

a well defined collection, the ways of writing one, and what happens when two are combined

What makes a collection a set

- a **set** is a well defined collection of distinct objects, and each object in it is called an **element**
- **well defined** means there is no argument about membership: the collection of prime numbers under 20 is a set, the collection of tall students is not
- sets are named with **capital letters** and elements with small ones, so A is the set holding 1, 2 and 3, written inside braces
- $a \in A$ is read as a belongs to A , and $a \notin A$ as a does not belong to A
- elements are **not repeated**: a roster listing 1, 2, 2 and 3 is simply the set holding 1, 2 and 3
- **order does not matter**, so a roster reading 1, 2, 3 and one reading 3, 1, 2 describe the same set

Two ways to write the same set *

Roster form

- **list every element** inside braces, separated by commas
- A is the roster holding 2, 3, 5, 7 and 11
- clear and direct, but **impractical for a large set**
- for an endless set, three dots stand for the rest, as in the naturals 1, 2, 3 and onwards

Set builder form

- **state the rule** the elements satisfy
- A is the set of all x such that x is prime and x is under 12
- the bar inside the braces is read as **such that**
- compact, and it works however large the set is

a question may ask you to convert one form into the other, so practise reading a rule into a list and writing a list as a rule