

Consider a sequence where the first two terms are 1 and 2.

- What would be the next term if it was an arithmetic sequence?
- What would be the next term if it was a geometric sequence?

Create your own sequence that starts with 1 and 2. What is the rule for each term in the sequence? Is there a closed form solution for the n th term of your sequence? What about the sum up to the n th term?

Write code in the language of your choice to calculate the n th term of the sequence defined by

$$a_n = a_{n-1} + 3, a_0 = 0$$

In two different ways:

1. Using a for loop to compute from a_0 to a_n
2. Using the closed form for the expression

Try running the code both ways for $n = 1, 100, 10,000$, and $1,000,000$.

Is there a significant time difference between the two methods? If there is, at what point do you notice a difference?

Does the countability of a set imply anything about the span of the set? That is, the difference between the smallest and the largest values? What about uncountable sets?

Prove $f(x)$ is bijective.

$$f(x) = \frac{3}{2}x + 6$$

Show $g(x)$ is not bijective

$$g(x) = 7x^4$$

What are some indicators that a function is bijective? Are there any indicators that a function is not bijective?