Newman's Analytic Number Theory Book

Stefanus Koesno[1]

[1] Somewhere in California

San Jose, CA 95134 USA

(Dated: February 19, 2017)

Abstract

Very interesting short book

An interesting way to factorize $1 - z^n$

$$\begin{aligned} 1 - z^n &= (1 - e^{(2\pi i)1/n} z)(1 - e^{(2\pi i)2/n} z) \dots (1 - e^{(2\pi i)n/n} z) \\ &= \sum_{k=1}^{n} (1 - e^{(2\pi i)k/n} z) \end{aligned}$$

so if we do partial fractions on say

$$\begin{aligned} (1 - z^6)(1 - z^{15}) &= (1 - z^3)(\dots) \times (1 - z^3)(\dots) \\ &= (1 - e^{(2\pi i)j/n} z)(\dots) \times (1 - e^{(2\pi i)j/n} z)(\dots) \end{aligned}$$

Stirling's formula

$$\begin{aligned} n! &\sim \sqrt{n}\; n^n \\ &\sim n^n \end{aligned}$$

=-=