# Mathematics
# Algebra II: CP
# Unit 8: Sequences and Series

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| **Essential Understandings** | ▪ Sequences and series can be used to model real-life situations. |
| **Essential Questions** | ▪ What are sequences and series?<br>▪ How do you generate the nth term of a sequence?<br>▪ How do you differentiate between an Arithmetic sequence and a Geometric sequence? |
| **Essential Knowledge** | ▪ Sequences are generated by an underlying pattern.<br>▪ The nth term of a sequence is calculated algebraically.<br>▪ The common difference or common ratio determines the type of sequence. |
| **Vocabulary** | ▪ Terms:<br>○ arithmetic sequence, geometric sequence, common ratio, common difference, series |
| **Essential Skills** | ▪ Calculate common differences and common ratios.<br>▪ Calculate the nth term of a sequence using the appropriate formula. |
| **Related Maine Learning Results** | Mathematics<br>A. Number<br>Real Number<br>A1. Students will know how to represent and use real numbers.<br>a. Use the concept of nth root.<br>b. Estimate the value(s) of roots and use technology to approximate them.<br>c. Compute using laws of exponents.<br>d. Multiply and divide numbers expressed in scientific notation.<br>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.<br>B. Data<br>Measurement and Approximation<br>B1. Students understand the relationship between precision and accuracy.<br>a. Express answers to a reasonable degree of precision in the context of a given problem.<br>b. Represent an approximate measurement using appropriate numbers of significant figures.<br>c. Know that most measurements are approximations and explain why it is useful to take the mean of repeated measurements. |

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| **Related Maine Learning Results** | D. Algebra<br>Symbols and Expressions<br>D1. Students understand and use polynomials and expressions with rational exponents.<br>a. Simplify expressions including those with rational numbers.<br>b. Add, subtract, and multiply polynomials.<br>c. Factor the common term out of polynomial expressions.<br>d. Divide polynomials by (ax+b).<br>Equations and Inequalities<br>D2. Students solve families of equations and inequalities.<br>a. Solve systems of linear equations and inequalities in two unknowns and interpret their graphs.<br>b. Solve quadratic equations graphically, by factoring in cases where factoring is efficient, and by applying the quadratic formula.<br>c. Solve simple rational equations.<br>d. Solve absolute value equations and inequalities and interpret the results.<br>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.<br>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.<br>D3. Students understand and apply ideas of logarithms.<br>a. Use and interpret logarithmic scales.<br>b. Solve equations in the form of $x + b^y$ using the equivalent form $y = \log_b x$.<br>Functions and Relations<br>D4. Students understand and interpret the characteristics of functions using graphs, tables, and algebraic techniques.<br>a. Recognize the graphs and sketch graphs of the basic functions.<br>b. Apply functions from these families to problem situations.<br>c. Use concepts such as domain, range, zeros, intercepts, and maximum and minimum values.<br>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. |
| **Sample Lessons And Activities** | ▪ Find the first five terms of a sequence.<br>▪ Find the nth term of a sequence. |

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| **Sample Classroom Assessment Methods** | ▪ Evaluate homework.<br>▪ Quizzes.<br>▪ Chapter test. |
| **Sample Resources** | ▪ Publications:<br>o McDougal Littell Algebra 2<br>▪ Other Resources:<br>o Graphing calculators<br>o The A+ learning system for remediation |