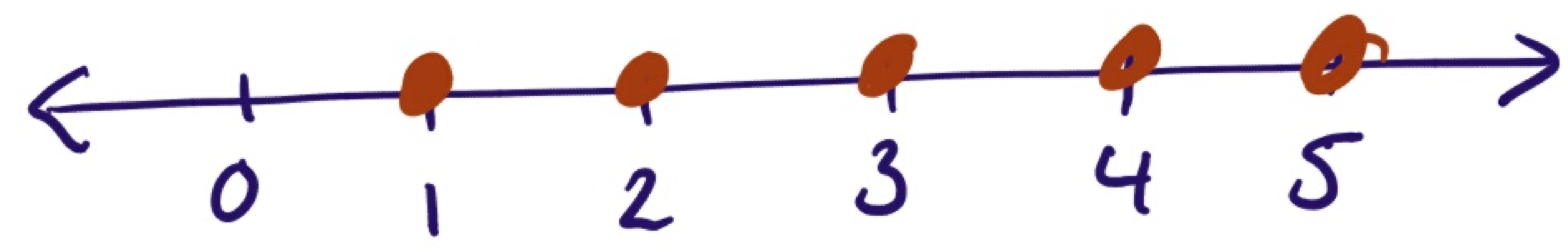
Mon 2/9/19

Number Systems

Pg 23 Log Tables

On the numberline



Use dots

1. Natural Numbers $\mathbb{N}$ $\mathbb{N}$

Set of positive whole numbers starting 1

$\mathbb{N} : \{1, 2, 3, 4, 5, 6, \ldots\}$

Natural Numbers

Odd

Even

Cubed numbers

$1^3, 2^3, 3^3$

1, 8, 27

Prime

-has factors only

2, 3, 5, 7, 11, 13

Perfect Squares

$(-2)^2 = 4$

$1^2, 2^2, 3^2, 4^2$

Natural Numbers

Highest common factor

A factor of a natural number is any natural number that divides evenly into the given number

Eg 1) Find the H.C.F of 16 and 24

Factors 16: 1, 2, 4, 8, 16

24: 1, 2, 3, 4, 6, 8, 12, 24

HCF is 8

Multiples

A multiple of a natural number is itself a natural number into which the natural number divides, leaving no remainder

Lowest common multiple of 6 and 7

LCM 6 : 6, 12, 18, 24, 30, 36, 42, 48

7 : 7, 14, 21, 28, 35, 42,

LCM of 6 and 7 = 42

Primes and prime factors

Only Two factors - the number itself and 1

2 is the only even prime number

Fundamental Theorem of Arithmetic :

Any natural number bigger than 1 can be written as a product of prime numbers

How to find the product of primes for any number :

1) Start with the lowest prime number that divides into the given number evenly keep dividing by primes until you get 1.

Find the prime products of 360

2	360
2	180
2	90
3	45
3	15
5	5
	1

$2^3 \times 3^2 \times 5$

Calculator

[360] [=] [SHIFT] [0999]

number

Composite numbers are made up of prime numbers multiplied together

Find the prime factors of each of the following

1) 290

$= 2 \times 5 \times 29$

2) 5880

$= 2^3 \times 3 \times 5 \times 7^2$

3) 36

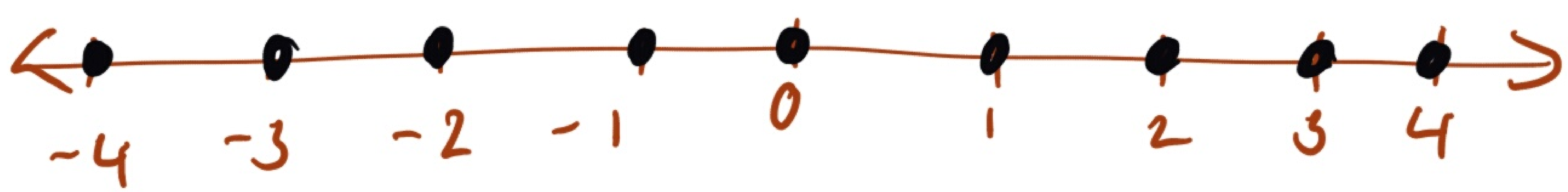
$= 2^2 \times 3^2$

2) Integers

$\mathbb{Z}$ – the set of positive and negative whole numbers

$$\mathbb{Z} = \{ \ldots, -3, -2, -1, 0, 1, 2, 3, \ldots \}$$

On the number line



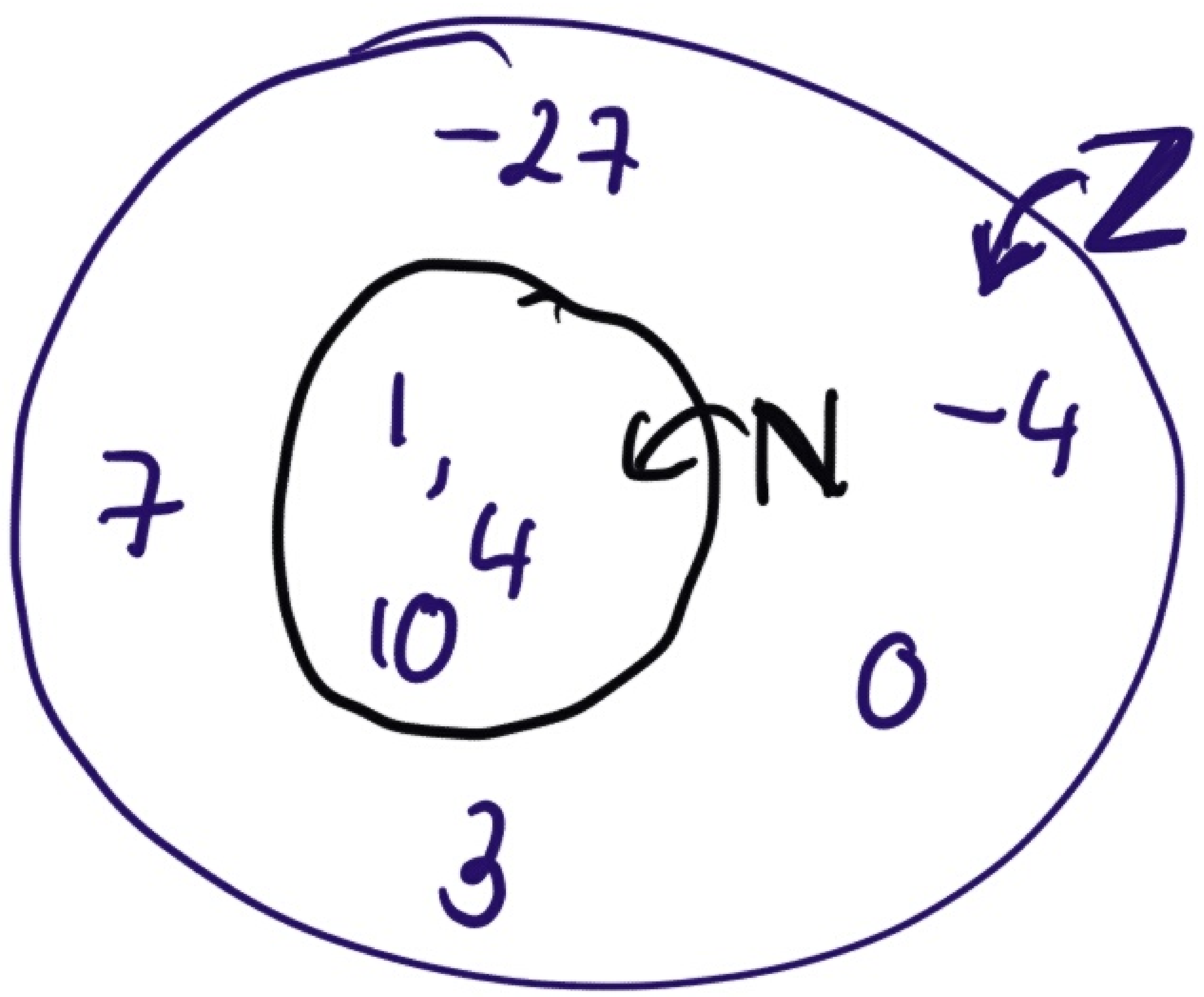
use "dots"

In Sets

Every natural number is an element of the set of integers

So $\mathbb{N}$ is a subset of $\mathbb{Z}$ $\qquad \mathbb{N} \subset \mathbb{Z}$

$\subset$



Pg 187

Q1+2

3) Rational Numbers $\mathbb{Q}$ - quotient (ratio)

A rational number is the result of dividing two integers
It is in the form $\frac{p}{q}$ where p and q are
integers and $q \neq 0$ (we can't divide by 0)

$$\frac{p}{q} = \frac{\text{numerator}}{\text{denominator}}$$

Log 23

$$\mathbb{Q} = \left\{ \frac{p}{q} \mid p \in \mathbb{Z}, q \in \mathbb{Z}, q \neq 0 \right\}$$

We can write any integer as fraction, by putting
it over 1 Eg -3 can be written as $\frac{-3}{1}$

H/W Pg 188 Q3-4

Q4 $\cdot 7 \Rightarrow \frac{7}{10}$

$1.2 \rightarrow \frac{12}{10} = \frac{6}{5}$

$\overset{+}{1}\frac{2}{10} = \frac{12}{10}$

x

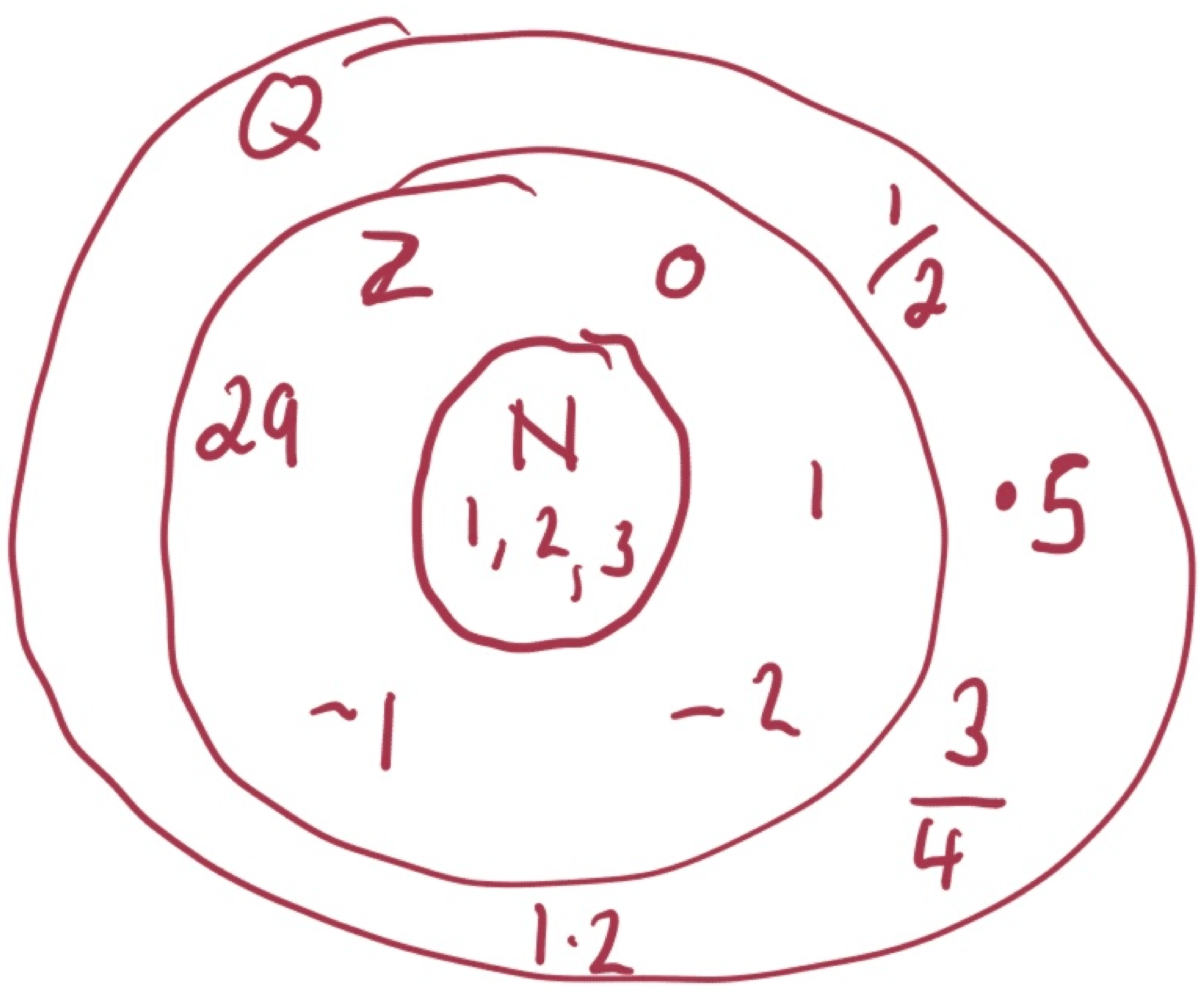
$2.6 \rightarrow \frac{26}{10} = \frac{13}{5}$

$8.2 \rightarrow \frac{41}{5}$

$0.005 \rightarrow \frac{1}{20}$

Every integer is an element of Q since -3 and be written $\frac{-3}{1}$

Thus $N \subset Z \subset Q$



4 Irrational numbers

Cannot be expressed as a ratio of integers so it cant be written in the form $\frac{p}{q}$

Cant be represented as a terminating decimal

It is a repeating, non terminating decimal

Egs of irrationals

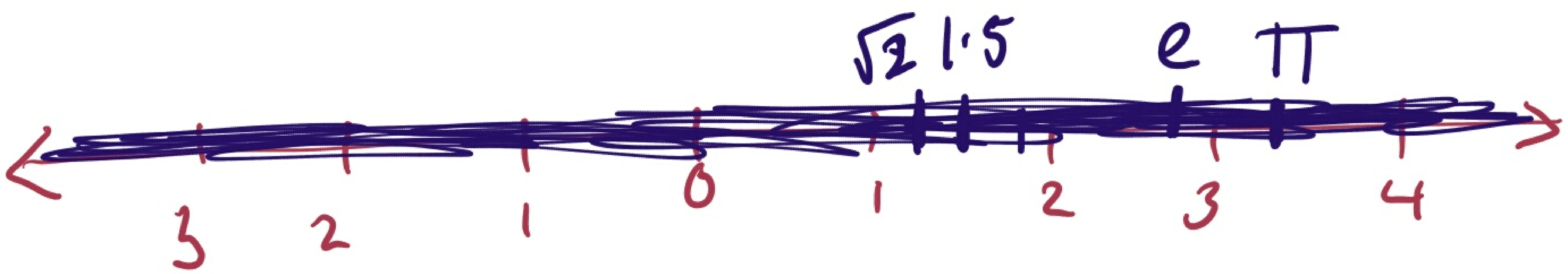
$\pi \approx 3.14$

e = eulers constant ≈ 2.7

Square root of primes $\sqrt{2} \approx 1.41421$

The set of all real numbers $\mathbb{R}$, includes ALL the rational and irrational numbers

Numberline

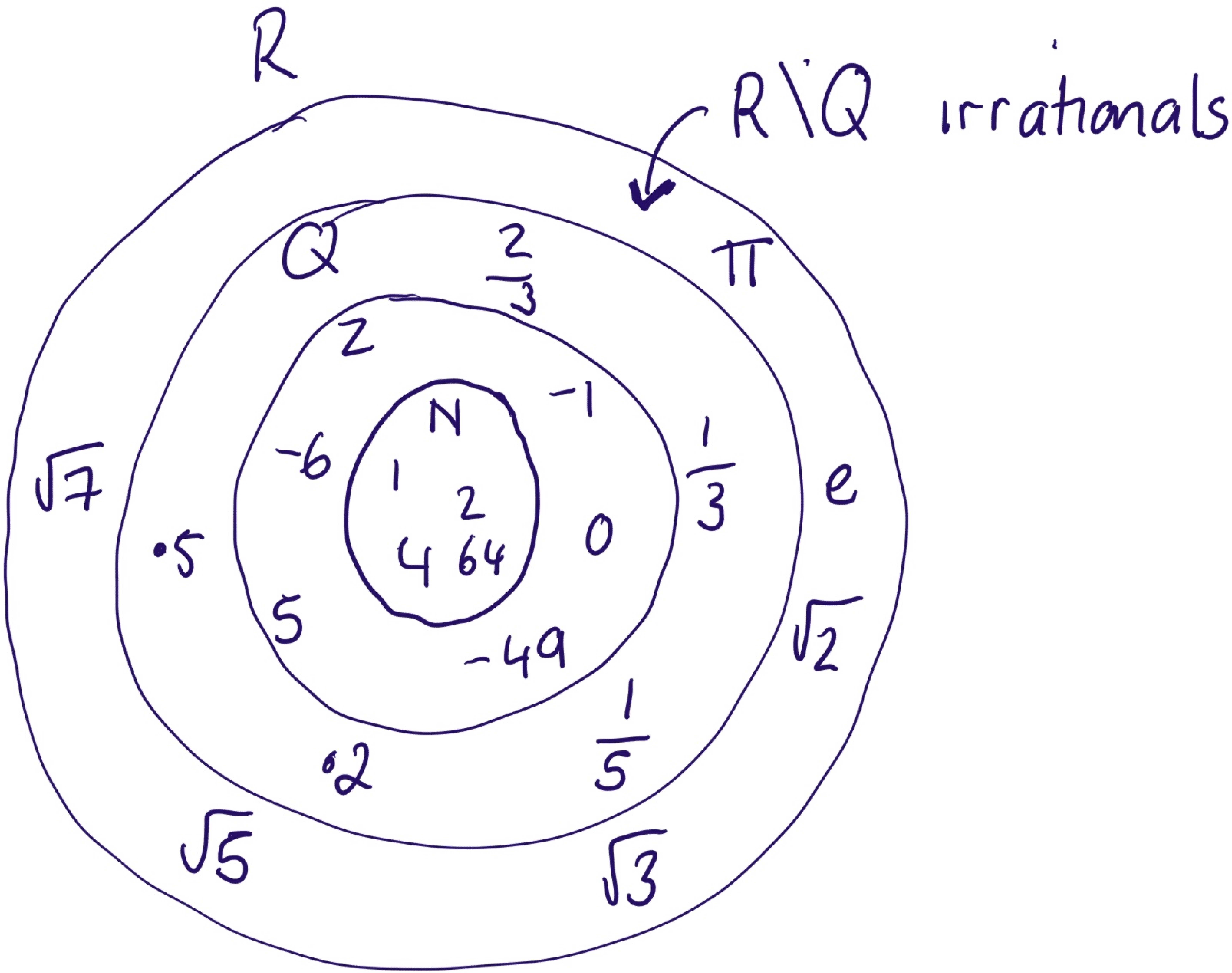


$\mathbb{R} \rightarrow$ river

heavy thick line

Real Numbers – all the numbers.

Irrational Numbers $\rightarrow \mathbb{R} \setminus \mathbb{Q}$ r without Q



C/W
Pg 188
Q5+6

H/W
Pg 188
Q 7