



What is Infinity

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What is Infinity?

- Infinity, many people think it's the largest number in the world. Some people think it doesn't exist, or it's impossible to exist.
- The simplest definition for infinity is that it is a boundless number that is larger than any natural number. But it's deeper than that. Way deeper. "Infinitely" deeper.



Representation of Infinity

- As many people may know, infinity is represented by a sideways eight. This common symbol for infinity was invented by an English mathematician John Wallis in 1665.
- It's not obvious why he chose this symbol to represent infinity, but historians' comment that the shape resembles an endless curve.



Infinity symbol

Cardinals and Ordinals

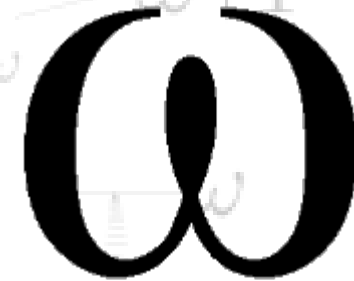
- To understand infinity, we must know what “cardinal numbers” and “ordinal numbers” are.
- Cardinal numbers are called the number of elements in a set (ex. The number set $[2, 4, 6]$ has a cardinality of 3). In a finite set, a cardinal number must be a natural number (1, 2, 3, etc.).
- For infinite sets, infinite cardinal numbers have been introduced, which are represented with the Hebrew letter aleph, which is marked with a subscript to indicate their rank.

The Aleph
letter



Ordinals

- Ordinal numbers are numbers that define the position/order of something in series, such as 'first', 'second', and 'third'. Ordinal numbers are commonly used to count beyond 'infinity'.
- An infinite set can be enumerated with ordinal numbers by first defining ordinal numbers as linearly ordered labels that include natural numbers (1, 2, 3, etc.), and have the property that every set of ordinals has a least element.
- To enumerate an infinite set, we can use the number 'omega', a transfinite number that is uncountable and greater than every natural number. We can count beyond 'omega' with 'omega + 1', 'omega + 2', 'omega + 3' and so on.



Omega symbol

Different Types of Infinity

- There are two main types of infinity Mathematical infinity and Physical infinity.
- In mathematics, infinity is seen as a number simply greater than every natural number. It refers to something without a limit or endless.
- Physical infinity is a way to describe extremely large distances in our world, such as space. Realistically, there is no physical infinity, physical infinity is only used to describe something large in the real world.

Conclusion

- Infinity has many different forms and is not truly a number. Rather, it is a 'kind' of number. Infinity could be seen as a concept, a concept that boasts that there is a number that is endless.
- Infinity is like a generalisation of concepts within it, such as aleph or omega, but there are many more concepts hidden inside infinity.