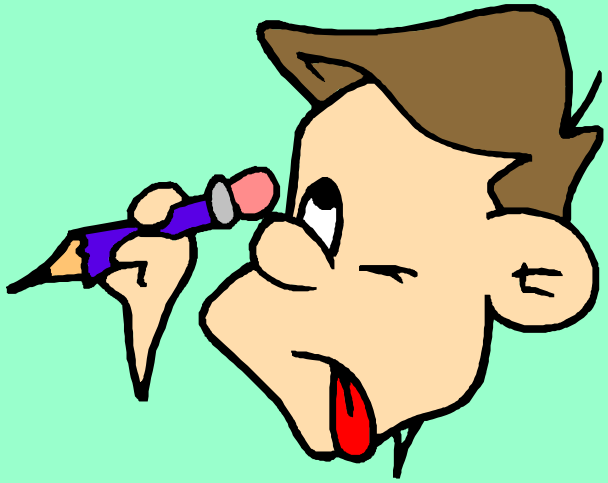
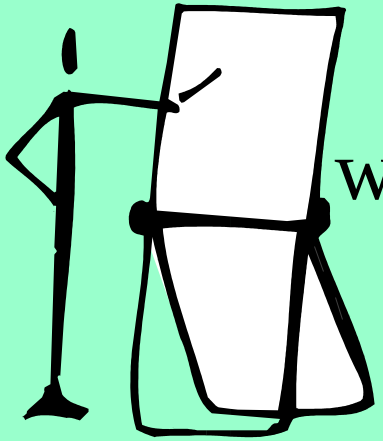


1.

Set Notation



SET –

a collection of **distinct elements** where **there is a rule** to decide if an element is a member of the set

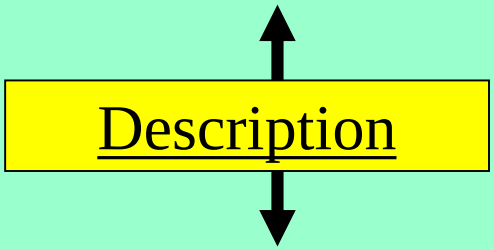
Sets

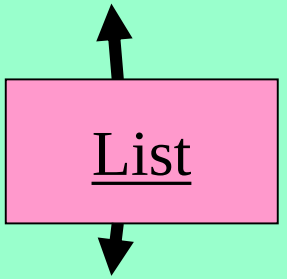
A set is a collection of items which have some common property.

These items are called the members or elements of the set.

Sets can be described or listed using "curly bracket" notation.

eg {colours in traffic lights} = {red, amber, green}





eg {square nos. less than 30} = { 0, 1, 4, 9, 16, 25}

In maths we use symbols as shorthand for words. Therefore you must learn the following:

Copy the following

Notation & Terminology

$\in$	means "belongs to or is a member of"
$\notin$	means "does not belong to or is not a member of"
$\{\ \}$	means " the empty set" i.e. there are no members
Subset	part of a set
Domain	The set of numbers it is possible to input into a function
Range	The set of possible numbers for your answer
Element	An element is a member of a set

Standard Sets

Numbers can be split up into “sets”. Numbers can belong to more than one set.

¥ (N) natural numbers $\{1, 2, 3, 4, 5.....\}$

W (W) whole numbers $\{0, 1, 2, 3, 4.....\}$

¢ (Z) integers $\{-3, -2, -1, 0, 1, 2, 3...\}$

¤ (Q) rational numbers

Any number which can be written as a fraction or a ratio

$\{1, -4, 0.4, \frac{55}{100}....\}$

¡ (R) real numbers

all possible numbers

$\{-2, -\frac{1}{6}, 0.125, \sqrt{2}, \pi\}$

We should also note that

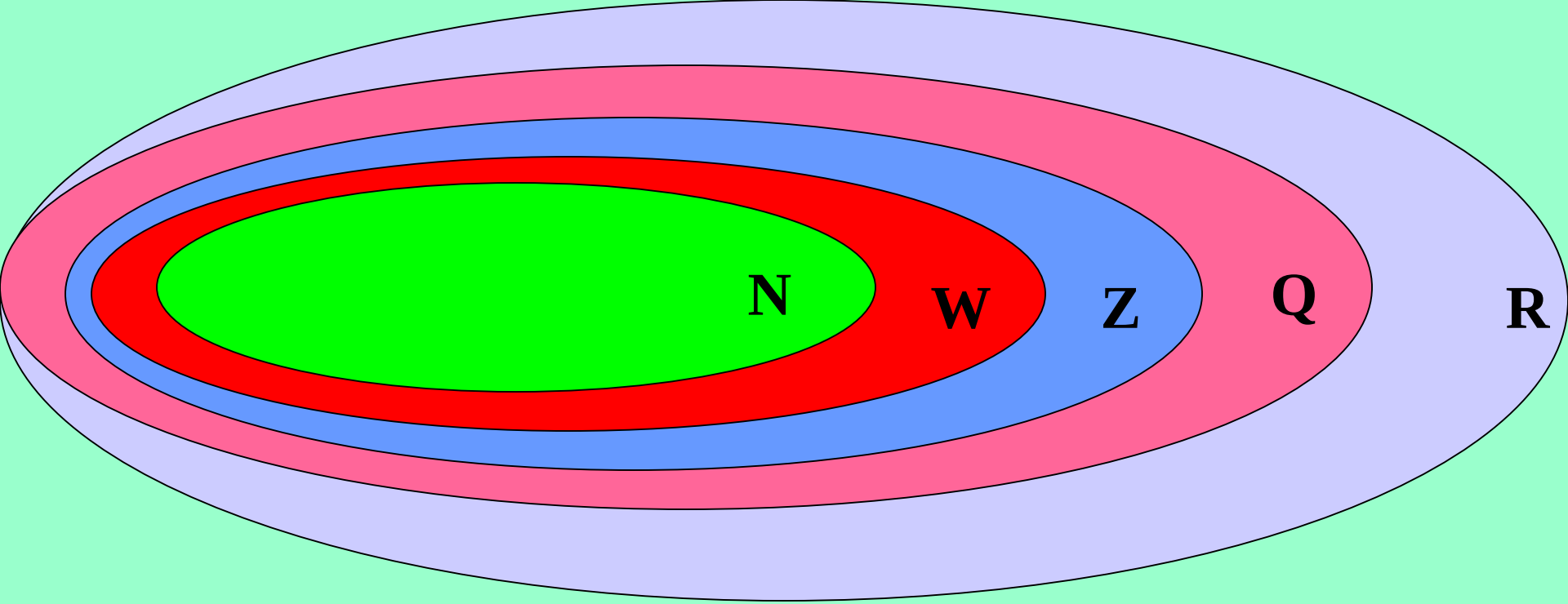
N “fits inside” W

W “fits inside” Z

Z “fits inside” Q

Q “fits inside” R

This can represented diagrammatically as follows:



When one set can fit inside another we say that it is a <u>subset</u> of the other.

The members of R which are not inside Q are called <u>irrational</u> numbers. These cannot be expressed as fractions and include π , $\sqrt{2}$, $\sqrt[3]{5}$ etc

Example 1:

Variable Rule Domain

List all the numbers in the set P where $P = \{x : 5 < x < 10 : x \in W\}$

Solution:

P = {6, 7, 8, 9}

Range

Example 2:

Variable Rule Domain

List the set defined by $G = \{x : x^2 + 2x - 3 = 0, x \in W\}$

Solution:

Here the members of the set G are the solutions to the quadratic.

So if: $x^2 + 2x - 3 = 0$

$(x+3)(x-1) = 0$

Not a whole number!! $x = -3$ or $x = 1$

$G = \{1\}$

Heinemann , p.23, EX 2A (ALL)