Skills for Sequences:

❶ Identify if a sequence is arithmetic, geometric, or neither.

Compare each term to the term before it.

- If the differences are constant, it is an arithmetic sequence. If ANY difference between two consecutive terms is not the same as the others, then it is NOT arithmetic!
- If the ratio of each pair of consecutive terms is constant, then it is a geometric sequence. If ANY ratio between two consecutive terms is not the same as the others, then it is NOT geometric!
- If it not an arithmetic or a geometric sequence, then we say it is neither.

❷ Write a recursive formula for a sequence.

Refer to the 9.1 Reteach practice sheet for the steps and examples of this skill.

❸ Write an explicit formula for a sequence.

- If the sequence is arithmetic, then:
    - The common difference comes from subtracting a term from the term that follows it: $d = a_n - a_{n-1}$
    - Identify the first term, a_1, the common difference, d, and then use the formula: $a_n = a_1 + (n-1)(d)$
    - If the first term is unknown, but you know another term, call it the kth term, and the common difference, d, then you can use the formula $a_n = a_k + (n-k)(d)$
- If the sequence is geometric, then:
    - The common ratio comes from dividing a term by the term that precedes it: $r = \dfrac{a_n}{a_{n-1}}$
    - Identify the first term, a_1, the common ratio, r, and then use the formula: $a_n = a_1(r)^{n-1}$
    - If the first term is unknown, but you know another term, call it the kth term, and the common ratio, r, then you can use the formula $a_n = a_k(r)^{n-k}$
- If the sequence is neither arithmetic nor geometric, then make a table with columns n and a_n, and look for a pattern that lets you put in n and gives a_n. These are not always easy to find. In this course, I will not ask you to find any explicit formulas that are very complicated, but you should be able to find ones that have a clear pattern.

❹ Find a specific term of a given sequence.

- Substitute for n to get the desired term. Recall that, for the first term, $n = 1$. For the second term, $n = 2$, and so on.