

A *set* is a collection of objects.

The objects in a set are the *elements* or *members* of the set.

→ Always enclose the elements of a set in curly brackets.

A set with the numbers $-1, 1, 0$ would be written as

where $x \in S$ is read “is an element of”

Define $S =$

More notation:

- 0 is the symbol for the real number zero
- $\{0\}$ is a set with one element, the real number zero
- \emptyset is a set with zero elements, the empty set. Alternative is $\{\}$.
- $\{\emptyset\}$ is a set with one element, the symbol for the empty set.

Two sets are *equal* ($=$) if they contain exactly the same elements (order doesn't matter).

They are *not equal* (\neq) if they don't contain the same elements.

Set builder notation: Describe the set in terms of its properties,

Roster notation: List the elements of the set.

Subset:

Set B is a subset of set A (written $B \subseteq A$) if every element in B is in A .

Proper Subset:

Set B is a proper subset of set A (written $B \subset A$) if $B \subseteq A$ and $A \neq B$.

Universal set:

The set from which all the member of other sets will be drawn. Called U .

Venn Diagram notation:

- A rectangle represents the universal set
- Circles are sets in the universal set.

Example: Show the relationship between E and F (defined above) in a Venn diagram.

Given a set A and a universal set U , the elements that are in U and are NOT in A is called the ***complement*** of A or A^c .

Example: From the last example, E is the set of positive even integers less than 17, what is E^c in roster notation?

Those elements that belong to both A *and* B are in the *intersection* of A and B , $A \cap B$.

Example: Let $U = \{x|x \text{ is a card in a standard deck of 52 playing cards}\}$
 $R = \{x|x \text{ is a red card}\}$ and $Q = \{x|x \text{ is a queen}\}$

Find $R \cap Q$ in roster notation.

If two sets have no elements in common, that is $A \cap B = \emptyset$, then the sets are *disjoint*.

Example: If $K = \{x|x \text{ is a king}\}$, find $K \cap Q$ in roster notation.

Those elements that belong to A *or* B are in the *union*, $A \cup B$.

Note: this is the *inclusive or*, not the exclusive or

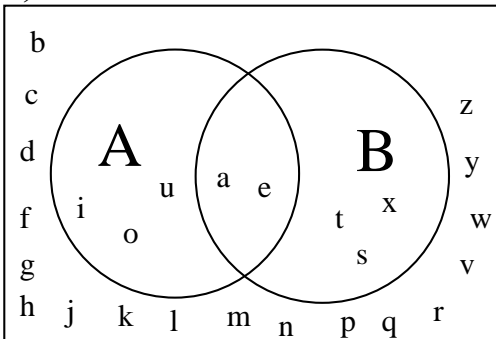
Example Let $U = \{x|x \text{ is a card in a standard deck of 52 playing cards}\}$
 $H = \{x|x \text{ is a heart card}\}$ $Q = \{x|x \text{ is a queen}\}$

Find $H \cup Q$ in roster notation.

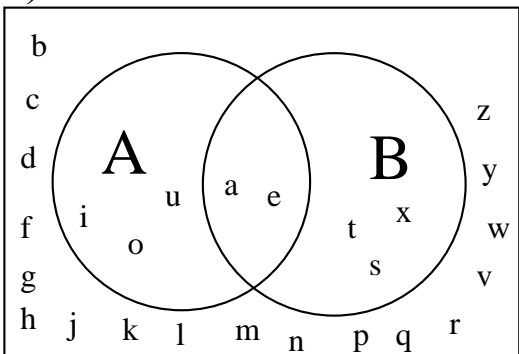
Example Let $U = \{x|x \text{ is a letter in the English alphabet}\} = \{a, b, c, \dots, z\}$
 $A = \{x|x \text{ is a vowel}\} = \{a, e, i, o, u\}$
 $B = \{x|x \text{ is a letter in the word texas}\} = \{t, e, x, a, s\}$

Find the following sets in roster notation.

a) What is $A \cap B$?



b) What is $A^c \cap B$?



c) What is $A \cup B^c$?

