

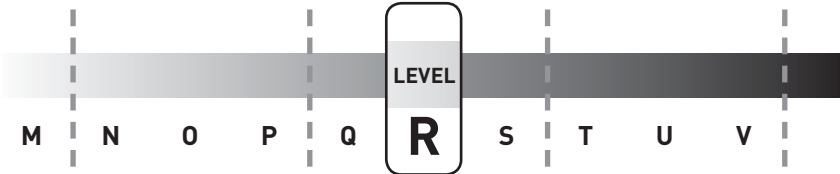


INFINITY

BY JULIE ELLIS

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SAMPLE

WHAT IS INFINITY?

You have probably heard of the word “infinity.” You may have even used it before. Maybe you stood on a beach wondering how many grains of sand were there. Have you ever looked up at the night sky and wondered what lay beyond the most distant star? Maybe you played a counting game with a friend once. When she said “a trillion,” you thought you could win by saying “infinity.” Is infinity a number? Is it a place you can reach? Can anything be beyond infinity?

Even though it would be very hard and time consuming to count the grains of sand on the beach, you’d eventually finish counting each one. Infinity isn’t the biggest number you can count. Infinity isn’t the farthest distance you can reach. The word “infinity” literally means “without end.”

THE BEGINNINGS OF INFINITY

Don't worry if you do not fully grasp the meaning of infinity. People have been confused over the idea for thousands of years. A long time ago, around 1800 B.C., mathematicians in India started discussing the idea of infinity. They said that if you take away a part of infinity, you'd still be left with infinity. However, if you add something to infinity, you would also still have infinity. About a century later, other mathematicians in India talked about different types of infinity. One kind of infinity was a line that went forever in one direction. Yet, infinity could also be a line that went forever in both directions.

About the same time, in a different part of the world, the ancient Greeks also wondered about things that went on without end.

They didn't have a word for infinity, but they had the idea. A Greek **philosopher** named Zeno thought of a paradox, or a contradiction – something that seems both possible *and* impossible at the same time. Zeno imagined a person traveling from City A to City B. In order to get there, the person would have to travel $\frac{1}{2}$ the distance first. Then, the person would have to travel $\frac{1}{2}$ the remaining distance, or $\frac{1}{4}$, then half that distance again, $\frac{1}{8}$, then again, $\frac{1}{16}$, and so on and so on. This halving sequence repeats itself forever. So, Zeno **hypothesized** that it's impossible to get from City A to City B. However, people always reached their destinations!

This paradox is based on the idea that no matter how small a **fraction** is, you can always divide it in half again. That means there will always be a small distance left to travel. Even though the distance between City A and City B is a **finite** number, Zeno argued that the journey is infinite.

According to Zeno's paradox, it should be impossible for a traveler to ever reach his or her destination. ▼

