# Unit 7 Sequences and Series

Content Area: **Math**
Course(s): **Accelerated PreCalculus, CP PreCalculus**
Time Period: **Marking Period 3**
Length: **4**
Status: **Published**

## Unit Overview

In this unit, students will analyze sequences and series, and expand binomials.

## Enduring Understandings

- Students will represent sequences and series and use them to model real-life phenomena. They will also expand binomials suing Pascal's Triangle and the Binomial Theorem.

## Essential Questions

How do you represent a sequence of numbers or the sum of a sequence?

How do you find the nth term or partial sum of an arithmetic sequence?

How do you find terms and sums of geometric sequences?

How do you use mathematical induction to find and prove formulas for sums of sequences and series?

How do you count the number of ways in which an event occurs?

How do you find the probability that a series of events will occur?

How do you find the expansion of a binomial (x+y)^n?

## New Jersey Student Learning Standards (No CCS)

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| MA.A-SSE.A.1 | Interpret expressions that represent a quantity in terms of its context. |
| MA.A-SSE.A.1a | Interpret parts of an expression, such as terms, factors, and coefficients. |
| MA.A-SSE.A.1b | Interpret complicated expressions by viewing one or more of their parts as a single entity. |

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| | For example, interpret $P(1 + r)^n$ as the product of $P$ and a factor not depending on $P$ |
| MA.A-SSE.A.2 | Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$. |
| MA.A-SSE.B | Write expressions in equivalent forms to solve problems |
| MA.A-SSE.B.3 | Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. |
| MA.A-SSE.B.3a | Factor a quadratic expression to reveal the zeros of the function it defines. |
| MA.A-SSE.B.3b | Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. |
| MA.A-SSE.B.3c | Use the properties of exponents to transform expressions for exponential functions. |
| MA.S-CP.A.1 | Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not"). |
| MA.S-CP.A.2 | Understand that two events $A$ and $B$ are independent if the probability of $A$ and $B$ occurring together is the product of their probabilities, and use this characterization to determine if they are independent. |
| MA.S-CP.A.3 | Understand the conditional probability of $A$ given $B$ as $P(A \text{ and } B)/P(B)$, and interpret independence of $A$ and $B$ as saying that the conditional probability of $A$ given $B$ is the same as the probability of $A$, and the conditional probability of $B$ given $A$ is the same as the probability of $B$. |
| MA.S-CP.A.4 | Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. |
| MA.S-CP.A.5 | Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. |
| MA.S-CP.B.6 | Find the conditional probability of $A$ given $B$ as the fraction of $B$'s outcomes that also belong to $A$, and interpret the answer in terms of the model. |
| MA.S-CP.B.7 | Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model. |
| MA.S-CP.B.8 | Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = [P(A)] \times [P(B \mid A)] = [P(B)] \times [P(A \mid B)]$, and interpret the answer in terms of the model. |
| MA.S-CP.B.9 | Use permutations and combinations to compute probabilities of compound events and solve problems. |

## Instructional Strategies & Learning Activities

- Provide access to online book
- Provide access to book pages and problems through Canvas
- Provide access to review keys
- Provide access to webassign as learning and reviewing tool
- Specific problems will be pulled out to to provide opportunities to extend their knowledge.
- Work on problem solving in a group setting

## Formative Assessments

- Daily homework checks
- Quiz
- Chapter Test
- Exit Tickets
- Warm-ups

## Summative Assessment

- Unit Test
- Unit Project

## Alternate Assessments

- Modified homework
- Modified quizzes
- Modified tests
- Modified projects

## Closure

- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Have students dramatize a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in terms so simple that a child in first grade would get it.
- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Have kids create a cheat sheet of information that would be useful for a quiz on the day's topic.
- Kids write notes to peers describing what they learned from them during class discussions.
- Have students fill out a checklist with the objectives for the day.
- Have students complete an exit ticket without putting their name on it. Hand back exit tickets the next day in class and have students correct as a warm up.
- Ask students to write what they learned, and any lingering questions on an "exit ticket". Before they leave class, have them put their exit tickets in a folder or bin labeled either "Got It," "More Practice,

Please," or "I Need Some Help!"

- After writing down the learning outcome, ask students to take a card, circle one of the following options, and return the card to you before they leave: "Stop (I'm totally confused. Go (I'm ready to move on.)" or "Proceed with caution (I could use some clarification on . . .)"