

Introduction

1. The Issue - infinity (no intuition)

2. Sizes of Infinity - there are different sizes of ∞ (Georg Cantor)

3. Ex:
$$\left. \begin{aligned} (1 + -1) + (1 + -1) + (1 + -1) + \dots &= 0 + 0 + 0 + \dots = 0 \\ 1 + (-1 + 1) + (-1 + 1) + (-1 + 1) + \dots &= 1 + 0 + 0 + \dots = 1 \end{aligned} \right\} \text{Grandi's Series}$$

$$T = 1 + -1 + 1 + -1 + 1 + -1 + \dots$$

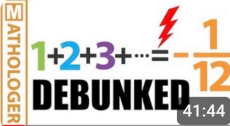
$$+ \quad T = \quad 1 + -1 + 1 + -1 + 1 + -1 + \dots$$

$$2T = 1 + 0 + 0 + \dots$$

$$2T = 1$$

$$T = \frac{1}{2}$$

4. Ex: $1 + 2 + 3 + 4 + \dots = \cancel{\infty} = -\frac{1}{12}$



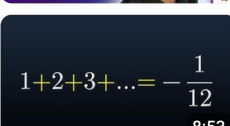
Numberphile v. Math: the truth about $1+2+3+\dots=-1/12$
Mathologer ✓
3M views • 6 years ago



One minus one plus one minus one - Numberphile
Numberphile ✓
4.6M views • 11 years ago



EXTRA Sum of Natural Numbers (second proof and extra...
Numberphile ✓
1.7M views • 9 years ago

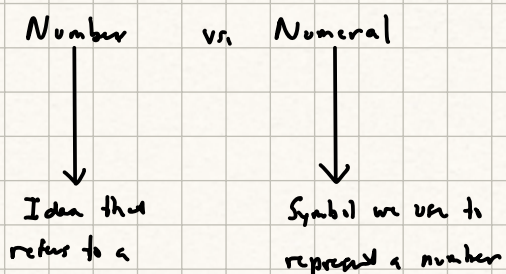


This Result Keeps Me Up At Night
BriTheMathGuy ✓
987K views • 2 years ago

5. Ex: $0.999\dots$ exactly equals 1.

If by exactly equals 1, we mean that at some point, we will have added enough 9's to get to 1, then NO.

If by exactly equals 1, we mean there is no number between $0.999\dots$ and 1, then YES.



concrete reality



	0	1	2	3
ADLaM	⓪	Ⓛ	Ⓛ	Ⓛ
Aegean		ι	ι	ι
Ahom	᱀	᱁	᱂	᱃
Arabic	٠	١	٢	٣
Balinese	ᮀ	ᮁ	ᮂ	ᮃ
Bamum		ᲀ	ᲁ	ᲂ
Bengali	০	১	২	৩
Bhaiksuki	᱀	᱁	᱂	᱃
Brahmi		—	—	—
Chakma	᱀	᱁	᱂	᱃
Cham	᱀	᱁	᱂	᱃
Chinese (simple)	〇	一	二	三
Chinese (complex)	零	壹	貳	參

0.99999999... = 1

⋯ : ⋯ : ⋯ : ⋯ : ⋯ : ⋯ : ⋯ : ⋯ :
0123456789
०१२३४५६७८९
⋯ ١٢٣٤٥٦٧٨٩
○ 一 二 三 四 五 六 七 八 九
零 壹 貳 參 肆 伍 陆 柒 捌 玖
— I II III IV V VI VII VIII IX

10x = 9.999999...
1x = 0.999999...

9x = 9.000000...

9x = 9
x = 1