

**Mathematics**  
**Precalculus: B**  
**Unit 4: Sequences and Series**

<b>Essential Understandings</b>	<ul style="list-style-type: none"> <li>▪ Mathematics can be used to model real-life situations.</li> </ul>
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>▪ What are sequences and series?</li> <li>▪ How do you generate the nth term of a sequence?</li> <li>▪ How do you differentiate between an Arithmetic sequence and a Geometric sequence?</li> <li>▪ How do you find the sum of a finite or infinite series?</li> </ul>
<b>Essential Knowledge</b>	<ul style="list-style-type: none"> <li>▪ Sequences are generated by an underlying pattern.</li> <li>▪ The nth term of a sequence is calculated algebraically.</li> <li>▪ Understand the common difference or common ratio of a sequence.</li> <li>▪ Understand the formulae needed to sum a series.</li> </ul>
<b>Vocabulary</b>	<ul style="list-style-type: none"> <li>▪ <u>Terms:</u> <ul style="list-style-type: none"> <li>○ arithmetic sequence, geometric sequence, finite, infinite, common ratio, common difference, series, partial sum, limit, summation notation, infinite geometric series, convergent, divergent</li> </ul> </li> </ul>
<b>Essential Skills</b>	<ul style="list-style-type: none"> <li>▪ Calculate common differences and common ratios.</li> <li>▪ Calculate the nth term of a sequence using the appropriate formula.</li> <li>▪ Determine if a series is convergent or divergent.</li> <li>▪ Calculate the sum of a finite or infinite series.</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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<b>Related Maine Learning Results</b>	<p>D. Algebra                  Functions and Relations                  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> <p>D5. Students express relationships recursively and use iterative methods to solve problems.</p> <ol style="list-style-type: none"> <li>a. Express the <math>(n+1)</math>st term in terms of the <math>n</math>th term and describe relationships in terms of starting point and rule followed to transform one terms to the next.</li> <li>b. Use technology to perform repeated calculations to develop solutions to real life problems involving linear, exponential, and other patterns of change.</li> </ol>
<b>Sample Lessons And Activities</b>	<ul style="list-style-type: none"> <li>▪ Find the first five terms of a sequence.</li> <li>▪ Find the <math>n</math>th term of a sequence.</li> <li>▪ Write a series using a summation notation.</li> <li>▪ Expand and evaluate a series.</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>
<b>Sample Resources</b>	<ul style="list-style-type: none"> <li>▪ <u>Publications:</u> <ul style="list-style-type: none"> <li>○ <u>Glencoe Advanced Mathematical Concepts</u></li> </ul> </li> <li>▪ <u>Other:</u> <ul style="list-style-type: none"> <li>○ Graphing calculators.</li> <li>○ The A+ learning system for remediation.</li> </ul> </li> </ul>