

Applications of Patterns and Arithmetic Series that Sum to N^k

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Abstract

A well-known problem in mathematics education courses is to find the sum of the first N consecutive odd natural numbers using patterns (O'Daffer, Charles, Conney, Dossey, & Schielack, 2008), and show that the sum in fact is N^2 . The same sum of the first N consecutive odd natural numbers can also be obtained as the sum of an arithmetic series containing N terms. In this paper we will analyze the sums using both methods. We will also write series of consecutive odd numbers that sum respectively to, $N^3, N^4, N^5, \dots, N^k$, where N and k are any natural numbers. We conclude with verifying our work using arithmetic sequences/series or by telescoping the sum of our series.



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