Sets:

A set is an unordered collection of objects.

Ordered list is called a tuple.

An object is called an element of a set if the object belongs to the set.

If two or more elements of a set are the same then all of them are just one element of the set.

Complement to a set includes all elements which are NOT in the set. Complement is equivalent to negation.

Venn diagram is a good way to deal with sets:

https://en.wikipedia.org/wiki/Venn\_diagram

A subset of a set includes some or all elements of the set.

A proper subset of a set includes only some, NOT all elements of the set.

An empty set has no elements and is a subset of any set.

Universal set includes all elements and all sets are subsets of universal the set.

Cardinality of a set is the number of elements in it.

Power of a set is the number of all subsets of the set.

We use combinations to find the number of subsets because order does NOT matter.

Power of a set = 2^c, here c = cardinality of the set. It is proved using binomial series.

Sets are logic: if a belongs to set A then the outcome is true or 1, if a does NOT belong to set A then the outcome is false of 0.

Intersection of sets is equivalent to conjunction (AND), logical multiplication.

Union of sets is equivalent to disjunction (OR), logical addition with exclusion.

Cardinality of a union = sum of individual cardinalities – cardinality of intersection.

In additional to classical discrete math sets, there are fuzzy sets and quantum logic.

https://en.wikipedia.org/wiki/Set\_theory