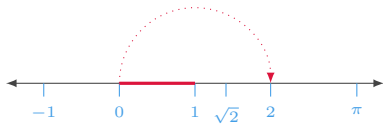


The Measuring Numbers

ian.mcloughlin@gmit.ie



What is the distance between 0 and 1?

What number comes directly after 0?

What number comes directly before 1?

0. $\overline{9}$

$$1 \times 0.999\ldots = 0.999\ldots$$

$$\Rightarrow 10 \times 0.999\ldots = 9.999\ldots$$

$$\Rightarrow 9 \times 0.999\ldots = 9.000\ldots$$

$$\Rightarrow 1 \times 0.999\ldots = 1.000\ldots$$

$$\Rightarrow 0.999\ldots = 1$$

\mathbb{R}

$\mathbb{N} \leftrightarrow \mathbb{R}$

$1 \leftrightarrow 43.17235759 \dots$

$2 \leftrightarrow 3.19535351 \dots$

$3 \leftrightarrow 209.00000000 \dots$

$4 \leftrightarrow 0.12345678 \dots$

$\vdots \leftrightarrow \vdots$

$? \leftrightarrow 0.2015 \dots$

Computer programs are countable.

Not all numbers are computable.