ISSN 2229-5518

Comparing and Contrasting the Concept of Infinity

Areej Alshareef

Comparison

Generally, infinity refers to endless or unlimited ventures or aspects which exceed the size of any number. In mathematics, something small than any positive number is defined to be infinitely small. The nature of infinity initially bordered along the speculation lines of philosophers such as Eudoxus of Cnidus and Zeno of Elea. According to Eudoxus of Cnidus, the method of exhaustion is determined by small quantities that are infinite (Field, 1997). However, Zeno of Elea's ideas of infinity revolves around many paradoxes. The concept of infinity is used in mathematics and other sciences, particularly physics and it helps to derive solutions to various theoretical and practical problems. Mathematically, infinity is regarded as a number to measure endless things but it is different from the absolute numbers. Towards the end of the 19th century and the beginning of 20th century, Georg Cantor attempted to develop a definite context regarding infinity in terms of cardinalities (Strogatz, 2012). The latter refer to differently sized infinite sets. For instance, one count infinite seta of integers but cannot count an infinite set of absolute numbers.

Commonly in mathematics, ∞ is a symbol for infinity. In 1657, an English Mathematician known as John Wallis invented the symbol. Infinity can be viewed in the aspect of metaphysics, physics and mathematics (Field, 1997). In the aspect of mathematics, the endless sequence of counting numbers depicts infinity. In physics, the concepts of infinity are mostly spatial and they are defined in terms of the measurement and endless existence of natural bodies. In the metaphysical aspect, infinity concepts are viewed in terms of ultimate entities and their subjects. For example, discussions, which revolve around the existence of God and his creations. It is therefore difficult to decipher infinity. The rationality of calculus subjects can be mind boggling to most mathematics students because they grapple with the definition of series and limits. Therefore, more research on infinity should be conducted to develop a comprehensive analysis.

In spite of earlier misconceptions and rejections of earlier infinity concepts, the modern mathematical community accepts different particular concepts (Strogatz, 2012). Potential and actual infinity are the two major concepts in this regard. Actual infinity can be explained as that which majorly challenges the intelligence of human beings such as the infinity of real numbers and the infinity of the world (Field, 1997). On the other hand, potential infinity is more dynamic and can be identified in various ways. There is an endless continuation to processes that appear finite at every moment. One can rationalize this by observing the fact that he or she perceives that every natural number is followed by another regardless of his or her knowledge of the entire set of numbers (Tubbs, 2009).

It is important to challenge oneself and pose questions such as if 1/0 = infinity, then does it mean that 1/infinity = 0? To translate this expression in words, if an item is divided among an infinite number of individuals, does it mean that nobody gets anything. There must be items available. Therefore, one can argue that 1/infinity = infinitesimally small. However, it is still possible that 1/infinity=0 is a common misconception because if the sentence is analyzed critically, it appears to be meaningless. This realization therefore is inclined towards infinity being a concept and not a number. Limitlessness is a character of the concept and using it with any mathematical operator such as +, -, x, and / does not make sense (Strogatz, 2012). These symbols are only workable with numbers.

There are natural and formal concepts of infinity. A reflection on finite experiences instigates infinity concepts because they are channeled to an extension of the infinite. These reflections depict natural infinities (Tubbs, 2009). Dividing a person by a concept tends to be senseless as the reflections define infinity as a concept. One can also not add a number to infinity or subtract a number from it and expect a logical result. Since infinity in this case is a concept, one can replace it with a concept such as justice and the expression will be meaningless.

However, in mathematics there is an element called limit and those who attempt to justify 1/infinity = 0 argue on this basis. Infinity in this regard is used as shorthand (Tubbs, 2009). As they divide people or items by infinity, they know that it does not create meaning but they attempt to create closeness to 0 by dividing 1 by higher numbers that are successive (Strogatz, 2012). The fraction obtained from dividing 1 by a very large number actually represents a small number. Therefore, it is true to say that the higher the denominator, the smaller the number or outcome, which is definitely not 0. 1 can continuously be divided by successively larger numbers since one cannot determine the largest number. The process is endless and denotes infinity.

Experiences in the finite world help in developing natural concepts of infinity. Rationalizing inconsistencies requires building formal conceptions of infinity through formal deductions. The measuring properties of a number can be extrapolated to interpret infinity intuitions as opposed to the cardinal number theory derived from the Cantorian counting paradigm (Strogatz, 2012). The measuring intuition of infinity defines the infinity status while the cardinal infinity claims that the two line segments have equal infinity measure regardless of length. For instance, according to the measuring tuition, if the line segment AB is double in length when compared to CD, the line segment AB has twice as many points as CD. Therefore, students can have a natural interpretation of infinity in this aspect, as the idea is more reasonable.

References

Field, J. V. (1997). *The invention of infinity: Mathematics and art in the Renaissance*. Oxford: Oxford University Press.

Strogatz, S. H. (2012). *The joy of x: A guided tour of math, from one to infinity*. Boston: Houghton Mifflin Harcourt.

Tubbs, R. (2009). *What is a number?: Mathematical concepts and their origins*. Baltimore: Johns Hopkins University Press.