Partial sum formula geometric

We have seen that the sum of the first n terms of a geometric series with first term a and common ratio r is $$S_n = \dfrac{a(1 - r^n)}{1 - r}, \quad\text{for } req 1.$$ In the case when r has magnitude less than 1, the term r^n approaches 0 as n becomes very large. So, in this case, the sequence of partial sums $S_1,S_2,S_3,\dots$ has a limit: $$\lim_{n\to \infty} S_n = \lim_{n\to \infty} \dfrac{a(1 - r^n)}{1 - r} = \dfrac{a}{1 - r}.$$ The value of this limit is called the limiting sum of the infinite geometric series. The values of the partial sums S_n of the series get as close as we like to the limiting sum, provided n is large enough. The limiting sum is usually referred to as the sum to infinity of the series and denoted by S_∞. Thus, for a geometric series with common ratio r such that \(|r|