2.Students justify statements about circles and solve problems.</p> <ul style="list-style-type: none"><li>a. Use the concepts of central and inscribed angles to solve problems and justify statements.</li><li>b. Use relationships among arc length and circumference, and areas of circles and sectors to solve problems and justify statements.</li></ul> <p>C3.Students understand and use basic ideas of trigonometry.</p> <ul style="list-style-type: none"><li>a. Identify and find the value of trigonometric ratios for angles in right triangles.</li><li>b. Use trigonometry to solve for missing lengths in right triangles.</li><li>c. Use inverse trigonometric functions to find missing angles in right triangles.</li></ul> <p>D. Algebra Symbols and Expressions D1.Students understand and use polynomials and expressions with rational exponents.</p> <ul 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></ul>
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<b>Related Maine Learning Results</b>	<p>Equations and Inequalities</p> <p>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 <math>x</math>-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> <p>Functions and Relations</p> <p>D4.Students understand and interpret the characteristics of functions using graphs, tables, and algebraic techniques.</p> <ol style="list-style-type: none"> <li>a. Recognize the graphs and sketch graphs of the basic functions.</li> <li>b. Apply functions from these families to problem situations.</li> <li>c. Use concepts such as domain, range, zeros, intercepts, and maximum and minimum values.</li> <li>d. Use the concepts of average rate of change (table of values) and increasing and decreasing over intervals, and use these characteristics to compare functions.</li> </ol>
<b>Sample Lessons And Activities</b>	<ul style="list-style-type: none"> <li>▪ Graph various conic sections.</li> <li>▪ Manipulate the equation of a conic section by completing the square to put it in standard form.</li> </ul>
<b>Sample Classroom Assessment Methods</b>	<ul style="list-style-type: none"> <li>▪ Evaluate homework.</li> <li>▪ Quizzes.</li> <li>▪ Chapter test.</li> </ul>

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<p><b>Sample Resources</b></p>	<ul style="list-style-type: none"><li>▪ <u>Publications:</u><ul style="list-style-type: none"><li>○ McDougal Littell Algebra 2</li></ul></li><li>▪ <u>Other Resources:</u><ul style="list-style-type: none"><li>○ Graphing calculators</li><li>○ The A+ learning system for remediation</li></ul></li></ul>
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