The ProbLemma Channel Sums

This document links all the sums evaluated on the ProbLemma channel to the episodes in which these evaluations were carried out.


In addition, all the sums related episodes are collected in the "Sums Are Us" play list.

1. Season 1 Episode 9 (**S1M10**): One Cotangent, Two Cotangents (Transform And Conquer)

$$\sum_{k=1}^{m} \cot^2\left(\frac{k\pi}{2m+1}\right) = \frac{m\,(2m-1)}{3}$$

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2. Season 2 Episode 2 (**S2M2**): A Weighty Question (Reinterpret And Conquer)

$$\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$$

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3. Season 2 Episode 26 (**S2M28**): Finite Integer Sums (Scope Expansion)

$$S_1 = \sum_{k=1}^{n} k = \frac{n(n+1)}{2}$$

$$S_2 = \sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$$

$$S_3 = \sum_{k=1}^{n} k^3 = \frac{n^2(n+1)^2}{4}$$

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4. Season 2 Episode 43 (S2M45): A Poisson Integral By The Book (Divide And Conquer)

$$\sum_{k=1}^{n} \log\left(1 - 2r\cos\left(\frac{k\pi}{n}\right) + r^2\right) = \log\left(\frac{r+1}{r-1}\cdot\left(r^{2n}-1\right)\right)$$

For the value of the corresponding finite product please see the “Products” index.

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5. Season