0.1 Elements of a Set

- Sets are comprised of members, which are often called **elements**.
- If a particular value (k) is an element of set A, then we would write this as

$$k \in A$$

- If a single value k is not an element of set A, then we write

$$k \notin A$$

0.2 Subsets

Given two sets A and B, the set A is a **subset** of set B if every element of A is also an element of B.

We write this mathematically as

$$A \subseteq B$$

Sets are denoted with curly braces, even if they contain only one element.

Subsets

Suppose we have the set A comprised of the following elements

$$A = \{3, 5, 7, 9\}$$

The value 5 is an element of A

$$5 \in A$$

The single element set $\{5\}$ is a subset of A.

$$\{5\} \subseteq A$$

1 Elements of a Set

A set is defined completely by its elements. Formally, sets X and Y are the same set if they have the same elements; that is, if every element of X is also an element of Y, and vice versa. For example, suppose we define:

$$F = \{x | (\text{x is an integer) and } 0 < x < 4)\}$$

The equivalence of empty sets has a ***metaphysical*** consequence for some theories of the metaphysics of properties that define the property of being x as simply the set of all x, then if the two properties are uninstantiated or coextensive they are equivalent - under this theory, because there are no unicorns and there are no pixies, the property of being a unicorn and being a pixie are the same - but if there were a unicorns and pixies, we could tell them apart. (See Universals for more on this.)

Elements and subsets

The $\in$ sign indicates set membership. If x is an element (or "member") of a set X, we write $\in X$; e.g. $3 \in A$. (We may also say "X contains x" and "A contains 3")

A very important notion is that of a subset. X is a subset of Y, written $X \subseteq Y$ (sometimes simply as$X \subset Y$), if every element of X is also an element of Y. From before $C \subseteq A \subseteq E$.

Sets containing Sets

Sets can of course be elements of other sets; for example we can form the set $G = \{A, B, C, D, E\}$, whose five elements are the sets we considered earlier. Then, for instance, $A \in G$. (Note that this is very different from saying $A \subseteq G$)

1.1 Equivalent Sets

If both of the following two statements are **true**,

$$1)\ A \subseteq B$$

$$2)\ B \subseteq A$$

then A and B are **equivalent sets**.

Non-Comparable Sets

If both of the following two statements are **false**,

$$1)\ A \subseteq B$$

$$2)\ B \subseteq A$$

then A and B are said to be said to be **noncomparable sets**.