The Empty Set

What is the "empty set?" The empty set is a set containing no elements. It is written as { } or $\emptyset$

So, how can "nothing" be "something?" When we form a set with no elements in it, we no longer have nothing. We have a set with nothing in it. This is the empty set.

If you consider {5}, which is a set containing the element 5. The set {5} is not a number. It is a set with the number 5 as an element, whereas 5 is a number.

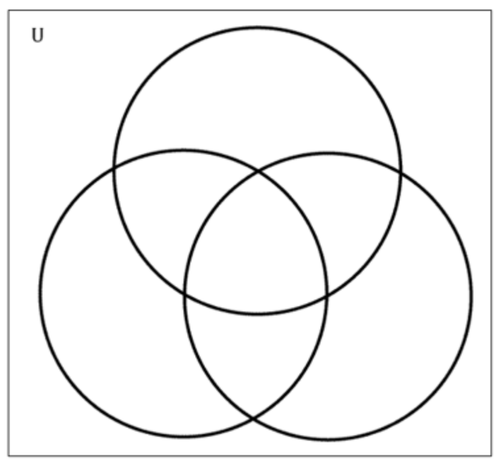
In a similar way, the empty set is not nothing. Instead it is the set with no elements. It helps to think of sets as containers, and the elements are those things that we put in them.

Why is the empty set a subset of every set?

It is confusing to think about. A subset of another set is defined as a set whose elements are all elements of the other set too. Because the empty set contains no elements, this condition always holds.

Review Problem:

Use the sets A, B, and C to find the following. Use the Venn Diagram to make things easier.



$A = \{-2, -1, 0, 1, 2\}$ $\quad$ $B = \{1, 2, 3, 4, 5, 6\}$ $\quad$ $C = \{1, 3, 5, 7\}$

1. $A \cap B =$
2. $B \cap C =$
3. $A \cup C =$
4. $(A \cup B) \cap C =$
5. $(B \cap C) \cup A =$

Use the sets A, B, and C to determine if each statement is true or false.

6. $B \subset Z$
7. $C \subset W$
8. $N \subset B$

Additional Symbols and Meanings

$\cup'$ - "the compliment of the union"	All elements NOT in the union of the sets. To find these elements: 1. find which elements are included in the union of the sets 2. All elements not included in the union will be your answer
$\cap'$ - "the compliment of the intersection"	All elements NOT in the intersection of the sets. To find these elements: 1. find which elements are included in the intersection of the sets 2. All elements not included in the intersection will be your answer
A' – "the compliment of the set A"	All elements NOT included in set A

Use the sets A, B, and C (from the above example) to find the following.

9. $A' =$

10. $B' =$

11. $C' =$

12. $(A \cap B)' =$

13. $A' \cap C =$

14. $(B \cup C)' =$