Sample Negative Case

Philosopher Bernard Baruch once stated that "Millions saw the apple fall, but Newton asked why." The very principles that govern our lives each day may be a natural occurrence, that is sure. Gravity existed before Newton. I will not deny that. However, only through experimentation and testing of hypothesis could we know the very nature of this principal. Like a person who invents a robot or a new computer chip, only through determination and imagination could we put the principles to paper; It is because of this and in this way that when faced with the question of Resolved: Mathematics was discovered, not invented, I must firmly stand in the negation. Today, I will first, provide some definitions and observations to clarify my belief, second, by explaining how math has always existed in nature, how math governs the universe without human intervention, and through the Mathematical Universe Hypothesis, I will provide you with three main points that support my belief, and finally, I will leave you with some parting words to think about as this debate moves on.

First, to set forth some basic definitions for this debate.
The term "invent" as defined by Webster's Dictionary means ": to produce (something, such as a useful device or process) for the first time through the use of the imagination or of ingenious thinking and experiment."

The term "discover" as defined by the same dictionary means "to see, get knowledge of, learn of, find, or find out; gain sight or knowledge of (something previously unseen or unknown)."

Taken together, when we invent something, we, through our imagination, determination, and will to learn about the natural world around us and to shape our own world, we can transcribe and translate the principals that govern our lives into things that we do understand. In this way, I will concede that math exists in nature. Two plus two equals four no matter your ability to understand that concept. However, it to express this as an equation and to create means to teach this to others means that we have invented the principles to describe how our lives are governed.

Today, to show this, my first main point will be that the transcription of the principles that describe our lives justifies the title of "invention." As I stated in my introduction, the concept of gravity existed since the dawn of space and time. As gravity is one of the four fundamental forces that rules the universe, it has always been a part of our lives. However, the first person to question this principal was Newton. As we are taught in grade school, after observing an apple falling from a tree, Newton began his quest to show why the apple falls towards the Earth and not higher up into the branches. He tested each theory and hypothesis he created, reworking and transcribing each observation he made. After hundreds of models, he determined he needed a new form of math to show expressions. Thus, he wrote the first calculus textbook. After years of work,

he published his book on the Laws of Gravity. In doing so, he through the use of math and observation, was able to show why the apple falls down. Although the principal existed before Newton and will exist long after, it was though his imagination and desire to know more about the world around him that lead to his work. Going back to my definition of what it means to "invent" we see that it is through the use of imagination and determination that one invents anything. Thus, principals are invented. When Einstein crafted his Theory of Relativity, Hawking's creation of his Black Hole Radiation Theory, or when the first early humans' sough to prove why two plus two equals four, we sought to simplify the natural world into principals that we could understand and teach to others. We invented new ways to of expressing this world, and thus, we invented math.

My second main point is that since you can publish and patent natural things and discoveries, it means you can invent them. In 1980, the Supreme Court ruled that a natural organism can be patented if it's discovery was the world of modification. The court wrote that through the imagination and ingenuity of the scientist, the lifeform came into being from never having been in existence before. When we apply this theory to that of mathematicise, there are similar principals that are upheld by law. Claims and patents having a mathematical formula or an application of laws of nature are patent eligible if they improve a particular process. The Joint Strike Fighter program under which the US and other allied nations developed a fifth-generation single engine aircraft, F-35, for their Navy and Air force is the world's most expensive weapons program. The cost of the
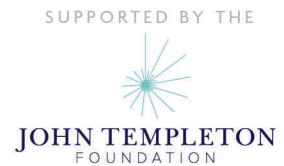
project is near $400 billion. The helmet mounted display (HMD) of F-35 is the most advanced HMD which provides unprecedented situational awareness to a pilot. A single HMD for an F35 aircraft costs $400k. Inventor Thales Visionix Inc sued US Department of Defense asserting the HMD of F-35 infringes claims 1–5, 11–13, 20, 22–26, 32– 34, and 41 of its '159 patent, directed to motion-tracking relative to a moving platform. Elbit Systems of America joined as a third-party defendant as it is the subcontractor that produces the HMDs. The Court of Federal Claims scrutinized the claims of 159 patents under the two-step Alice test and found that the claims are directed to the abstract idea of using laws of nature governing motion to track two objects and provide no inventive concept beyond the abstract idea. In this way, the courts granted that the natural fundamentals of math that existed, as they are applied and described, are an invention of the claim holder and thus, are property.

My third main point is that we shape nature and reality to describe our purpose, not the other way around. Cosmologist Max Tegmark believes that everything in the universe is part of a mathematical structure. All matter is made up of particles, which have properties such as charge and spin, but these properties are purely mathematical. Tegmark states that "If you accept the idea that both space itself, and all the stuff in space, have no properties at all except mathematical properties," then the idea that everything is mathematical "starts to sound a little bit less insane." This, in the view of Tegmark, leads to one big fining. Scientists could in theory predict every observation or

measurement in physics if given enough time to shape a theory or a principal that fit the observations. Though testing and experimentation, we could craft a theory of everything. In short, we could invent a theory. Someday, Tegmark goes on to say scientists will probably be able to describe even consciousness using math.

Today, I have shown that math exists in nature absent humans, but it is only through observation and experimenting that we can know the nature of what we are seeing, because we can place a legal claim and patent on mathematical principals and gain rewards for our work, and because we invent math to shape our understanding of the known universe that I justify that math was invented and not discovered and I stand in firm negation of the resolution. Thank you.