The World of Languages
and Languages of the World

The Language of Mathematics

Get you thinking caps on...Is mathematics a language?

Objectives

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WoLLoW the HiPPo

- Today we will
- Consider mathematics as a language
- Look at symbols within Maths – their origin and their meaning
- Crack some codes

Let’s Go!

What makes a language? Think of 4 things:

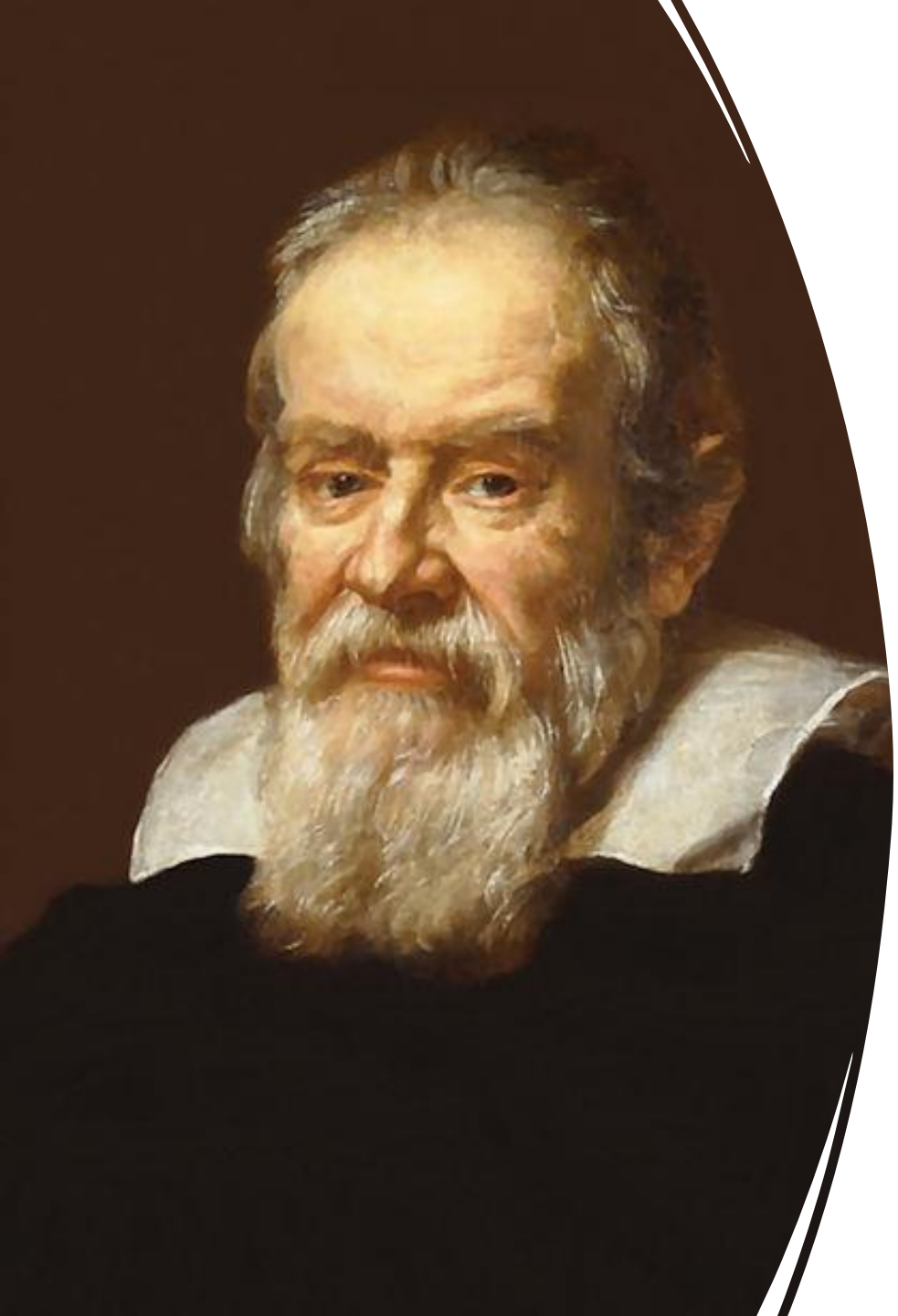
1

2

3

4

So, is mathematics a language?



Yes, it's a language!

"*Mathematics is the language in which God has written the universe.*"(Galileo)

It has a:

- Vocabulary
- Meaning
- Grammar
- Syntax (arrangement of words and phrases)
- People use and understand they symbols

Are these symbols nouns or verbs? (6 of each)

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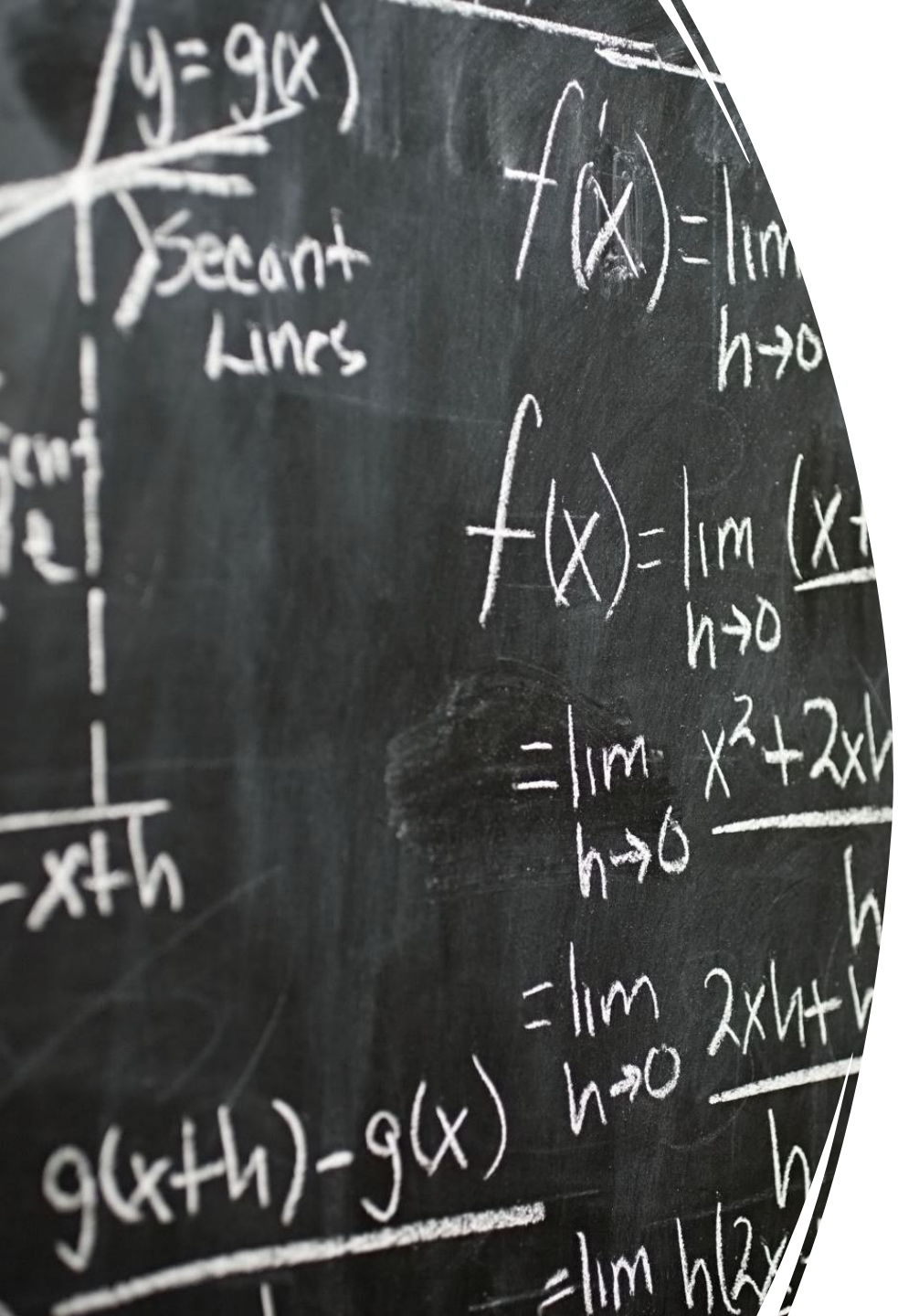


So, why do mathematicians use symbols instead of written words?

Think of three reasons:

- 1
- 2
- 3

What did you come up with?

Symbols are used as they can act as a universal language as they are the same all over the world.

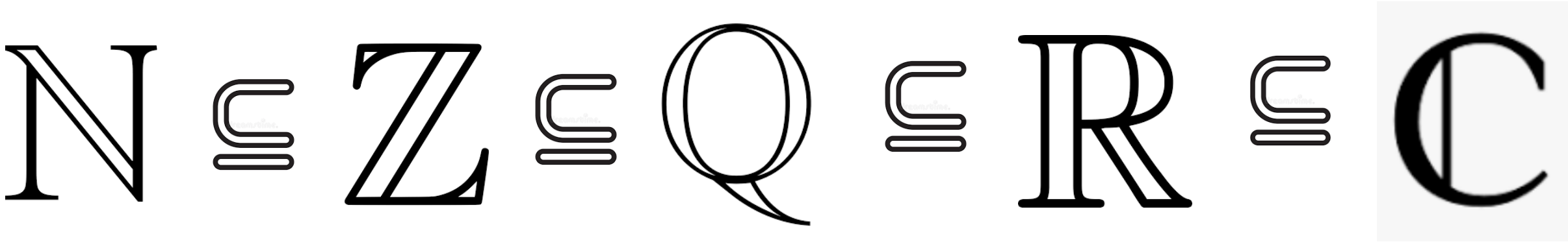
Symbols are quicker to write than words – they take less space and less time to jot down.

Symbols are flexible and they reduce the cognitive load.

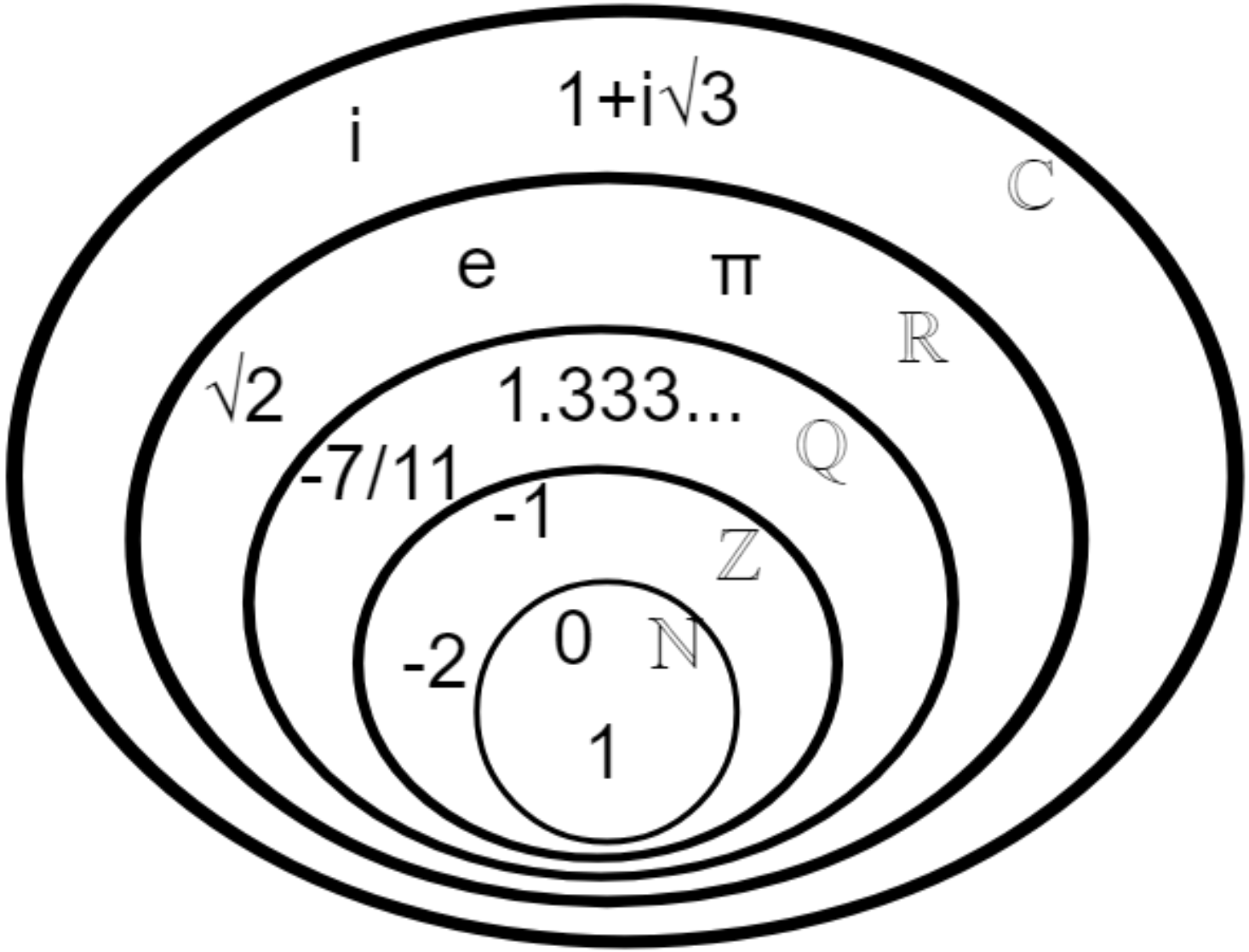
The Evolution of Numbers – do you know any of these terms?

- Natural Numbers N
- Whole Numbers W
- Integers Z
- Rational Numbers Q
- Real Numbers R
- Complex Numbers C

Language Detectives – crack this code!



Does this help?



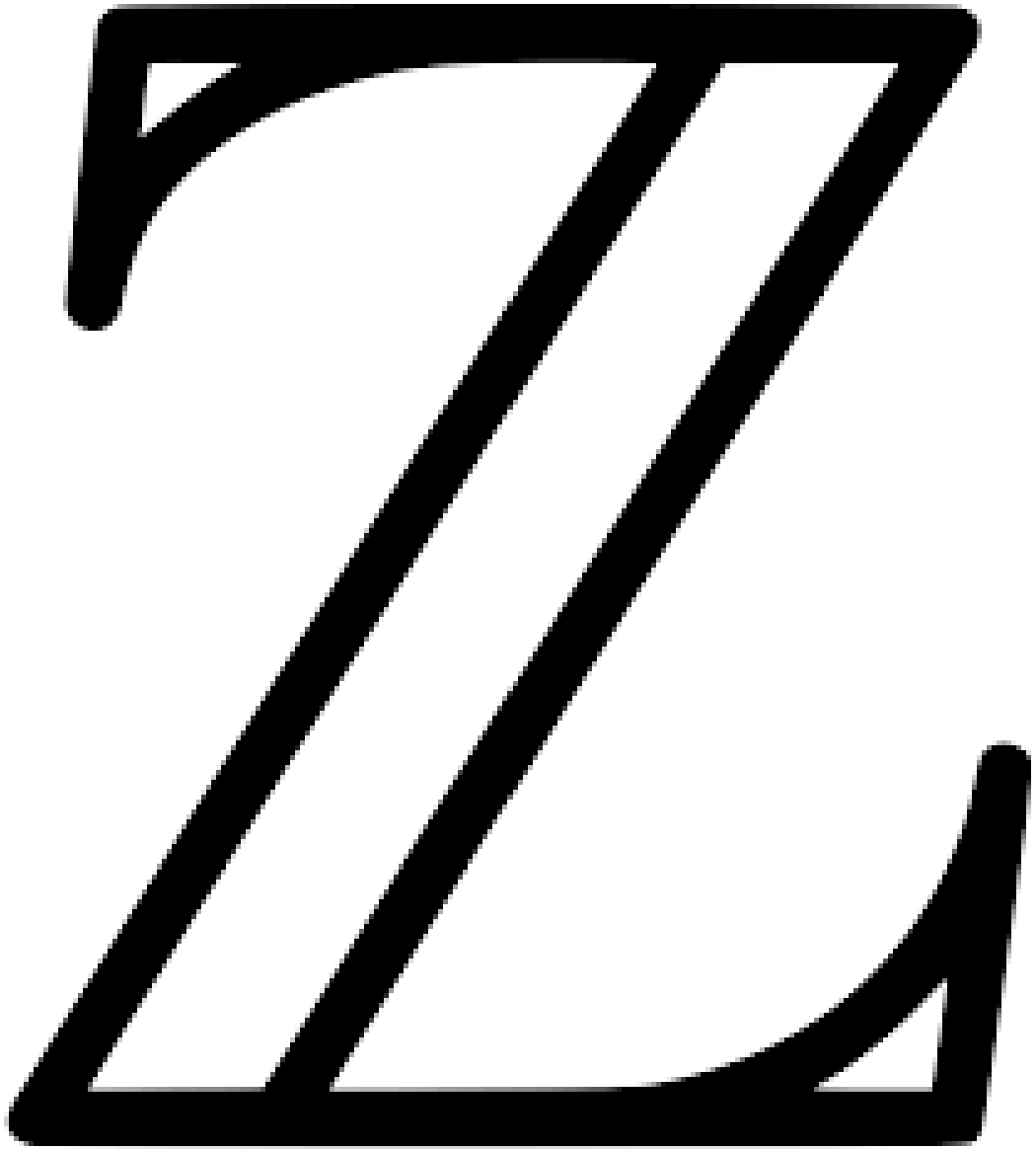
Natural Numbers

- We use these numbers to count.
- These numbers came about in around 4000 BC.
- How many apples are in this basket?
- So, natural numbers are 1,2,3,4 etc.

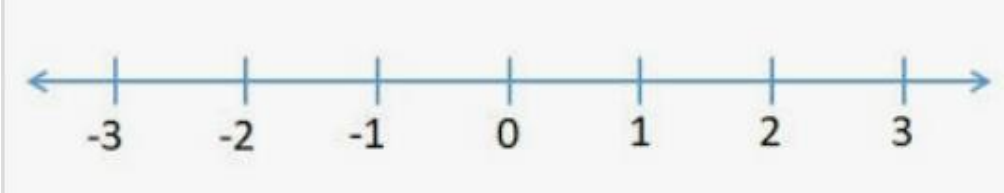
- What about zero?

Zero is tricky. It is also a Natural Number. It came later, about 3000 years ago.

How can we count, if there is nothing to count? The second picture is just an empty basket!



Integers – does this help?



Why Z and not I?

It's taken from the German word Zahlen meaning "numbers"!

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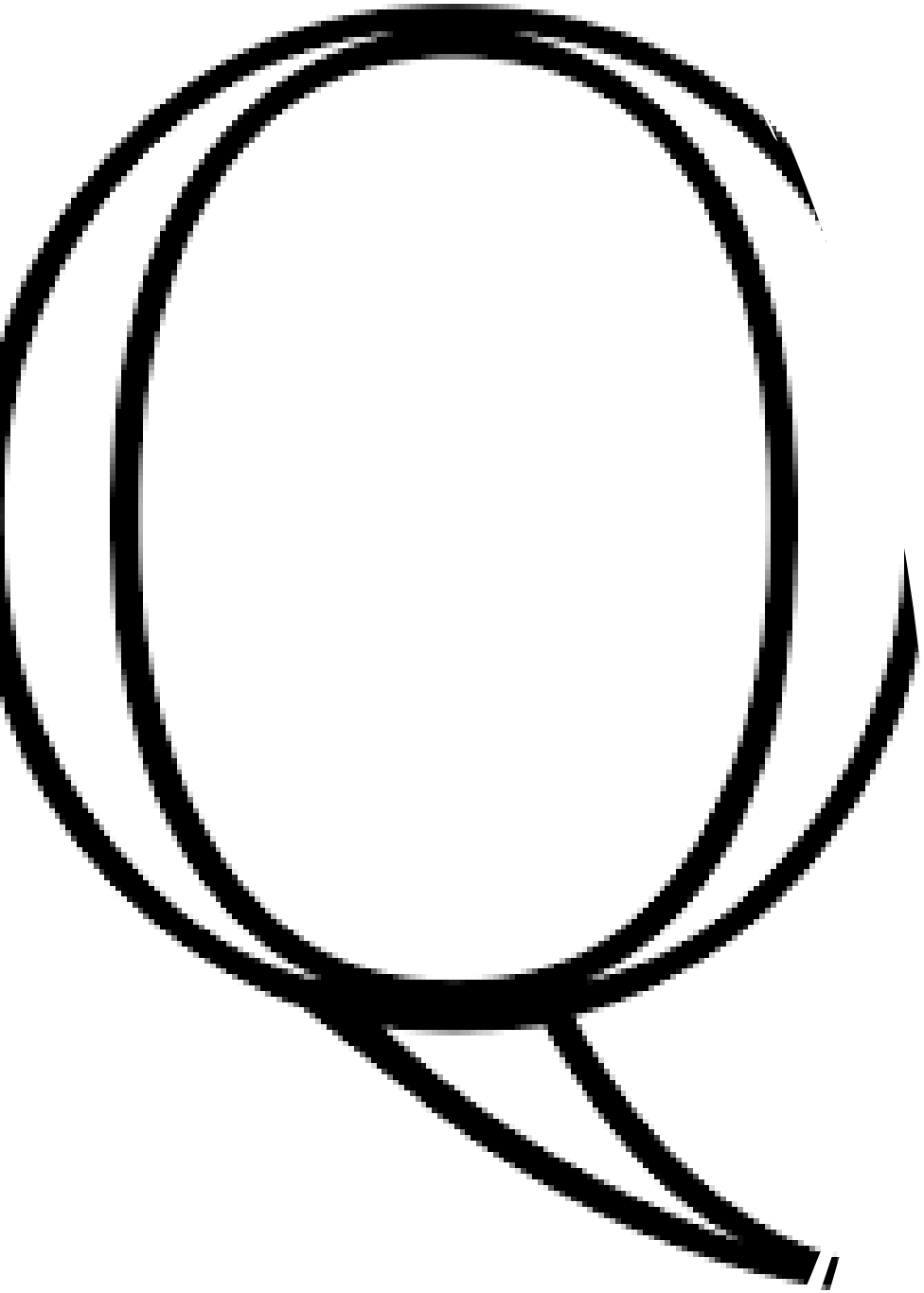


Rational Numbers

A Rational Number can be made by dividing an integer by an integer.

E.g. 1.5 is a rational number. 1.5 = 3/2 (3 and 2 are both integers)

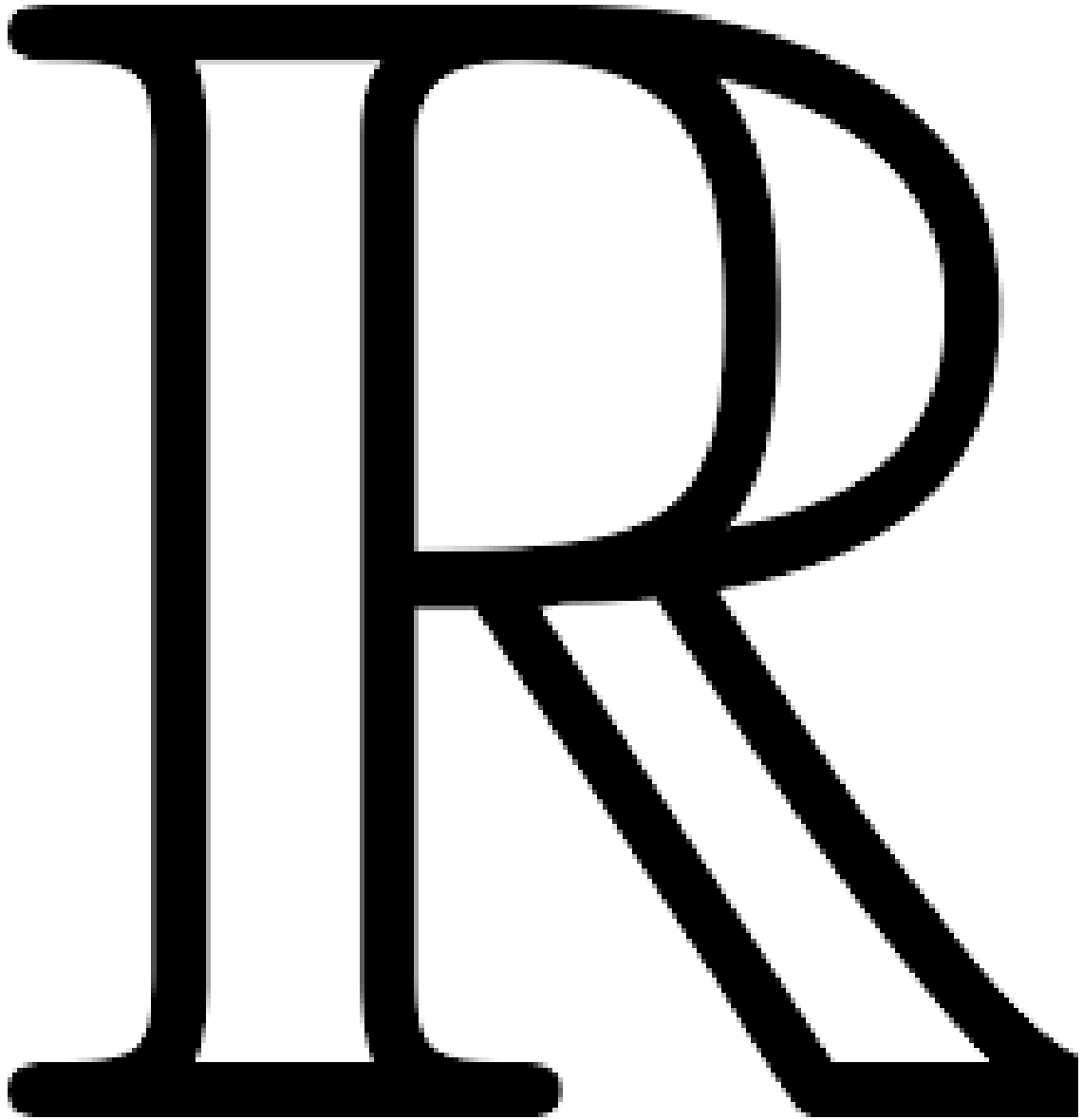
Why Q and not R?

Well, Q stands for "Quotient"

Real Numbers

- Real numbers can be thought of as points on an infinitely long line called the number line or real line: an infinite decimal expansion!

- They are positive, negative, large, small, fractions, decimals



Complex Numbers

- A complex number is part of a number system that extends the real numbers with a specific element "i". This is called the imaginary unit.

So, now to crack the code! You need to work out what $\subseteq$ means!

$$\mathbb{N} \subseteq \mathbb{Z} \subseteq \mathbb{Q} \subseteq \mathbb{R} \subseteq \mathbb{C}$$

This is how we order numbers and therefore how we bring order to the universe!

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WoLLoW would like to know…

N is a subset of Z.

Z is a subset of Q.

Q is a subset of R.

R is a subset of C.

So, now can you give an example of each of these subsets?

N

Z

Q

R

C

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