I.9 Partial Product 2

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1 Conclusions

- $\Pi_{i=1}^{\infty} 1 + \frac{f(x)}{g(x)}$
- $\Pi_{i=1}^{\infty} 1 + \frac{2}{n^2+3}$
- This first variation of the function $\Pi_{i=1}^{\infty} 1 + \frac{f(x)}{g(x)}$, where $f(x) = 2$ and $g(x) = n^2 + 3$ converges at 3.766. This is so because $g(x)$ increases at a rate faster than $f(x)$ such that it will not be able to increase.
- $\Pi_{i=1}^{\infty} 1 + \frac{2}{n+3}$
- This version where $f(x) = 2$ and $g(x) = n+3$ diverges. This is so because $g(x)$ is not increasing at a fast enough rate. The pattern I notice is that after the first two elements of the sequence, the following terms can be grouped and added together such that every n terms, 100 will be added. This means the values will always be increasing.
- $\Pi_{i=1}^{\infty} 1 + b^n$
- $\Pi_{i=1}^{\infty} 1 + .5^n$
- This version of the exponential partial product will converge for values $0 < b < 1$. In this case .5 was chosen. The value b^n decreases very fast and equals 0 very quickly, therefore the product ends up being multiplied by 1 repeatedly.
- $\Pi_{i=1}^{\infty} 1 + 2^n$
- This function on the other hand diverges. This is so because 2^n increases at a very high rate, and in turn the product ends up being multiplied by increasing powers of 2. The function will grow exponentially unlike the other function where it decreases to 0.