

= Sylvester 's sequence =

In number theory , Sylvester 's sequence is an integer sequence in which each member of the sequence is the product of the previous members , plus one . The first few terms of the sequence are :

2 , 3 , 7 , 43 , 1807 , 3263443 , 10650056950807 , 113423713055421844361000443 (sequence A000058 in the OEIS) .

Sylvester 's sequence is named after James Joseph Sylvester , who first investigated it in 1880 . Its values grow doubly exponentially , and the sum of its reciprocals forms a series of unit fractions that converges to 1 more rapidly than any other series of unit fractions with the same number of terms . The recurrence by which it is defined allows the numbers in the sequence to be factored more easily than other numbers of the same magnitude , but , due to the rapid growth of the sequence , complete prime factorizations are known only for a few of its members . Values derived from this sequence have also been used to construct finite Egyptian fraction representations of 1 , Sasakian Einstein manifolds , and hard instances for online algorithms .

= = Formal definitions = =

Formally , Sylvester 's sequence can be defined by the formula
<formula>